North Alcoa Site
East St. Louis, Illinois
Radiological Survey Report

US EPA RECORDS CENTER REGION 5
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ALCOA, Inc.
City of East St. Louis

January 6, 2012

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1. INTRODUCTION & SCOPE

Radiological surveys and sampling were performed on November 14 through November 18, 2011 pursuant to the Administrative Order on Consent and Statement of Work (AOC/SOW) to conduct a Remedial Investigation/Feasibility Study (RI/FS) for the North Alcoa Site (the Site), East St. Louis (U.S. EPA Docket No. V-W-'03-C-728, signed December 31, 2002) and the North Alcoa Site East St. Louis, Illinois Radiological Survey Work Plan (Work Plan) dated November 4, 2011. Alcoa Inc. (Alcoa) and the City of East St. Louis (the City) are Respondents under the Consent Order with the U.S. Environmental Protection Agency (USEPA).

The Site is defined in the AOC/SOW (page 4) as:

> "Site" or "Facility" or "North Alcoa Site" shall mean the facility as that term is defined at 42 U.S.C. Section 9601(9), which includes the following areas in East St. Louis, Illinois: 1) the property located north of Missouri Avenue, which is approximately bounded by 29th St. to the west, Alton Southern Railroad to the east and Lake Drive to the north; and 2) areas located north of Missouri Avenue where hazardous substances have or may have come to be located from former Alcoa operations.

The overall Site boundary set forth in the first part of this definition is shown in Figure 1. In the interest of facilitating Site redevelopment, the Respondents and USEPA have agreed that the Site will be subdivided into Operable Units. The geographic extent of Operable Unit No. 1 (OU-1) is shown in Figure 2, and includes the bauxite residue impoundments, gypsum areas, and other adjacent areas. Although not yet formalized, the remaining area of the Site may be addressed as Operable Unit No. 2 (OU-2).

This reports details the results of gamma survey and soil sampling activities conducted at the Site in accordance with the Work Plan. The gamma surveys evaluated the site conditions with respect to external radiation levels, measured in units of

microRoentgens/hour (μR/hr). External radiation is one of the primary risk drivers for remediation of the Site. Additionally, the agency has identified 40 CFR 192 as an ARAR for the Site, and this regulation contains closure criteria specified in radiation exposure rate units of μR/hr. The soil sampling evaluated radioactive material concentrations in the surface and subsurface soils.

2. BACKGROUND

Alcoa formerly operated a bauxite refinery in East St. Louis from the early 1900's to the 1950's. The operation removed alumina from crushed bauxite using caustic liquor. The remaining material, termed "bauxite residue," was stored in several Residue Disposal Areas (RDAs). Initially, these areas were natural depressions related to Pittsburg Lake (an oxbow lake) and surrounding swamps. Later, RDAs were extended above grade by constructing perimeter dikes and filling the interior with residue. Perimeter dikes were constructed using another by-product of the bauxite refinery, anhydrite ($CaSO_4$) and/or gypsum ($CaSO_4*2H_2O$).

Over the years, the pH and Sodium Adsorption Ratio (SAR) of some areas of the residue has decreased to a point that the bauxite residue supports growth of vegetation. Generally, vegetation has established in the peripheral and central areas of each RDA, but intermediate areas remain barren.

The Remedial Investigation (RI) collected radionuclide soil concentration data within the RDAs and associated dikes. However, during the RI no radionuclide soil concentration data were collected outside of these Investigative Blocks (IBs). No gamma survey data were collected from anywhere on Site prior to the current investigation, nor were background soil radionuclide concentration or background gamma exposure rate data available either.

Evaluation of the baseline risk at the Site revealed that the primary risk driver is external radiation, with a cancer risk that is an order of magnitude greater than the risk from

inhalation or ingestion of radionuclides or from non-radioactive chemicals via any exposure pathway. For the RDAs (IB-1) and Gypsum Area (IB-2), one of the proposed remediation alternatives is to place a 2-foot cover over these areas. Once a cover is in place, the radionuclide inhalation and ingestion risk drops to zero as there is no complete exposure pathway. Similarly, the chemical risk drops to zero as well. The 2-foot soil cover serves to shield underlying radioactive material, reducing the external exposure to an individual at that location and thus would also reduce the risk due to external radiation. The gamma survey described in this Work Plan will establish the baseline external radiation levels and allow for quantification of the amount of external radiation risk reduction provided by a 2-foot soil cover.

To date, external exposure rates and associated risk have been based upon estimating the external exposure rate from radionuclide concentrations measured in surficial soil samples and the use of reasonable maximum exposure (RME) conditions. However, external exposure levels are driven by wide-area concentrations rather than point-wise conditions. With inhalation or ingestion, the intake can be a relatively small, discrete amount of material which results in the associated risk; however, external exposures are different. External exposure is due to an integration of the radiation exposure from all the material in the vicinity of a receptor. Material up to several meters or even further can contribute to the external exposure at any point. Under these conditions, the RME concentration of radioactive material at any location is not as important as the average concentration in the vicinity of the receptor that contributes to the external exposure.

This concept is contained in the 40 CFR 192 ARAR. 40 CFR 192.12(a) states that the Ra-226 concentration in soil averaged over a 100 square meter ($m^{2)}$ area and averaged over the top 15 centimeters (cm) (6 inches) of depth shall not exceed 5 picocuries per gram (pCi/g) above background. Below the top 15 cm, the concentration shall not exceed 15 pCi/g above background in any 15 cm interval and averaged over a 100 m^2area. This 100 m^2 area is the "vicinity" of the receptor that contributes the bulk of the radiation exposure.

40 CFR 192.12(b)(2) states that the level of gamma radiation shall not exceed 20 μR/hr above background in any occupied or habitable building. There presently are not any buildings within OU-1. However, if this requirement is met outdoors, any building erected at a later date would necessarily have an exposure rate less than 20 μR/hr above background as well. 40 CFR 192.20(b)(1) states that compliance with these 192.12 (a) and (b) requirements should be demonstrated through radiation surveys designed to measure compliance averaged over defined areas (i.e., 100 m^2). This is the basis for conducting the gamma surveys and establishing a correlation between radionuclide concentrations in the soil and gamma exposure rates.

3. WORK PERFORMED

3.1 Methodology

The North Alcoa Site East St. Louis, Illinois Radiological Survey Work Plan (Work Plan) dated November 4, 2011 specified the following activities to be performed:

- Gamma surveys over accessible areas
- Collection of surface soil samples
- Collection of subsurface soil samples
- Determination of background soil concentrations and exposure rates.

Gamma surveys were performed with 3"x 3" NaI detectors connected to GPS-enabled dataloggers at a height of 1 meter above the ground surface. This height equates to the lower torso of most individuals and is considered representative of the exposure to an individual on the site. For areas accessible by an All Terrain Vehicle (ATV), i.e., Kawasaki Mule, surveys were performed on transects spaced approximately 10 meters apart traversed at a speed of no more than 2 m/s with measurements logged every 2 seconds. The NaI detector was mounted on an extension off the back of the ATV with a clear view of the ground. Areas clear of vegetation or with vegetation that could be driven over by the ATV were surveyed in this manner. A greater than expected portion of the phragmites-covered areas were able to be surveyed on the ATV with only the areas with the densest and/or tallest stands of phragmites being inaccessible by the ATV.

Areas inaccessible to the ATV were surveyed on foot where on-foot access was possible. Manual surveys were collected on wider-spaced transects than was performed with the ATV. The spacing of the manual transects was largely determined by accessibility constraints. The location and spacing of transects was field-determined with the objective of making 4-5 transects over each feature. Some areas were not accessible by either means and were not surveyed. Areas with standing water were not surveyed due to the hazard posed by the water and the shielding effect of the water which would negate the effectiveness of the gamma survey.

Locations for surface soil samples were selected based upon two objectives. The first was to obtain radiological data in areas where no such data had previously been obtained. These areas include IB-3, IB-4, and background data. The second objective was to establish a correlation between radionuclide concentrations and gamma survey measurements. To meet the second objective, the results of the gamma surveys were used to select locations representative of a range of gamma exposure rate levels.

A five-point composite sample was collected at each selected location. One point was centered at the sampling location with the other 4 points placed 2 meters away from the central point at 90 degree angles from each other (i.e., the cardinal directions). Each sample was approximately a half-liter in volume and was collected from the top 15 cm (6 inches) of soil. This composite sample was designed to collect samples representative of the field of view of the radiation detector.

A total of 26 locations were sampled, 5 for determination of background concentrations, 7 in IB's 1 and 2 combined, 9 in IB-3 and 5 in IB-4. At three of these locations, the 5 parts of the composite sample were individually sampled in addition to extraction of an aliquot for analysis from the composite. This was done to permit evaluation of the representativeness of the composite sample compared to the individual portions of the composite as requested by the EPA.

All soil samples were analyzed for Ra-226, Ra-228, and U-238. Th-232 was considered to be in equilibrium with Ra-228 rather than performing a separate analysis for Th-232. Table 1 provides the analysis methods used. These analyses are consistent with the Remedial Investigation data previously collected for radionuclides in IB-1 and IB-2. The uranium analysis method used is based on alpha spectroscopy rather than EPA Method E908.0 (kpa, mass-based measurement). Conversion between the two methods can be made as needed based on the specific activity of U-238. Samples were sent to Eberline Services in Oak Ridge, TN, a NELAP accredited laboratory, for analysis.

Table 1. Radionuclide Analysis Methods

Analyte	Method
Ra-226	E903.0
Ra-228	E904.0
U-238	EML U-02 Mod

Subsurface soil samples were collected in areas where it was suspected that there may be bauxite residue and/or gypsum at depth but not on the surface. Field determination of sample locations was made based on gamma survey results and previous subsurface sampling results, with a total of 10 locations selected.

Subsurface soil samples were collected with a Geoprobe™ direct push drill rig using 1.75 inch PVC core liners. The borings were advanced to a depth of 12 feet below ground surface. The liners were opened with a sampling kit including a core holder and a double-hook core cutter for collection of the samples at the desired depth interval(s). The cores were examined for evidence of residue, gypsum, or other materials associated with Alcoa operations. Additionally the cores were scanned with a radiation detector to determine if any depth interval exhibited elevated radiation levels. If such material was found, a sample of that material was collected. Examination of the cores for the radiation survey and sampling resulted in sufficient disturbance of the cores that retention of the remainder in an organized manner was not possible. Samples were analyzed for the same constituents as for the surface samples given in Table 1.

3.2 Gamma Survey completeness

Areas surveyed by ATV were performed on 10-meter or less transects with limited exceptions. In most areas, the transects paralleled terrain features rather than being straight lines. Straight line transects were limited to large open areas, primarily the ball fields and the Paule property in IB-3a. Areas surveyed on foot were surveyed in a manner to achieve 4-5 transects through any given feature. This objective was met for those features large enough to merit multiple transects, the notable exception being the tops of berms. The area where this was applied included IB-1a and the wooded portions of IB-3b.

The radiation detector was checked for proper operation at the beginning of each day by verifying the battery charge, observing expected response to ambient radiation levels and response to the check source located on the side of the meter case. Gamma survey data were downloaded from the dataloggers multiple times per day. A running depiction of the areas that had been covered was maintained and used to plan the surveys for subsequent survey sessions. This routine also allowed for the repetition of surveys where the data were suspect or failed to record. The survey completeness by area is:

- RDA1/IB-1a: All of this RDA was surveyed except for one area on the south side where there was standing water. Most surveys were on foot except for where paths had been cleared through the brush by a bulldozer, and along the flat bauxite residue surface where the outflow to the dike breach is present.
- RDA2/IB-1b: The perimeter of the bauxite residue on the south and west sides was surveyed along with limited portions of the east side. The remaining area contained standing water or was very marshy and was not surveyed. Most of the survey was performed on the ATV.
- RDA 3/IB-1c: Surveys were completed except for a central annular area where the phragmites were sufficiently dense to be inaccessible both on ATC and on foot. Most of the survey was performed on the ATV.
- Gypsum Dikes/IB-2: The portion of IB-2 south of the RDAs was surveyed in its entirety. Most of the survey was performed on the ATV. The north portion of IB-2 along the south edge of IB-4a was not surveyed due to accessibility issues. It was

surrounded by standing water and consisted of very steep terrain not safe for on-foot surveys.

- Paule property/IB-3a: This area was surveyed in its entirety by ATV.
- IB-3b: This area was surveyed primarily on foot except for portions within the Paule property that were cleared. Minor portions were not surveyed due to activities on the Paule property (brush piles, equipment parking, active brush burning pit). On-foot coverage met with established expectations. The area along the border with IB-4e was surveyed but the data rejected due to corruption of the GPS fix data associated with the logged measurements, resulting in no usable data for this area.
- IB-3c: The area was surveyed in its entirety by ATV.
- IB-4a & IB-4b: These areas contained standing water or were marshy to the point of being inaccessible. Only limited data along the perimeter of these areas was obtained.
- Ball fields/IB-4c: This area was surveyed in its entirety by ATV except for the eastern and southern edges where heavy brush was present, which were surveyed on foot.
- IB-4d: This area contained standing water or was marshy to the point of being inaccessible. Only limited data along the perimeter of this area was obtained.
- IB-4e: No data from this area was obtained due to the lack of access agreements with the landowners.

3.3 Background Surveys

Background gamma surveys were performed in the western portion of Frank Holten State Park, the undeveloped area east of IB-3a and the Alton & Southern railroad tracks at the south corner of the site (agricultural field). The northwest portion of the ball fields was also used as a background area as described in the Work Plan. Parallel transects and an enclosing perimeter survey were performed in the agricultural field and at Frank Holten State Park. For the ball fields, the surveyed area north of 706400 feet North and west of 2307900 feet East (Illinois State Plane West, NAD 1983, feet) was used as the background reference area.

4. RESULTS

4.1 Background Gamma Radiation Levels

From each area, the survey results were filtered to exclude points not at least one foot from the previous logged survey location. This serves to limit duplicate measurements at a single location which could bias analysis of the results. Filtering in this manner resulted in 367 measurements at the ball fields, 388 from Frank Holten State Park, and 538 from the agricultural field. The pertinent statistical results from this data set are given in Table 2. Based on these results, any survey results less than 14 μR/hr are considered to be background.

Table 2. Background Statistical Analysis.

Parameter	Value (μR/hr)
Mean	11.6
Standard deviation	1.8
Minimum	7
Maximum	20
95th percentile	14.3

4.2 Background Soil Concentrations

Five background soil concentration samples were collected, 2 from Frank Holten State Park, 2 from the agricultural field southeast of the site, and 1 from the northwest edge of the ballfield. These locations and the measured concentrations are shown in Figure 3. Sample location BKG-4 was selected as a duplicate sample. For this location, the average of the original and duplicate result was used to determine the concentration at this location. Sample location BKG-5 was selected as the background sample location where the individual components of the composite sample were analyzed in addition to the composite. For determination of the average background soil concentration, only the composite result was used for consistency with the other samples. Comparison of the composite with the individual components is discussed in Section 4.7. The average background soil concentrations are given in Table 3.

Table 3. Average Background Radionuclide Concentrations

Radionuclide	Average (pCi/g)	Standard deviation (pCi/g)
Ra-226	2.14	0.66
Ra-228	1.31	0.40
U-238	1.20	0.54

These concentrations are used to determine the net radionuclide concentrations for the samples within each investigation block, i.e., the concentration in excess of background.

4.3 Gamma Survey Results

Figure 4 depicts the results of the gamma survey. The exposure rate ranges are based on the correlation of exposure rate with the Ra-226 concentration as discussed in more detail in Section 4.6. The lowest range is less than or equal to 34 μR/hr. This equates to those areas with a Ra-226 soil concentration of 5 pCi/g or less above background at the 95% confidence level. The next range is 34-44 μR/hr. 44 μR/hr is the average exposure rate that correlates to a Ra-226 soil concentration of 5 pCi/g above background. For the next level, 54 μR/hr equates to those areas with a Ra-226 soil concentration of 5 pCi/g or more *above* background at the 95% confidence level. As expected, the RDAs exhibit the highest radiation levels, with exposed bauxite residue measuring 54 μR/hr and higher. The highest radiation levels are within the IB-1a "canyons." These higher readings are due to the geometric effect of having exposed bauxite residue both underneath the detector and on the sides in close proximity.

Outside of the RDAs, the radiation levels are much lower. Most of the measurements in excess of 54 μR/hr exhibit identifiable patterns. The trends present in the radiation levels outside the RDAs are:

1 Surface deposition of bauxite residue eroded from RDA-1 results in increased radiation levels in the low-lying areas in IB-3c and the northwest portion of IB-3b.

2 Elevated levels are present in the southeast portion of IB-3b and are most likely associated with additional runoff from the area of the RDA-1 dike breach or may

also be associated with runoff from RDA-2 and erosion from the excavation along the south dike wall of RDA-2.

3 Elevated levels are present along the east edge of IB-4b near the railroad tracks.

4 Elevated radiation levels along the east portion of the ball fields correspond to areas where it is suspected that subsurface bauxite residue is present.

Core samples collected in the outflow area from the IB-1a dike breach indicated bauxite residue depths of 1.5 feet in the eastern portion of this area and 0.5 feet in the western portion. The bauxite residue appears to be limited to the top layer of soil and is underlain by cinders and native silts and clays. The vegetation in the areas exhibiting elevated radiation levels is dominated by phragmites with some interspersed light brush. A portion of this outflow area extends into the northern portion of the Paule property that has been cleared. A similar elevated area near the center of the Paule property along the access road to the site had a bauxite residue layer 1 to 2.5 feet below ground surface along with additional thin bauxite layers at greater depth. This location potentially had bauxite residue mixed with the clay in the top one foot as well.

The southeast portion of IB-3b is the lowest elevation area along the southern portion of the site and would logically accumulate runoff from other areas. No core samples were collected in this area as it is inaccessible by vehicle. An attempt to enter this area with a bulldozer by AMEC was unsuccessful, resulting in the bulldozer becoming buried above the height of the tracks immediately upon entry into the area. Under a thin hard crust, the underlying soil was very muddy and saturated with water. The hole made extracting the bulldozer filled with water to within a couple inches of the ground surface by the next day.

The core collected in the eastern portion of the ballfields indicated a layer of bauxite residue 7 feet thick at a depth of 4 feet overlaid by 3 feet of loose cinders and a one foot layer of brown clay at the surface, confirming the data from previous core samples which indicated buried bauxite residue. The measured dose rate was 22 μR/hr, less than the 34 μR/hr action level associated with areas below the 40 CFR 192 ARAR.

4.4 Surface Soil Sampling

21 soil samples were collected, 7 in IB's 1 and 2 combined, 9 in IB-3 and 5 in IB-4. Within IB-1 and IB-2, previous investigations had adequately sampled those areas. These samples were collected with the single purpose of establishing a correlation between soil concentrations and gamma survey exposure rates. The sample locations selected in IB-3 and IB-4 were based both on establishing a correlation between soil concentrations and gamma survey exposure rates and to obtain radiological data in areas where these had not previously been collected. More locations in IB-3 than in IB-4 were selected based on the larger amount of accessible area in IB-3 compared to IB-4.

All the selected locations were chosen based on the results of the gamma surveys. The locations were selected to correspond to the whole range of observed gamma exposure rate measurements for each investigation block and to provide broad geographic coverage of the areas.

The results of this sampling are shown in Figure 3 and in Table A1. The laboratory Level 4 reports are provided in Attachment C. The highlighted Ra-226 concentrations in Figure 3 are locations where the Ra-226 concentrations exceed 5 pCi/g above background, the 40 CFR 192.12(a) ARAR. All of these locations are associated with surface deposits of bauxite residue, both within the RDAs and outside of them. Outside the RDAs, 3 exceedances are in the downstream deposition area from the IB-1a dike breach. At other two locations, IB3-2 and IB3-3, the characteristic red-brown color of the bauxite residue was clearly visible.

None of the locations had concentrations in excess of 15 pCi/g above background. Therefore, all sampled locations would be in compliance with the 40 CFR 192.12(a) ARAR if a cover at least 6 inches thick is applied.

4.5 Subsurface Soil Sampling

Subsurface core samples were collected from areas outside the residue disposal areas. 10 core samples were collected, 7 within IB-3, 2 in IB-4, and 1 in IB-1. These locations, the sampled depth interval, and radionuclide concentrations are shown in Figure 5 and in Table A2. The location in IB-1 was in the outflow area from the dike breach and not within the confines of the original residue disposal area. The locations were selected based on professional judgment of locations that would contribute information potentially useful in designing a remediation plan. To that end, three locations (Cores 1, 2, and 3) were selected in the outflow area from the IB-1a dike breach area to determine the thickness of the surface bauxite residue layer in those areas. Two locations (Cores 4 and 8) were selected on the basis of elevated gamma survey measurements and observed surface deposits of bauxite residue. Two more (Cores 7 and 10) were chosen on the basis of elevated gamma survey measurements in areas which did not exhibit visible surface deposits of bauxite residue. The last three locations (Cores 5, 6, and 9) were selected as locations without elevated gamma survey measurements to characterize areas not otherwise covered.

Each core was surveyed to determine if any depth interval exhibited elevated measurements. No elevated measurements were noted in any of the cores. This is attributed to the limited amount of material from the relatively small diameter cores. The selection of a depth interval to sample was based on examination of the core logs. The core logs are provided in Appendix B. Cores typically contained layers of bauxite residue, cinders, carbon nodules mixed in clay, clays colored red-brown or various shades of gray, and sands and silts of various colors. If bauxite residue was observed in the core, a sample was taken from the depth interval containing the residue. If there was no bauxite residue present, the sampled interval was chosen to collect samples from the full spectrum of material types observed in all the cores.

All subsurface sampled intervals contained Ra-226 concentrations less than the 40 CFR 192.12(a) ARAR. Therefore, no further action is required for these locations. One core was sampled in the top 1 foot interval. This core (#1) is within the outflow area from the

IB-1a dike breach and is less than the 40 CFR 192.12(a) ARAR for subsurface soils but not for surface soils. As with the surface samples, compliance with the 40 CFR 192.12(a) ARAR would be achieved once a cover at least 6 inches thick is applied.

4.6 Correlation of Survey Measurements to Soil Concentrations

Soil Ra-226, Ra-228, and U-238 concentrations were compared with the gamma exposure rate measurements at the same locations. It was assumed that there was a linear relationship between the soil concentration and the exposure rate and that the data were normally distributed. This is consistent with the normally distributed measurement uncertainty used for soil concentrations. A simple linear regression analysis was performed on the data for each radionuclide.

Figure 6 plots the gamma exposure rates versus the sample Ra-226 concentrations. The mean correlation trend line is plotted along with confidence intervals corresponding to Type 1 and Type 2 error rates of 5%, or respective 95% confidence levels. For remediation purposes, Type 1 errors (underestimating the soil concentration) are the more significant. This is equivalent to a 95th percentile upper confidence limit. With a Type 1 error rate of 5%, a Ra-226 surface soil concentration of 7.14 pCi/g, 5 pCi/g above background, equates to an exposure rate of 34.41 μR/hr.

Figure 7 plots the gamma exposure rates versus the sample Ra-228 concentrations. The mean correlation trend line is plotted along with confidence intervals corresponding to Type 1 and 2 error rates of 5%. The correlation for Ra-228 is tighter than for Ra-226. This result is expected as Ra-228 and its decay products include more gamma emitters than does Ra-226 and its decay products. There is no proposed ARAR for Ra-228 soil concentrations. However, should the need arise to estimate Ra-228 soil concentrations from gamma exposure rate data, this correlation will permit such a determination.

For U-238, there is no correlation of exposure rate with soil concentration. This is unsurprising since U-238 decay products prior to Ra-226 do not emit many penetrating gamma rays which would contribute to ambient gamma exposure rates.

4.7 Soil Compositing Comparison

At three locations, the five individual pieces of the 5-point soil composite were analyzed separately. The purpose of this analysis was to determine if the composite sample was representative of the individual samples. To make this determination, two comparisons were made; 1) the average of the individual sample results was compared to the composite results, and 2) the individual results were compared to the uncertainty of the composite results. Since each sample was analyzed for three constituents, there are nine possible points of comparison.

Table 4 presents the comparison of the average of the individual sample results with the composite results. All but one result had a relative difference of less than one. In other words, the average concentration in the individual samples was less than the uncertainty in the composite results in all but one instance. This is well within the expected variability for data that are normally distributed, where approximately 2/3^{rds} of the results would be expected to have a relative difference less than 1.0.

Table 5 compares the distribution of the individual results with the uncertainty of the composite results. Of the 45 individual results, 34 have a relative difference of less than one. For a normally distributed population, the expectation would be that 30 would have a relative difference of less than one. Two individual results have a relative difference of greater than 2, the expected number for a normally distributed population. As with the previous comparison above, this result is consistent with the expected behavior of normally distributed data and well within the expected variability for that data.

Table 4. Comparison of Composite with Individual Sample Average.

	Composite pCi/g	Average pCi/g	Difference pCi/g	Relative Difference
BKG-5 Ra-226	1.35	1.71	0.37	0.80
BKG-5 Ra-228	1.69	1.74	0.05	0.08
BKG-5 U-238	1.10	0.92	0.19	0.69
IB1/2-4 Ra-226	8.05	10.19	2.14	1.54
IB1/2-4 Ra-228	11.74	12.23	0.49	0.49
IB1/2-4 U-238	3.11	2.96	0.15	0.31
IB3-6 Ra-226	2.34	2.11	0.22	0.35
IB3-6 Ra-228	1.64	1.47	0.16	0.28
IB3-6 U-238	1.25	1.04	0.22	0.74

Table 5. Individual Results Relative Difference.

Location	Relative Difference		
	Ra-226	Ra-228	U-238
BKG-5C	0.19	0.48	0.40
BKG-5E	0.78	0.67	1.22
BKG-5N	0.29	0.35	1.23
BKG-5S	0.00	0.54	0.21
BKG-5W	2.74	0.30	0.38
IB1/2-4A	1.22	0.73	0.53
IB1/2-4B	4.13	1.83	0.15
IB1/2-4C	1.28	0.69	0.04
IB1/2-4D	0.42	1.59	0.60
IB1/2-4E	0.64	0.44	0.23
IB3-6A	0.08	0.21	0.21
IB3-6B	0.86	0.08	0.40
IB3-6C	0.86	1.37	1.98
IB3-6D	0.34	0.45	1.38
IB3-6E	0.30	0.72	0.15

5. CONCLUSIONS

Gamma radiation level patterns exhibit logical patterns. The RDAs, with thick layers of bauxite residue, contain the highest radiation levels, with levels consistently more than 54 μR/hr. Outside the RDAs, elevated radiation levels are primarily limited to low-lying areas that have historically collected runoff from the RDAs. This is especially true for runoff from the breached dike of RDA-1. The radiation levels in areas that have collected runoff mostly exceed 34 μR/hr with surface bauxite residue thickness varying from a few inches to a couple feet. It is reasonable to assume that marshy areas or areas with standing water contain similar elevated areas as those that could be surveyed.

The gamma survey also demonstrated sensitivity to near-surface bauxite residue as evidenced by radiation levels and core logging in the area of the ball fields and on the Paule property. Bauxite at a depth of 1 foot was readily detectable on the Paule property, whereas deeper-buried material in the ball fields was less detectable. The material on the ballfields was overlain by low-density dry cinders which provide less shielding than would be provided by a soil cover of similar thickness.

All soil samples in this investigation, as well as in the previous RI investigation, had Ra-226 concentrations less than 15 pCi/g above background. Soil samples of materials other than the bauxite residue had Ra-226 concentrations of less than 5 pCi/g above background. Therefore compliance with the 40 CFR 192.12(a) ARAR can be achieved by covering exposed bauxite residue with at least 6 inches of cover. For relatively thin surface layers of bauxite residue, such as in the outflow area from the IB-1a dike breach and portions of IB-3a and IB-3b, removal of the surficial layer of bauxite residue may be more effective and allow less restriction on the property use.

The measured gamma exposure rates correlated well with both the soil Ra-226 and Ra-228 concentrations, and did not correlate at all with the U-238 concentrations. For comparison to the 40 CFR 192.12(a) surface soils ARAR of 5 Ci/g above background for Ra-226, this equates to a gamma exposure rate of 34.41 μR/hr with a Type I (false

negative) error rate of 5%. Areas with exposure rates below this level averaged over 100 m^2 are in compliance with the 40 CFR 192.12(a) ARAR. Areas with exposure rates between 34 and 44 μR/hr may still be in compliance with the ARAR even though the gamma survey cannot confirm this with sufficient accuracy. ARAR compliance for these areas should be determined via soil sampling or remediation sufficient to reduce the dose rate to less than 34 μR/hr should be performed. Areas with exposure rates above 44 and especially 54 μR/hr require remediation for compliance with the ARAR.

Comparison of the composite samples with the individual components of the composite samples demonstrated that the composite samples are consistent with the average concentration of the individual samples, the differences being within the expected statistical uncertainty. Therefore, the composite sample is an accurate representation of the average concentration of the individual components of the composite sample.

Figures

EXPLANATION

- Site Boundary
- Proposed Operable Unit No. 1 Boundary
- Mud Lakes

N

0 600 1,200

Feet

AERIAL PHOTOGRAPHY: SEPTEMBER 1, 2000

NORTH ALCOA SITE

EAST ST. LOUIS, ILLINOIS

FIGURE 1

SITE LOCATION MAP

PROJECT: 114-021309	DATE: DEC 14, 2011	
REV: 1	BY: SMM	CHECKED: JCM

TETRA TECH

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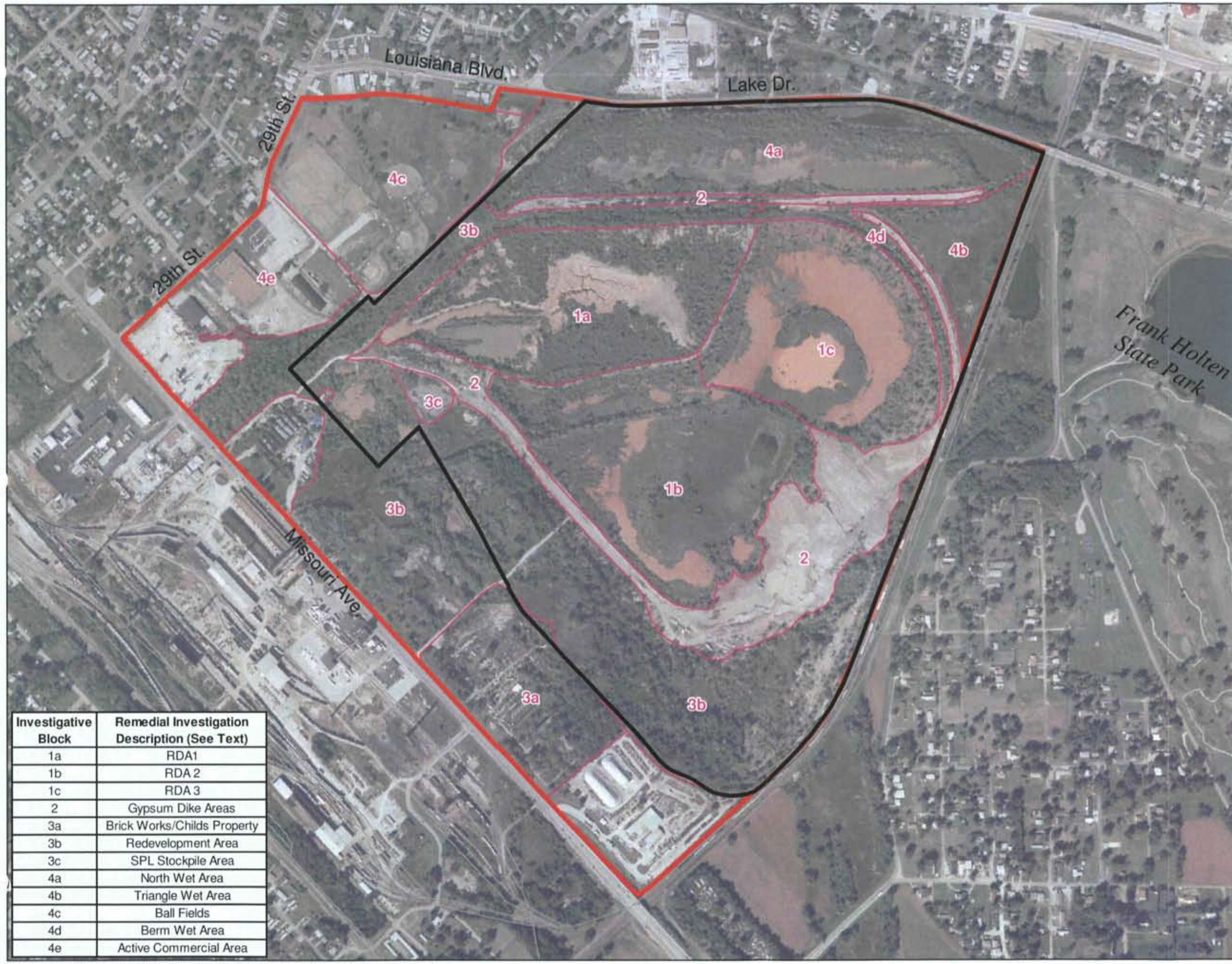
Path: E:\ESL\Rad Data\mxd\Site Map.mxd



Investigative Block	Remedial Investigation Description (See Text)
1a	RDA1
1b	RDA 2
1c	RDA 3
2	Gypsum Dike Areas
3a	Brick Works/Childs Property
3b	Redevelopment Area
3c	SPL Stockpile Area
4a	North Wet Area
4b	Triangle Wet Area
4c	Ball Fields
4d	Berm Wet Area
4e	Active Commercial Area

EXPLANATION

Proposed Operable Unit No. 1 Boundary

Site Boundary

Note:

1. Boundaries of Investigative Blocks were originally set forth in the Remedial Investigation Work Plan (2003). Several properties outside the proposed limits of Operable Unit No. 1 have changed ownership since that time.

N

0 600 1,200

Feet

NORTH ALCOA SITE
EAST ST. LOUIS, ILLINOIS

FIGURE 2

PROPOSED OPERABLE UNIT NO. 1 BOUNDARY

PROJECT: 114-021309	DATE: DEC 14, 2011	
REV: 1	BY: SMM	CHECKED: JCM

TETRA TECH
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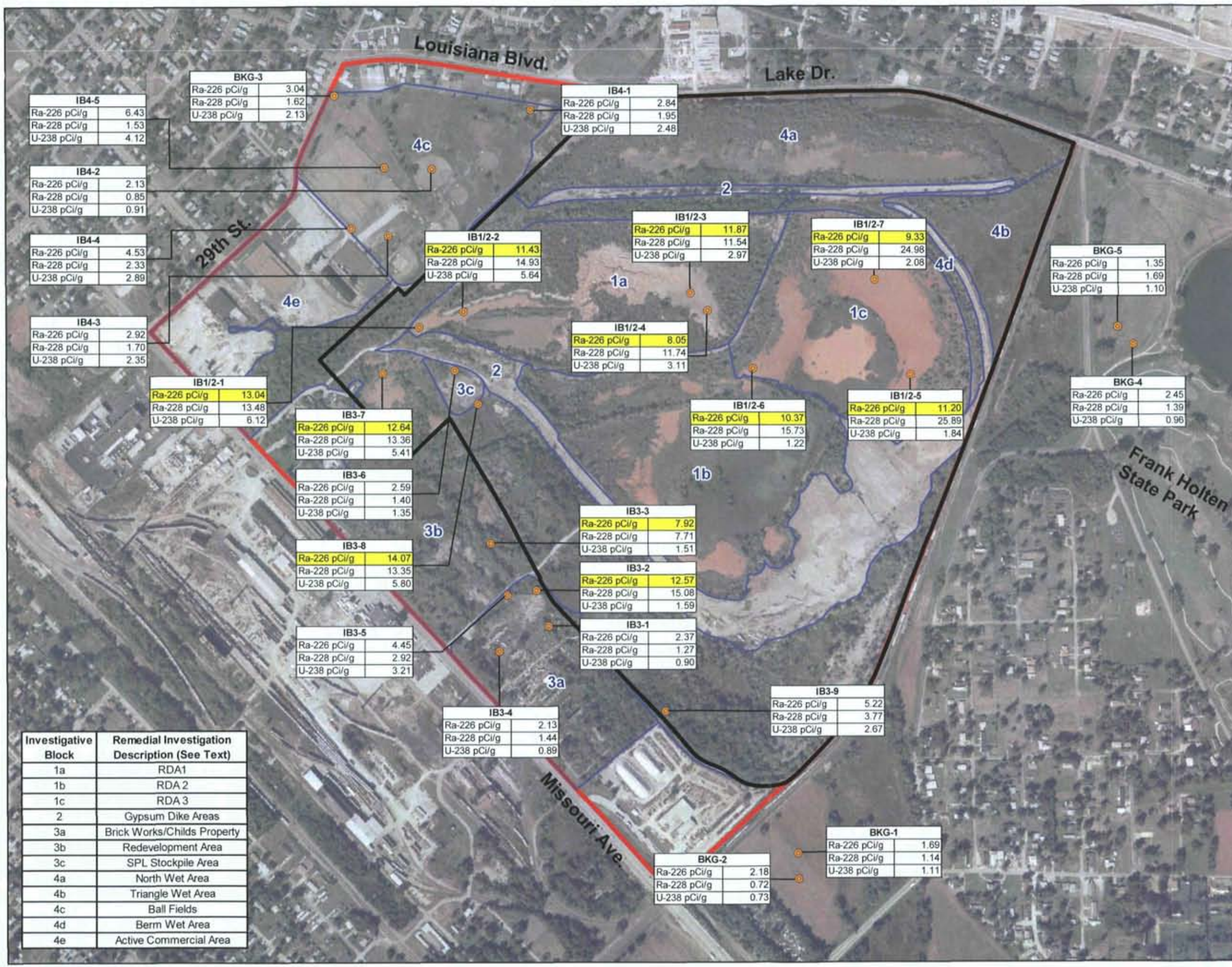
Path: E:\ESL\Rad Data\mxd\Proposed Operable Unit No1 Boundary.mxd



Investigative Block	Remedial Investigation Description (See Text)
1a	RDA1
1b	RDA 2
1c	RDA 3
2	Gypsum Dike Areas
3a	Brick Works/Childs Property
3b	Redevelopment Area
3c	SPL Stockpile Area
4a	North Wet Area
4b	Triangle Wet Area
4c	Ball Fields
4d	Berm Wet Area
4e	Active Commercial Area

EXPLANATION

- Surface Soil Sample
- Proposed Operable Unit No. 1 Boundary
- Investigative Block
- Site Boundary

Note: Highlighted measurements include concentrations greater than 5 pCi/g above background (40 CFR 192.12(a)).

N

0 600 1,200

Feet

AERIAL PHOTOGRAPHY: SEPTEMBER 1, 2000

NORTH ALCOA SITE

EAST ST. LOUIS, ILLINOIS

FIGURE 3

SURFACE SOIL SAMPLE RESULTS

PROJECT: 114-021362	DATE: JAN 6, 2012	
REV: 01	BY: SMM	CHECKED: JCM

TETRA TECH

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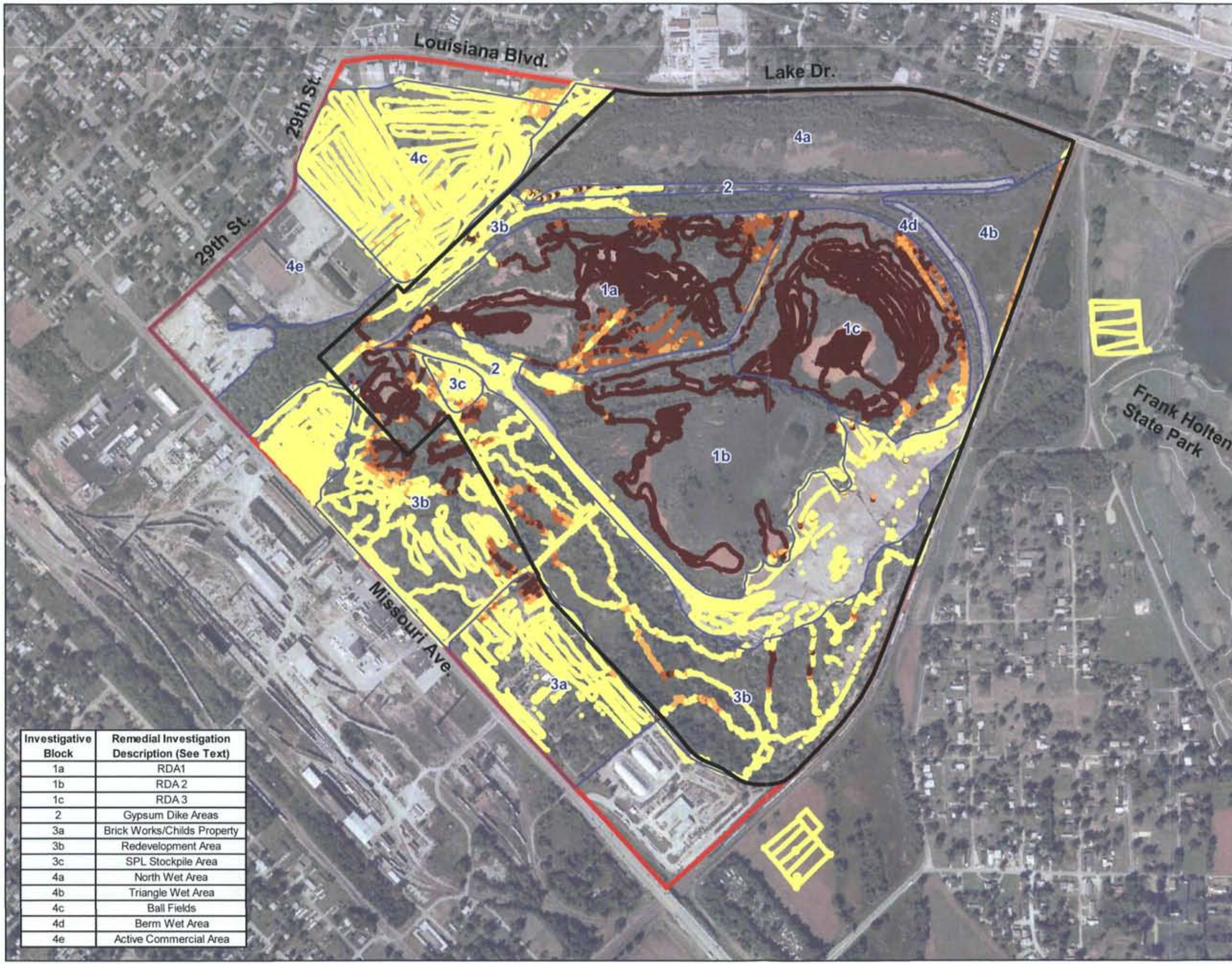

Investigative Block	Remedial Investigation Description (See Text)
1a	RDA1
1b	RDA 2
1c	RDA 3
2	Gypsum Dike Areas
3a	Brick Works/Childs Property
3b	Redevelopment Area
3c	SPL Stockpile Area
4a	North Wet Area
4b	Triangle Wet Area
4c	Ball Fields
4d	Berm Wet Area
4e	Active Commercial Area

EXPLANATION

- Proposed Operable Unit No. 1 Boundary
- Investigative Block
- Site Boundary

Gamma Exposure Rate, µR/hr

- 0 - ≤ 34
- > 34 - ≤ 44
- > 44 - ≤ 54
- > 54

N

0 600 1,200

Feet

AERIAL PHOTOGRAPHY: SEPTEMBER 1, 2000

NORTH ALCOA SITE

EAST ST. LOUIS, ILLINOIS

FIGURE 4

GAMMA SURVEY RESULTS

PROJECT: 114-021362	DATE: JAN 6, 2012	
REV: 01	BY: SMM	CHECKED: JCM

TETRA TECH

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Investigative Block	Remedial Investigation Description (See Text)
1a	RDA1
1b	RDA 2
1c	RDA 3
2	Gypsum Dike Areas
3a	Brick Works/Childs Property
3b	Redevelopment Area
3c	SPL Stockpile Area
4a	North Wet Area
4b	Triangle Wet Area
4c	Ball Fields
4d	Berm Wet Area
4e	Active Commercial Area

EXPLANATION

- Soil Boring Location
- Proposed Operable Unit No. 1 Boundary
- Investigative Block
- Site Boundary

N

0 600 1,200

Feet

AERIAL PHOTOGRAPHY: SEPTEMBER 1, 2000

NORTH ALCOA SITE

EAST ST. LOUIS, ILLINOIS

FIGURE 5

SOIL BORING RESULTS

PROJECT: 114-021362	DATE: DEC 15, 2011	
REV: 01	BY: SMM	CHECKED: JCM

TETRA TECH

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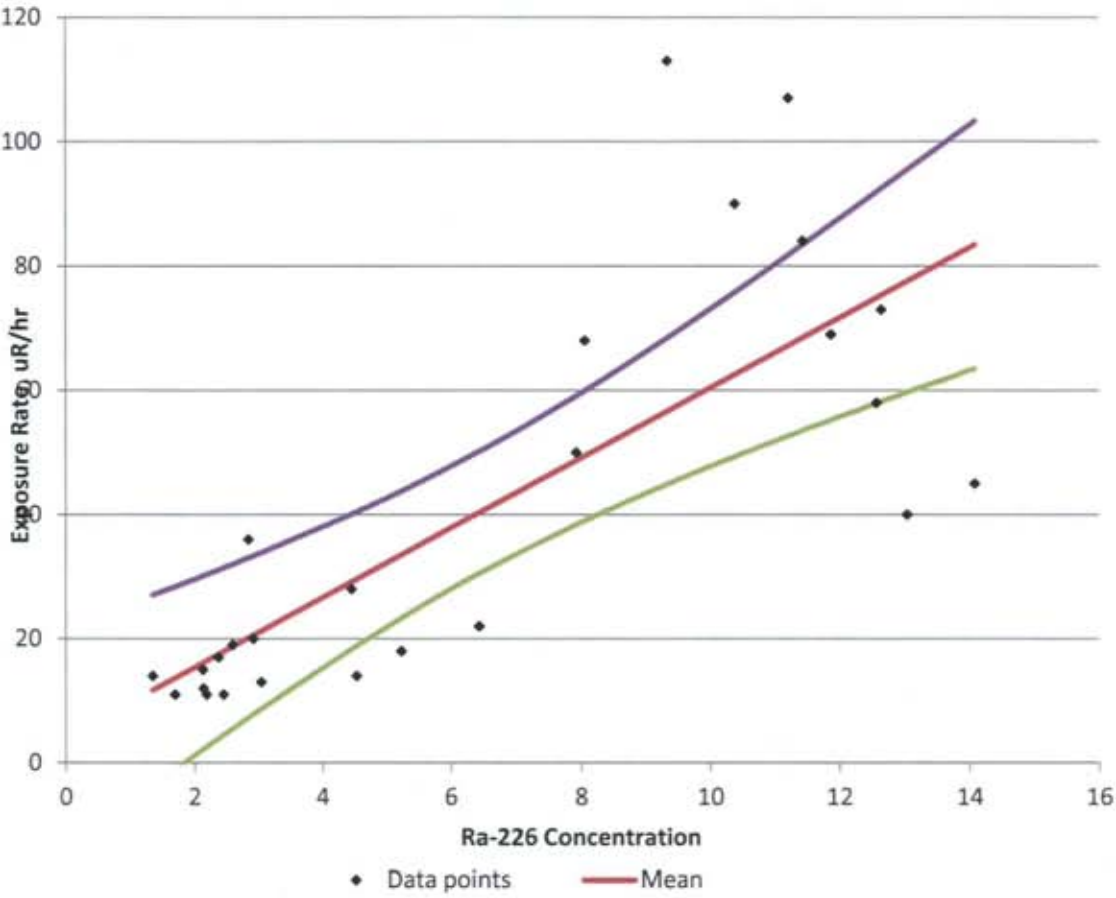

Figure 6. Exposure Rate Correlation with Ra-226 concentration

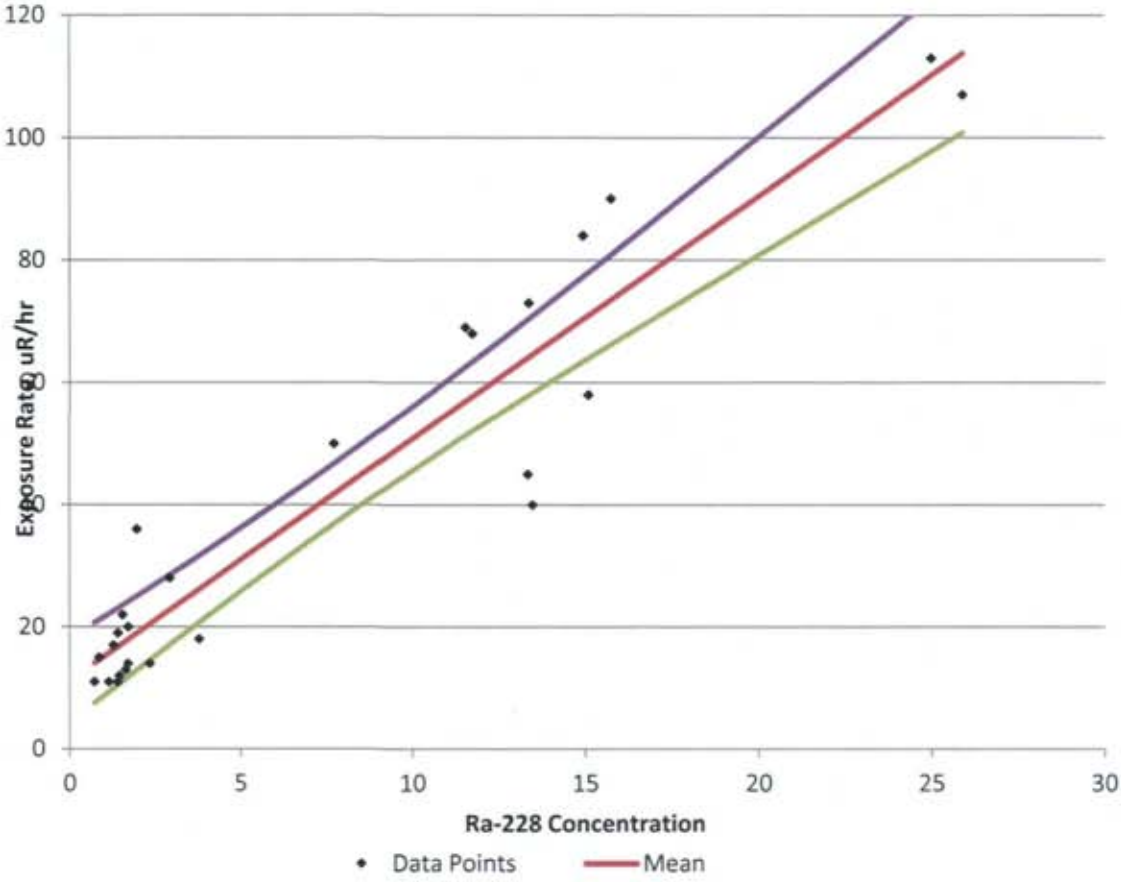

Figure 7. Exposure Rate Correlation with Ra-228 concentration

APPENDIX A

Appendix A

Soil Sample Analytical Results

Table A1. Surface Soil Sample Results

Sample ID	Easting	Northing	Sample Type	Ra-226 pCi/g	Ra-228 pCi/g	U-238 pCi/g
BKG-1	2310566	701953	TRG	1.69	1.14	1.11
BKG-2	2310572	701791	TRG	2.18	0.72	0.73
BKG-3	2307651	706708	TRG	3.04	1.62	2.13
BKG-4	2312710	705144	DO	1.93	1.43	1.01
BKG-4	2312710	705144	DUP	2.96	1.34	0.91
BKG-5	2312612	705253	TRG	1.35	1.69	1.10
BKG-5C	2312612	705253	TRG	1.43	2.01	0.99
BKG-5E	2312612	705253	TRG	1.70	1.24	0.77
BKG-5N	2312612	705253	TRG	1.48	1.92	0.77
BKG-5S	2312612	705253	TRG	1.35	2.05	1.04
BKG-5W	2312612	705253	TRG	2.60	1.49	1.00
IB1/2-1	2308179	705257	DO	12.51	12.97	6.26
IB1/2-1	2308179	705257	DUP	13.57	14.00	5.98
IB1/2-2	2308459	705354	TRG	11.43	14.93	5.64
IB1/2-3	2309890	705469	TRG	11.87	11.54	2.97
IB1/2-4	2309998	705359	TRG	8.05	11.74	3.11
IB1/2-4A	2309998	705359	TRG	9.75	11.00	2.85
IB1/2-4B	2309998	705359	TRG	13.79	13.59	3.04
IB1/2-4C	2309998	705359	TRG	9.83	11.04	3.09
IB1/2-4D	2309998	705359	TRG	8.64	13.35	2.82
IB1/2-4E	2309998	705359	TRG	8.94	12.19	3.00
IB1/2-5	2311294	704956	TRG	11.20	25.89	1.84
IB1/2-6	2310283	704996	TRG	10.37	15.73	1.22
IB1/2-7	2311068	705552	TRG	9.33	24.98	2.08
IB3-1	2308992	703377	TRG	2.37	1.27	0.90
IB3-2	2308915	703600	TRG	12.57	15.08	1.59
IB3-3	2308627	703896	TRG	7.92	7.71	1.51
IB3-4	2308681	703217	TRG	2.13	1.44	0.89
IB3-5	2308731	703571	TRG	4.45	2.92	3.21
IB3-6	2308404	704985	DO	2.34	1.64	1.25
IB3-6	2308404	704985	DUP	2.84	1.17	1.44
IB3-6A	2308404	704985	TRG	2.29	1.51	1.32
IB3-6B	2308404	704985	TRG	1.79	1.59	1.14
IB3-6C	2308404	704985	TRG	1.79	0.83	0.67
IB3-6D	2308404	704985	TRG	2.55	1.37	0.85
IB3-6E	2308404	704985	TRG	2.15	2.06	1.21
IB3-7	2307949	704969	TRG	12.64	13.36	5.41
IB3-8	2308550	704774	TRG	14.07	13.35	5.80
IB3-9	2309727	702842	TRG	5.22	3.77	2.67
IB4-1	2308887	706620	TRG	2.84	1.95	2.48
IB4-2	2308261	706248	TRG	2.13	0.85	0.91

Sample ID	Easting	Northing	Sample Type	Ra-226 pCi/g	Ra-228 pCi/g	U-238 pCi/g
IB4-3	2307987	705831	TRG	2.92	1.70	2.35
IB4-4	2307755	705877	TRG	4.53	2.33	2.89
IB4-5	2307963	706259	TRG	6.43	1.53	4.12

Table A2. Subsurface Sample Results

Sample ID	Easting	Northing	Sample Type	Ra-226 pCi/g	Ra-228 pCi/g	U-238 pCi/g
CORE 1 0-1	2307876	705088	DO	12.46	10.99	4.76
CORE 1 0-1	2307876	705088	DUP	9.39	9.77	4.85
CORE 2 11-12	2308199	705296	TRG	7.53	7.52	8.31
CORE 3 2-3	2308918	703579	TRG	8.77	10.36	4.15
CORE 4 4-5	2309331	703018	TRG	7.09	13.11	2.23
CORE 5 4-5	2307627	704910	TRG	3.69	1.78	1.34
CORE 6 10-11	2309125	704356	TRG	5.95	3.83	5.56
CORE 7 5-6	2308894	703922	TRG	4.45	1.07	2.86
CORE 8 2-3	2307769	706655	TRG	6.43	7.14	7.08
CORE 9 5-6	2308846	706346	TRG	6.23	1.45	0.89
CORE 10 8-9	2308253	704844	TRG	0.08	7.81	5.40

APPENDIX B

Appendix B

Core Logs

LUST Incident No.:	Boring Number: Core 1	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/17/11 Start 12:15 Finish 12:45

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
		3		1	Lt brn bauxite wet v. plastic		2.5		
				2	Lt. brn CL w Fe stain and carbon nodules moist		2.5		
				3			2		
		3		4	Buff silt wet		2.5		
				5			2		
				6			1		
		3		7			1		
				8			1		
				9	Blk cinders sat loose		0		
		3		10					
				11	Brn-gray silt moist		0		
				12			1.5		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data

▼ Depth While Drilling _____

▽ Depth After Drilling _____

Auger Depth _____ Rig _____

Rotary Depth _____ Geologist _____

Driller/Co _____

Note: Boring backfilled unless otherwise noted

Illinois Environmental Protection Agency

The Agency is authorized to require this information under 415 ILCS 5/4 and 21. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000.00 for each day failure continues, a fine up to $50,000.00 and imprisonment up to five years. This form has been approved by the Forms Management Center.

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LPC 501 Rev June 2004

LUST Incident No.:	Boring Number: Core 2	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/12/11 Start 13:15 Finish 13:30

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Red-Brn Bauxite	wet	1		
		2'		1	Blk clayey cinders wet		1.5		
				2			1.5		
				3					
				4	Red-Brn sand wet		0		
		2'5		5	Brn silt		0		
				6	Red-Brn sand saturated		1		
				7	fine grn well rounded well sorted		0		
		3		8			0		
				9			0		
		3		10			0		
				11	Red-Brn silt wet		1		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____ ▽ Depth After Drilling _____	Auger Depth _____ Rig _____ Rotary Depth _____ Geologist _____ Driller/Co _____ Note: Boring backfilled unless otherwise noted	Illinois Environmental Protection Agency

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LUST Incident No.:	Boring Number: Core 3	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/17/11 Start 13:45 Finish 14:05

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
		3		1	Red-Brn Bauxite wet plastic		1.5		
				2			1.5		
				3			1.5		
				4			1.5		
		3		5			1.5		
				6			1.5		
				7			1.5		
		3		8	Brn sand fine grn well rounded well sorted		0		
				9	Saturated		0		
					Blk cinders		0		
		3		10	Brn sand		0		
				11	Brn-gray silt		1		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____ ▽ Depth After Drilling _____	Auger Depth _____ Rig _____ Rotary Depth _____ Geologist _____ Driller/Co _____ Note: Boring backfilled unless otherwise noted	Illinois Environmental Protection Agency

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LPC 501 Rev June 2004

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LUST Incident No.:	Boring Number: Core 4	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/17/4 Start 14:10 Finish 14:35

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Red-Brn CL dry		4		
		2.5		1	Red-Brn Bauxite wet plastic		1.5		
				2					
				3	Red-Brn CL dry		1		
				4	Red-Brn Bauxite wet		1.5		
		3		5	Brn sand dry v. fine well sorted		0		
				6	Red-Brn sand dry		0		
				7	Red-Brn CL dry		1.5		
		3		8	Brn sand dry		0		
					Red-Brn Bauxite wet				
				9	Dark gray-Blk CL moist		1		
		3		10	Gray CL w/carbon nodules moist plastic		2		
				11			2		
							2		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____	Auger Depth _____ Rig _____	Illinois Environmental Protection Agency
▽ Depth After Drilling _____	Rotary Depth _____ Geologist _____	
	Driller/Co _____	
	Note: Boring backfilled unless otherwise noted	

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LUST Incident No.:	Boring Number: Core 5	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/17/4 Start 14:45 Finish 15:20

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Dk gray - Blk CL moist		1		
		3		1	Blk cinders loose moist		0		
				2			0		
				3					
				4	Dark gray - Blk CL moist plastic		2		
		3		5	grading to brn-gray		2.5		
				6			2		
				7			1.5		
		3		8	Brn silt moist		1		
				9			1		
		3		10			1		
				11			1		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____ ▽ Depth After Drilling _____	Auger Depth _____ Rig _____ Rotary Depth _____ Geologist _____ Driller/Co _____ Note: Boring backfilled unless otherwise noted	Illinois Environmental Protection Agency

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LUST Incident No.:	Boring Number: Core 6	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/17/11 Start 1555 Finish 16:20

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
		3		1	Drk gray - Blk cinders loose dry		0		
				2			0		
				3	Lt. Brn silt dry		3		
		3		4	Blk cinders loose dry		0		
				5	Lt Brn-Buff silt wet		1.5		
				6					
		2		7	Red-Brn Cinders Saturated		0		
				8			0		
				9	Drk Brn cinders		0		
		3		10	Blk cinders wet		0		
				11	Buff silt moist Brn-gray silt moist		2 3		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____	Auger Depth _____ Rig _____	Illinois Environmental Protection Agency
▽ Depth After Drilling _____	Rotary Depth _____ Geologist _____	
	Driller/Co _____	
	Note: Boring backfilled unless otherwise noted	

The Agency is authorized to require this information under 415 ILCS 5/4 and 21. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000.00 for each day failure continues, a fine up to $50,000.00 and imprisonment up to five years. This form has been approved by the Forms Management Center.

LUST Incident No.:	Boring Number: Core 7	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/18/11 Start 8:00 Finish 8:30

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brn CL moist		1		
		2		1	Dark Brn silt moist		0.5		
				2	Lt gray gysum dry loose		0		
				3	Dark brn cinders loose dry		0		
		3		4	Blk cinders wet loose		0		
				5			0		
				6			0		
		3		7	Saturated		0		
				8	Blk silt v. moist		0		
				9			1.0		
		3		10			1.0		
				11			1.0		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data

▼ Depth While Drilling _____

▽ Depth After Drilling _____

Auger Depth _____ Rig _____

Rotary Depth _____ Geologist _____

Driller/Co _____

Note: Boring backfilled unless otherwise noted

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LUST Incident No.:	Boring Number: Core 8	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/18/11 Start 8:45 Finish 9:15

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brn CL w/cinders loose moist		0.5		
				1	Blk cinders loose moist		0		
		3		2	Brn CL moist		1.0		
				3			1.0		
				4	Dark gray CL w/carbon nodules moist				
		3		5			1.0		
				6			1.0		
				7			1.0		
		3		8			1.0		
				9			1.0		
		3		10			1.0		
				11	Dark gray silt slimoist		1.0		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data

▼ Depth While Drilling

▽ Depth After Drilling

Auger Depth _____ Rig _____

Rotary Depth _____ Geologist _____

Driller/Co _____

Note: Boring backfilled unless otherwise noted

Illinois Environmental Protection Agency

IL 532-2275
LPC 501 Rev June 2004

The Agency is authorized to require this information under 415 ILCS 5/4 and 21. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000.00 for each day failure continues, a fine up to $50,000.00 and imprisonment up to five years. This form has been approved by the Forms Management Center.

LUST Incident No.:	Boring Number: Core 9	Page 1 of 1
Site Name: ALCOA Address:	Boring Location	Date: 11/18/11 Start 9:30 Finish 10:00

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
				1	Gray CL w/carbon nodules moist		1.5		
		3		2			2		
				3			3		
				4			3		
		3		5			2.5		
				6			2		
				7			2		
		3		8	Brn sandy silt moist		1.0		
				9			1.0		
				10			2		
		3		11	saturated		2		
							2		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data		
▼ Depth While Drilling _____ ▽ Depth After Drilling _____	Auger Depth _____ Rig _____ Rotary Depth _____ Geologist _____ Driller/Co _____ Note: Boring backfilled unless otherwise noted	Illinois Environmental Protection Agency

IL 532-2275
LPC 501 Rev June 2004

The Agency is authorized to require this information under 415 ILCS 5/4 and 21. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000.00 for each day failure continues, a fine up to $50,000.00 and imprisonment up to five years. This form has been approved by the Forms Management Center.

LUST Incident No.:	Boring Number: Core 10	Page of
Site Name:	Boring Location	Date: 11/18/04 Start 10:20
Address:		Finish

Sample Number	Sample Device	Sample Recovery	Lithology Symbol	Depth (feet)	Detailed Soil and Rock Description	Natural Moisture Content %	Hand Penetrometer	OVA/PID/FID/OVM	Remarks
					Brn CL moist		2		
		2		1	Drk Brn-Blk cinders loose dry		0		
				2			0		
				3			0		
				4			0		
		3		5	Red-Brn Bauxite wet		2		
				6			2		
		3		7			2		
				8			2		
				9			2		
		3		10	saturated		0.5		
				11	Drk gray-Blk CL moist		1.5		

Note: Stratification lines are approximate; in-situ transition between soil types may be gradual.

Groundwater Data

▼ Depth While Drilling _____

▽ Depth After Drilling _____

Auger Depth _____ Rig _____

Rotary Depth _____ Geologist _____

Driller/Co _____

Note: Boring backfilled unless otherwise noted

Illinois Environmental Protection Agency

IL 532-2275
LPC 501 Rev June 2004

The Agency is authorized to require this information under 415 ILCS 5/4 and 21. Disclosure of this information is required. Failure to do so may result in a civil penalty up to $25,000.00 for each day failure continues, a fine up to $50,000.00 and imprisonment up to five years. This form has been approved by the Forms Management Center.

[redacted]

APPENDIX C

Appendix C

Laboratory Analytical Data Reports

FOXFIRE SCIENTIFIC

Alcoa – TT ESL

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #11-11139-OR

December 15, 2011

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

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	Last Page Number	0402

Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 11-11139

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		11-22-11	JWM	Sample Log-In
		12/7/11	KW	Data Compilation
		12-12-11	[illegible]	First Technical Data Review
		12/13/11	NK	Second Technical Data Review
		12/14/11	[illegible]	Data Entry/Electronic Deliverable
		12/14/11	[illegible]	Case Narrative
		12/14/11	EJT	Electronic Deliverable Proof
		12/14/11	[illegible]	Samples Analyzed within Holding Time Yes? [ ] No? [ ] U/ES
		12/14/11	[illegible]	QA/QC Review
		12/07/11	EJT	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: [signature] 12/15/11

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY

EBERLINE SERVICES

Richmond Laboratory

Chain of Custody

CLIENT: Foxfire Scientific

ADDRESS:

PROJECT: Alcoa-TT ESL

SAMPLERS SIGNATURE:

PURCHASE ORDER NO.

DATE 11/21 PAGE 1 OF 4

TAT (IN DAYS) 14

PARAMETERS: 11-11139

	SAMPLE NO.	DATE	TIME	LOCATION	Ra-226	Ra-228	total U									SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
4	IB 1/2-1	11/18	1418		X	X	X									soil	1	See pg. 2
5	IB 1/2-2	11/18	1410														1	
6	IB 1/2-3	11/18	—														1	
7	IB 1/2-4	11/18	—														1	
8	IB 1/2-5		1570														1	
9	IB 1/2-6		1512														1	
10	IB 1/2-7		1570														1	
	~~IB 1/2-8~~																	
11	IB 1/2-4A		—														1	
12	IB 1/2-4B		—														1	
13	IB 1/2-4C		—														1	
14	IB 1/2-4D		—														1	

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
11/21/11	Justin McKamey 11-22-11 1119		
COMPANY: Foxfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 12

METHOD OF SHIPMENT:

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

RECD NOV 28 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES — Richmond Laboratory

Chain of Custody

CLIENT: Foxfire (~~Alcoa - TT~~ Scientific)

ADDRESS: 4621 S. Cooper St. #131-332, Arlington, TX 76017

PROJECT: Alcoa - TT ESL

SAMPLERS SIGNATURE:

PURCHASE ORDER NO.

DATE 11/21 PAGE 2 OF 4

TAT (IN DAYS) 14

11-11139

SAMPLE NO.	DATE	TIME	LOCATION	Ra-226	Ra-228	total U	SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
IB1/2-4E	11/18	—	15	X	X	X	soil	1	homogenize prior to aliquot extraction
IB3-1	11/18	1547	16					1	
IB3-2		1542	17					1	
IB3-3		1540	18					1	
~~IB3-3~~		~~1550~~						1	
IB3-4	KBD	~~1537~~	19 15:50					1	
IB3-5	11/22/11	—	20 15:37					1	
IB3-6		—						1	
IB3-7		1426						1	
IB3-8		—						1	
IB3-9		—						1	
IB3-6A								1	

Removed Per Client X SUM 11-22-11 per email from M. Ross 11/22/11 KBD

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
11/21/11	Justin McKenny 11-22-11 1119		
COMPANY: Foxfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 12

METHOD OF SHIPMENT:

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

REC'D NOV 22 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11139
		Lab Deadline	12/2/2011
		Analysis	UUISO - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	80	L1.3
	05	78	L1.3
	06	64	L1.3
	07	75	L1.3
	08	76	L1.3
	09	81	L1.3
	10	106	L1.3
	11	82	L1.3
	12	50	L1.3
	13	52	L1.3
	14	63	L1.3
	15	57	L1.3
	16	44	L1.3
	17	84	L1.3
	18	68	L1.3
	19	49	L1.3
	20	47	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenny Sells	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	Kenny Sells	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 1315
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JPD	11/23/11 1315
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	RMH	11/29/11 0800
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/29/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	11/29/11 1412
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11139
		Lab Deadline	12/2/2011
		Analysis	Ra226 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	80	L1.3
	05	78	L1.3
	06	64	L1.3
	07	75	L1.3
	08	76	L1.3
	09	81	L1.3
	10	106	L1.3
	11	82	L1.3
	12	50	L1.3
	13	52	L1.3
	14	63	L1.3
	15	57	L1.3
	16	44	L1.3
	17	84	L1.3
	18	68	L1.3
	19	49	L1.3
	20	47	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kerry Seely	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	Kerry Seely	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/28/11 0800
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-28-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-30-11 1355
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	11/30/11 1355
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	[illegible]
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11139
		Lab Deadline	12/2/2011
		Analysis	Ra228 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	80	L1.3
	05	78	L1.3
	06	64	L1.3
	07	75	L1.3
	08	76	L1.3
	09	81	L1.3
	10	106	L1.3
	11	82	L1.3
	12	50	L1.3
	13	52	L1.3
	14	63	L1.3
	15	57	L1.3
	16	44	L1.3
	17	84	L1.3
	18	68	L1.3
	19	49	L1.3
	20	47	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenny Seely	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	Kenny Seely	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/28/11 0800
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-28-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-30-11 1355
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MG	11/30/11 1355
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12/2/11 0800
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-2-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-6-11 1103
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/6/11 1105
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/6/11 1418
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT & CORRESPONDENCE

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Foxfire Scientific, Inc.	ALCOA - TT ESL	Environmental	11/22/2011	14	11-11139
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
ALCOA - TT ESL	ALCOA - TT ESL	H	12/02/2011	12/06/2011	12/06/2011

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	U-238	Tll
01	LCS	11/22/11	SO	L1.3	X	X	X	3
02	BLANK	11/22/11	SO	L1.3	X	X	X	3
03	DUP	11/22/11	SO	L1.3	X	X	X	3
04	IB1/2-1	11/18/11 14:18	SO	L1.3	X	X	X	3
05	IB1/2-2	11/18/11 14:10	SO	L1.3	X	X	X	3
06	IB1/2-3	11/18/11 00:00	SO	L1.3	X	X	X	3
07	IB1/2-4	11/18/11 00:00	SO	L1.3	X	X	X	3
08	IB1/2-5	11/18/11 15:20	SO	L1.3	X	X	X	3
09	IB1/2-6	11/18/11 15:12	SO	L1.3	X	X	X	3
10	IB1/2-7	11/18/11 15:20	SO	L1.3	X	X	X	3
11	IB1/2-4A	11/18/11 00:00	SO	L1.3	X	X	X	3
12	IB1/2-4B	11/18/11 00:00	SO	L1.3	X	X	X	3
13	IB1/2-4C	11/18/11 00:00	SO	L1.3	X	X	X	3
14	IB1/2-4D	11/18/11 00:00	SO	L1.3	X	X	X	3
15	IB1/2-4E	11/18/11 00:00	SO	L1.3	X	X	X	3
16	IB3-1	11/18/11 15:47	SO	L1.3	X	X	X	3
17	IB3-2	11/18/11 15:42	SO	L1.3	X	X	X	3
18	IB3-3	11/18/11 15:40	SO	L1.3	X	X	X	3
19	IB3-4	11/18/11 15:50	SO	L1.3	X	X	X	3
20	IB3-5	11/18/11 15:37	SO	L1.3	X	X	X	3
	Totals Per Analysis (non QA samples)				17	17	17	

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice
Accounts Payable
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017
Voice 817-995-6762
Fax

Contact
Matthew Arno
Voice 817-563-0579
Fax 877-433-2029

Report Data
Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017
Voice 817-563-0579
Fax 877-433-2029

Printed: 11/22/2011 1:16 PM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 11-11139

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	Y	N	
If aqueous, properly preserved	Y	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	Y	N
Unbroken on outside of package?	Y	N
Present on samples?	Y	N
Unbroken on samples?	Y	N
Was chain of custody present upon sample receipt?	Y	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: (17) bags of soil

SIGNATURE: [signature] DATE: 11·22·11

Eberline Services – Oak Ridge Laboratory

DISCREPANT SAMPLE RECEIPT REPORT
MP-001-1

WORK ORDER: 11-11139	
CUSTOMER: Foxfire Scientific	
DATE RECEIVED: 11·22·11	
MATRIX: Soil	
PROBLEM: Sample ID: IB-3-3 is listed twice with two different sample times. Only one IB3-3 is in shipment.	
ACTION TAKEN: Contacted client.	
CLIENT NOTIFIED: Y	**DATE** 11·22·11 **INITIALS** JWM
CLIENTCOMMENT Client stated to remove 2nd IB3-3 from the COC. An email stating this is also provided	

1. *Shipping papers not in order.*
2. *Custody papers absent.*
3. *Analyses not specified.*
4. *Samples physically damaged.*
5. *Samples not adequately identified.*
6. *Custody seals absent or broken.*
7. *Sample screen activity levels elevated.*
8. *Amount of sample less than that required for analyses.*
9. *Number of samples does not agree with chain-of-custody.*
10. *Identification of samples does not agree with chain-of-custody.*
11. *Sample analyses requested do not agree with paperwork.*
12. *Other (describe).*

SIGNATURE: Justin McKamey Date: 11·22·11

Justin McKamey

From: Kathy Shaulis
Sent: Tuesday, November 22, 2011 12:33 PM
To: Justin McKamey
Subject: FW: Foxfire sample instructions

11-11139

From: Matthew Arno [mailto:arno@foxfirescientific.com]
Sent: Tuesday, November 22, 2011 11:59 AM
To: Kathy Shaulis
Subject: Foxfire sample instructions

Kathy,

Please forward to Justin.

There should be only one IB3-3 sample. Please line out the second IB3-3 listed on the chain of custody.

The time for IB3-4 should be 1550.

The time for IB3-5 should be 1537.

Matthew Arno, Ph.D., P.E., CHP
Vice-President, Owner
Foxfire Scientific, Inc.
4621 S. Cooper Street # 131-332
Arlington, TX 76017
office: +1 877-433-2029
direct: +1 817-563-0579
cell: +1 817-995-6762
fax: +1 877-433-2029

REC'D NOV 22 2011

0014

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-33135

December 15, 2011

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

CASE NARRATIVE
Work Order # 11-11139-OR

SAMPLE RECEIPT

This work order contains seventeen soil samples received 11/22/2011. Samples were analyzed for Isotopic Uranium, Total Uranium by Alpha and Radium-226/228.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
IB1/2-1	11-11139-04	IB1/2-4C	11-11139-13
IB1/2-2	11-11139-05	IB1/2-4D	11-11139-14
IB1/2-3	11-11139-06	IB1/2-4E	11-11139-15
IB1/2-4	11-11139-07	IB3-1	11-11139-16
IB1/2-5	11-11139-08	IB3-2	11-11139-17
IB1/2-6	11-11139-09	IB3-3	11-11139-18
IB1/2-7	11-11139-10	IB3-4	11-11139-19
IB1/2-4A	11-11139-11	IB3-5	11-11139-20
IB1/2-4B	11-11139-12		

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

0016

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

Samples demonstrated acceptable results for Uranium-234, Uranium-235 and Uranium-238 activity. Total Uranium results were calculated by mass conversion of Isotopic Uranium activity. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were prepared by drying, pulverizing and homogenization. Representative aliquots were removed and digested using mixed acids. Radium-226 was precipitated as Radium sulfate using elemental Barium and Lead as carriers. Sulfates were dissolved in alkaline EDTA. Radium-226 was selectively precipitated from slightly acidic EDTA. Precipitates were then mounted by semi-micro-precipitations onto micro-porous filters. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated acceptable results for Radium-226 activity. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for Radium-228 activity. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 12/15/2011

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11139**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.02E+01	4.71E-01			pCi/g
11-11139-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	9.51E+00	1.09E+00	2.29E+00	1.26E-01	pCi/g
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	5.18E-02	8.78E-02	8.85E-02	1.49E-01	pCi/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.36E+01	1.42E+00	3.20E+00	2.49E-01	pCi/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.25E+01	1.32E+00	2.96E+00	1.39E-01	pCi/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.14E+01	1.32E+00	2.75E+00	1.52E-01	pCi/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.19E+01	1.47E+00	2.91E+00	2.49E-01	pCi/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	8.05E+00	1.39E+00	2.20E+00	2.88E-01	pCi/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.12E+01	1.25E+00	2.68E+00	1.59E-01	pCi/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.04E+01	1.32E+00	2.56E+00	3.17E-01	pCi/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	9.33E+00	1.12E+00	2.27E+00	1.83E-01	pCi/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	9.75E+00	1.45E+00	2.52E+00	2.24E-01	pCi/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.38E+01	1.55E+00	3.30E+00	1.98E-01	pCi/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	9.83E+00	1.21E+00	2.40E+00	2.16E-01	pCi/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	8.64E+00	1.12E+00	2.14E+00	1.43E-01	pCi/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	8.94E+00	1.15E+00	2.21E+00	2.18E-01	pCi/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	2.37E+00	6.58E-01	8.28E-01	2.61E-01	pCi/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	1.26E+01	1.62E+00	3.11E+00	3.60E-01	pCi/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	7.92E+00	1.23E+00	2.08E+00	2.80E-01	pCi/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	2.13E+00	5.87E-01	7.40E-01	2.84E-01	pCi/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	12/1/2011	11-11139	Radium-226	EPA 903.0 Modified	4.45E+00	8.08E-01	1.24E+00	2.65E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11139**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	8.53E+00	4.35E-01			pCi/g
11-11139-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	7.22E+00	8.33E-01	1.83E+00	1.08E+00	pCi/g
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	7.06E-01	5.11E-01	5.36E-01	1.01E+00	pCi/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.40E+01	1.07E+00	3.34E+00	1.09E+00	pCi/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.30E+01	1.10E+00	3.13E+00	1.25E+00	pCi/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.49E+01	1.19E+00	3.59E+00	1.30E+00	pCi/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.15E+01	1.05E+00	2.82E+00	1.19E+00	pCi/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.17E+01	1.01E+00	2.84E+00	1.10E+00	pCi/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	2.59E+01	1.48E+00	6.04E+00	1.22E+00	pCi/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.57E+01	1.24E+00	3.77E+00	1.38E+00	pCi/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	2.50E+01	1.45E+00	5.84E+00	1.36E+00	pCi/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.10E+01	1.01E+00	2.69E+00	1.16E+00	pCi/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.36E+01	1.20E+00	3.30E+00	1.40E+00	pCi/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.10E+01	1.20E+00	2.77E+00	1.61E+00	pCi/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.34E+01	1.18E+00	3.24E+00	1.26E+00	pCi/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.22E+01	1.10E+00	2.97E+00	1.28E+00	pCi/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.27E+00	6.38E-01	7.00E-01	1.22E+00	pCi/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.51E+01	1.33E+00	3.66E+00	1.57E+00	pCi/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	7.71E+00	1.14E+00	2.08E+00	1.73E+00	pCi/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	1.44E+00	7.68E-01	8.35E-01	1.48E+00	pCi/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	12/6/2011	11-11139	Radium-228	EPA 904.0 Modified	2.92E+00	8.95E-01	1.11E+00	1.61E+00	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11139**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.59E-02	1.21E-01	1.21E-01	2.02E-01	ug/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	1.79E+01	2.52E+00	2.87E+00	2.94E-01	ug/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	1.88E+01	2.61E+00	2.99E+00	2.31E-01	ug/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	1.69E+01	2.30E+00	2.64E+00	1.82E-01	ug/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	8.92E+00	1.43E+00	1.59E+00	2.93E-01	ug/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.33E+00	1.48E+00	1.65E+00	1.89E-01	ug/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	5.54E+00	1.02E+00	1.11E+00	2.38E-01	ug/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	3.69E+00	7.89E-01	8.39E-01	3.16E-01	ug/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	6.25E+00	1.14E+00	1.23E+00	1.94E-01	ug/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	8.58E+00	1.32E+00	1.47E+00	2.03E-01	ug/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.10E+00	1.39E+00	1.56E+00	3.63E-01	ug/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.30E+00	1.48E+00	1.64E+00	2.56E-01	ug/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	8.40E+00	1.37E+00	1.51E+00	1.86E-01	ug/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.01E+00	1.42E+00	1.58E+00	1.73E-01	ug/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	2.70E+00	6.56E-01	6.88E-01	1.83E-01	ug/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	4.76E+00	1.03E+00	1.09E+00	2.87E-01	ug/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	4.52E+00	8.86E-01	9.52E-01	1.99E-01	ug/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	2.64E+00	7.37E-01	7.64E-01	2.99E-01	ug/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	11/29/2011	11-11139	Total Uranium	EML U-02 Modified	9.61E+00	1.55E+00	1.72E+00	2.58E-01	ug/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11139**
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Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	8.13E+00	2.93E-01			pCi/g
11-11139-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	7.59E+00	1.08E+00	1.21E+00	8.96E-02	pCi/g
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	5.23E-02	4.96E-02	4.97E-02	6.08E-02	pCi/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	6.52E+00	9.08E-01	1.02E+00	1.07E-01	pCi/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	5.95E+00	8.44E-01	9.45E-01	8.28E-02	pCi/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	5.77E+00	7.87E-01	8.88E-01	6.24E-02	pCi/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.68E+00	4.48E-01	4.88E-01	7.16E-02	pCi/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.78E+00	4.61E-01	5.02E-01	6.76E-02	pCi/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.09E+00	3.74E-01	4.02E-01	6.09E-02	pCi/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	1.55E+00	3.06E-01	3.25E-01	7.23E-02	pCi/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.51E+00	4.34E-01	4.69E-01	5.88E-02	pCi/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.73E+00	4.31E-01	4.73E-01	5.11E-02	pCi/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	3.13E+00	4.78E-01	5.28E-01	8.41E-02	pCi/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.98E+00	4.84E-01	5.29E-01	5.04E-02	pCi/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.66E+00	4.42E-01	4.81E-01	4.92E-02	pCi/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	2.55E+00	4.28E-01	4.66E-01	6.85E-02	pCi/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	8.57E-01	2.15E-01	2.23E-01	4.84E-02	pCi/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	1.60E+00	3.46E-01	3.65E-01	8.54E-02	pCi/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	1.74E+00	3.27E-01	3.50E-01	5.94E-02	pCi/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	7.69E-01	2.27E-01	2.34E-01	6.19E-02	pCi/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	11/29/2011	11-11139	Uranium-234	EML U-02 Modified	3.80E+00	5.90E-01	6.49E-01	7.55E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

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Final Report of Analysis

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Matthew Arno
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Work Order Details:

SDG: **11-11139**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.89E-01	1.49E-01	1.50E-01	8.82E-02	pCi/g
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	-8.52E-03	2.59E-02	2.60E-02	7.07E-02	pCi/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.82E-01	1.38E-01	1.39E-01	8.47E-02	pCi/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	4.05E-01	1.68E-01	1.70E-01	9.72E-02	pCi/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.86E-01	1.32E-01	1.34E-01	7.69E-02	pCi/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.77E-01	1.06E-01	1.07E-01	8.84E-02	pCi/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.48E-01	9.73E-02	9.79E-02	8.86E-02	pCi/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.67E-01	9.89E-02	9.96E-02	6.84E-02	pCi/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.65E-01	9.78E-02	9.85E-02	6.77E-02	pCi/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.21E-01	9.02E-02	9.06E-02	9.10E-02	pCi/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.51E-01	1.18E-01	1.20E-01	7.91E-02	pCi/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.47E-01	9.16E-02	9.22E-02	7.99E-02	pCi/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.24E-01	1.19E-01	1.20E-01	8.94E-02	pCi/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	5.82E-02	6.40E-02	6.42E-02	8.72E-02	pCi/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	2.07E-01	1.10E-01	1.11E-01	6.75E-02	pCi/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	4.30E-02	5.63E-02	5.64E-02	8.59E-02	pCi/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	6.73E-02	6.96E-02	6.97E-02	7.34E-02	pCi/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	6.99E-02	6.75E-02	6.76E-02	8.38E-02	pCi/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	-3.11E-03	3.64E-02	3.64E-02	7.64E-02	pCi/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	11/29/2011	11-11139	Uranium-235	EML U-02 Modified	1.35E-01	9.28E-02	9.33E-02	7.43E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11139**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11139-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	7.92E+00	2.85E-01			pCi/g
11-11139-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	7.60E+00	1.08E+00	1.21E+00	1.06E-01	pCi/g
11-11139-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.36E-02	4.03E-02	4.04E-02	5.70E-02	pCi/g
11-11139-03	DUP	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	5.98E+00	8.46E-01	9.47E-01	8.58E-02	pCi/g
11-11139-04	DO	IB1/2-1	11/18/11 14:18	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	6.26E+00	8.78E-01	9.85E-01	6.25E-02	pCi/g
11-11139-05	TRG	IB1/2-2	11/18/11 14:10	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	5.64E+00	7.72E-01	8.71E-01	4.94E-02	pCi/g
11-11139-06	TRG	IB1/2-3	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	2.97E+00	4.82E-01	5.26E-01	8.46E-02	pCi/g
11-11139-07	TRG	IB1/2-4	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.11E+00	4.98E-01	5.45E-01	4.98E-02	pCi/g
11-11139-08	TRG	IB1/2-5	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	1.84E+00	3.43E-01	3.67E-01	6.92E-02	pCi/g
11-11139-09	TRG	IB1/2-6	11/18/11 15:12	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	1.22E+00	2.65E-01	2.79E-01	9.59E-02	pCi/g
11-11139-10	TRG	IB1/2-7	11/18/11 15:20	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	2.08E+00	3.82E-01	4.10E-01	5.11E-02	pCi/g
11-11139-11	TRG	IB1/2-4A	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	2.85E+00	4.43E-01	4.87E-01	5.58E-02	pCi/g
11-11139-12	TRG	IB1/2-4B	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.04E+00	4.69E-01	5.16E-01	1.10E-01	pCi/g
11-11139-13	TRG	IB1/2-4C	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.09E+00	4.97E-01	5.44E-01	7.22E-02	pCi/g
11-11139-14	TRG	IB1/2-4D	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	2.82E+00	4.59E-01	5.01E-01	4.90E-02	pCi/g
11-11139-15	TRG	IB1/2-4E	11/18/11 00:00	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.00E+00	4.78E-01	5.24E-01	4.76E-02	pCi/g
11-11139-16	TRG	IB3-1	11/18/11 15:47	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	9.00E-01	2.20E-01	2.29E-01	4.82E-02	pCi/g
11-11139-17	TRG	IB3-2	11/18/11 15:42	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	1.59E+00	3.45E-01	3.63E-01	8.51E-02	pCi/g
11-11139-18	TRG	IB3-3	11/18/11 15:40	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	1.51E+00	2.98E-01	3.17E-01	5.39E-02	pCi/g
11-11139-19	TRG	IB3-4	11/18/11 15:50	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	8.87E-01	2.48E-01	2.56E-01	8.86E-02	pCi/g
11-11139-20	TRG	IB3-5	11/18/11 15:37	11/22/2011	11/29/2011	11-11139	Uranium-238	EML U-02 Modified	3.21E+00	5.21E-01	5.69E-01	7.52E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials [illegible]

U-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities

Refer to attached technical data sheet

Radioactive Daughters

Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11 MC

SOLUTION REFERENCE # IPL 479-50

CURRENT DATE ~~10/12/2010~~ 0:00
SOLUTION # U-8

Principal Radionuclide: $^{234,235,238}U$

Half Life, Years: 4.468E+09

Half Life, Days: 1.632E+12

Radionuclide: $^{234,235,238}U$

Certified Activity: 8.016E+00 µCi

Certified Concentration: µCi per gram

Reference Date: 1/1/1995 0:00

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution
Uranyl nitrate in dilute HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 8.0160 µCi Which Equals 1.780E+07 dpm at the date listed above

And after dilution the activity of this solution is 1.77955E+04 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Fuller Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: **Radioactive Reference Standards Solutions & Records**

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # IPL 479-50

Date 10/12/2010 0:00
Solution # U-8a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide of Interest $^{234,235,238}U$
Parent Solution Conc. 1.7796E+04 dpm/ml

Reference Date 1/1/1995 0:00

Chemical Composition of Standard Solution
Uranly Nitrate in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 4.0000 ml
Total Activity: 7.1182E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1182E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By _____ Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

0029

RECORD COPY

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67
Measurement	Reference date:		01 March 2000
	Radioactive concentration U-232		6.739E+03 becquerels per gram of solution
	which is equivalent to		1.821E-01 microcuries per gram of solution
	Mass of solution		5.356 grams
	Volume of solution		5.035 millilitres
	Total activity of U-232		3.61E+04 becquerels
	which is equivalent to		9.76E-01 microcuries

Method of measurement (see reverse of this certificate)

Accuracy Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Roger Wiltshire

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11

CURRENT DATE: 10/13/2010 0:00

SOLUTION REFERENCE #: AEA/Amersham 92/232/67

SOLUTION #: U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide: ^{232}U

Reference Date: 3/1/2000 0:00

Certified Activity: 9.760E-01 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams

Empty Ampoule: Weight, Grams

Solution Net: Weight, Grams

Total Activity in Ampoule: 0.9760 µCi

Chemical Composition of Standard Solution

$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used: 2M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.9760 µCi Which Equals 2.167E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.167E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Martin R. Kelly Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # AEA/Amersham 92/232/67

Date 11/9/2009 0:00
Solution # U-10a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide of Interest ^{232}U
Parent Solution Conc. 2.167E+03 dpm/ml

Reference Date 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Keller Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

0032

Ba-6
(# 6a)

National Institute of Standards & Technology

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

0033

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 9/30/2011 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium

Reference Date: 9/1/1993 0:00

Certified Activity: µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin R. Keller Date: 10/10/11

QC Approval J. Halan Date: 10/12/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS

SECONDARY DILUTION RECERTIFICATION

Solution Reference # QCP-009-1-A NIST SRM4251C

Date 9/30/11
Solution # Ba-6a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.048E+01	3.828E+03

Radionuclide of Interest ^{133}Ba

Parent Solution Conc. 1.48E+05 dpm/ml

Reference Date 9/1/1993 0:00

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml
Total Activity: 3.6950E+06 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin A. Keller Date: 10/10/11

QC Approval _____ Date: 10/10/11

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Ra-5
QA/QC REVIEWED
Date 2/8/94 Initials WT

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity:	(Ra-226) 1.001 μCi.
		Contained Radioactivity:	(Ra-226) 37.0 kBq.

Description of Solution

a. Mass of solution: 5.1864 g (in a 5 ml Flame Sealed Ampoule)

b. Chemical form: Ra(NO3)2 in 1 N HNO3

c. Carrier content: None added

d. Density: 1.0318 g/ml @ 20°C.

Radioimpurities None detected(other than daughters)

Radioactive Daughters

Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±3.4%

b. Random uncertainty in assay: ±3.1%

c. Random uncertainty in weighing(s): ±0.2%

d. Total uncertainty at the 99% confidence level: ±4.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Kuen
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/30/2011 0:00

SOLUTION REFERENCE #: IPL 453-26

SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium

Reference Date: 2/1/1994 0:00

Certified Activity: 1.001E+00 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams

Empty Ampoule: Weight, Grams

Solution Net: Weight, Grams

Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution

$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 30, 2012

Diluted By: _____ Date: 11/30/2011

Verified & Approved By: Martin R. Keller Date: 11/30/11

QC Approval: _____ Date: 11/30/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009
Solution Reference # IPL-453-26

Date 11/30/2011 0:00
Solution # Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest ^{226}Radium
Parent Solution Conc. 2.22E+03 dpm/ml

Reference Date 2/1/1994 0:00

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 20.0000 ml
Total Activity: 4.4440E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml
This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: November 30, 2012

Recertified By _____ Date: 11/30/2011 0:00

Verified & Approved By Martin R. Helm Date: 11/30/11

QC Approval _____ Date: 11/30/11

RA-11

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 μg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 11/7/01

New vial from the 6/11/01 shipment.
P.S. Different activity level
8/19/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 4/13/2011 0:00

SOLUTION REFERENCE #: Analytics 62680-416

SOLUTION #: Ra-11

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Ra	5.750E+00	2.100E+03

Radionuclide: ^{226}Ra

Reference Date: 11/7/2001 0:00

Certified Activity: 6.966E-02 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0699	µCi

Chemical Composition of Standard Solution

$^{226}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 13, 2012

Recertified By _____ Date: 4/20/11

Verified & Approved By _____ Date: 8/9/11

QC Approval _____ Date: 8/9/11

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	UUISO	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	0.86	93.35%	15.96%	100.00%	3.60%	8.13E+00	2.93E-01	7.59E+00	1.21E+00	U-8a	3.52E+01	3.60E+00	5.12E-01
U-238	0.51	95.99%	15.95%	100.00%	3.60%	7.92E+00	2.85E-01	7.60E+00	1.21E+00	U-8a	3.44E+01	3.60E+00	5.12E-01

Matrix Spike

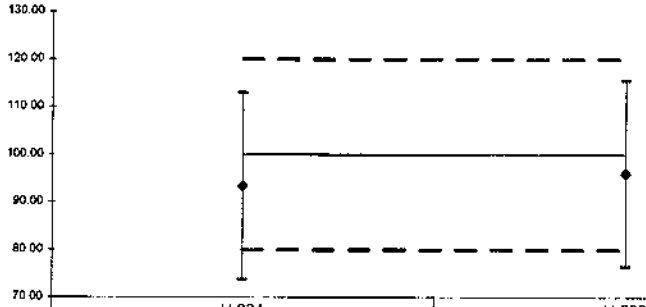
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample / QC Summary

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
U-234	0.81	9.16	5.95E+00	9.45E-01	6.52E+00	1.02E+00	0.93	OK	OK			OK	OK
U-238	0.41	4.66	6.26E+00	9.85E-01	5.98E+00	9.47E-01	0.96	OK	OK			OK	OK
U-235	1.10	35.76	4.05E-01	1.70E-01	2.82E-01	1.39E-01		OK	OK			NA	OK

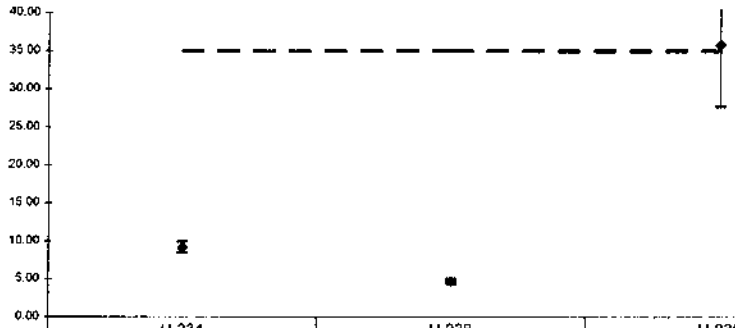
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	UUISO	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



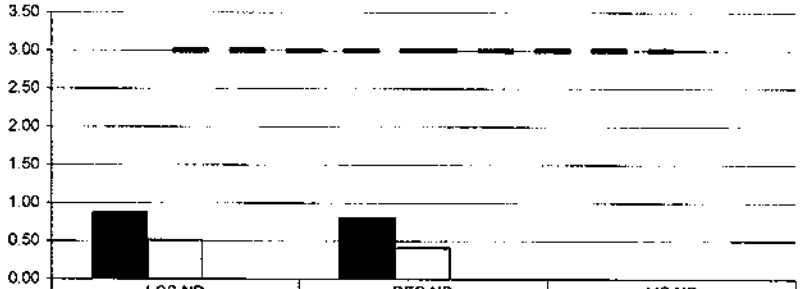
	U-234	U-238
Lower Error	73.79	76.43
Upper Error	112.92	115.54
%R	93.35	95.99
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	9.89	5.03	43.82
Upper Error	8.44	4.29	27.71
RPD	9.16	4.66	35.76
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	0.86	0.81	0.00
U-238	0.51	0.41	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	Ra226	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.62	92.85%	24.06%	100.00%	4.60%	1.02E+01	4.71E-01	9.51E+00	2.29E+00	Ra-5b	4.41E+01	4.60E+00	5.16E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-226	0.48	8.14	1.25E+01	2.96E+00	1.36E+01	3.20E+00

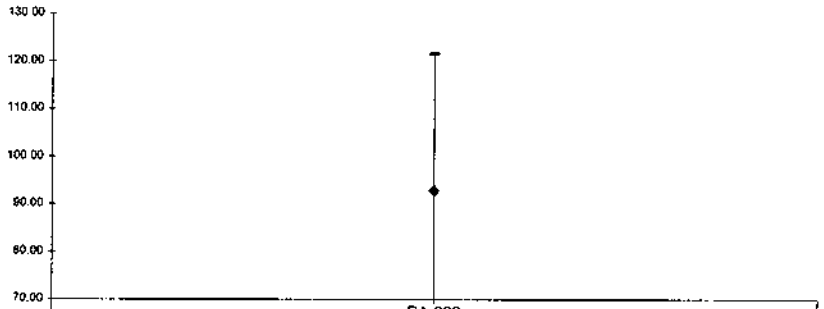
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
0.93	OK	OK			OK	OK

Version

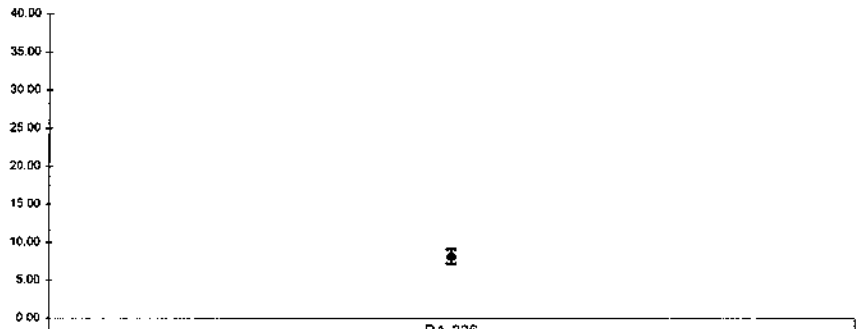
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	Ra226	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



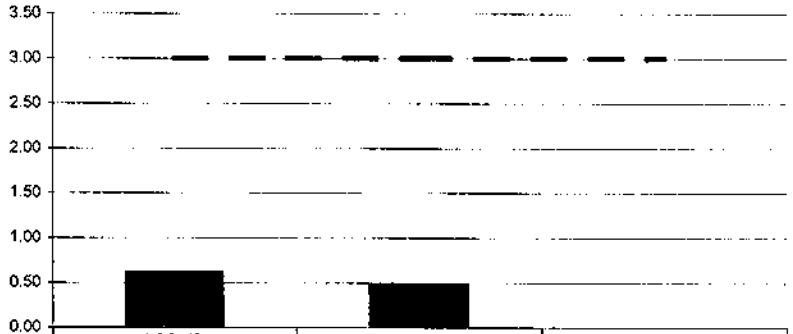
	RA-226
Lower Error	64.19
Upper Error	121.51
%R	92.85
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	9.11
Upper Error	7.18
RPD	8.14
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.62	0.48	0.00
UCL	3	3	3

No Matrix Spike

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	Ra228	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	1.38	84.63%	25.41%	100.00%	5.10%	8.53E+00	4.35E-01	7.22E+00	1.83E+00	Ra-11	4.62E+01	5.10E+00	4.10E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-228	0.44	7.66	1.30E+01	3.13E+00	1.40E+01	3.34E+00

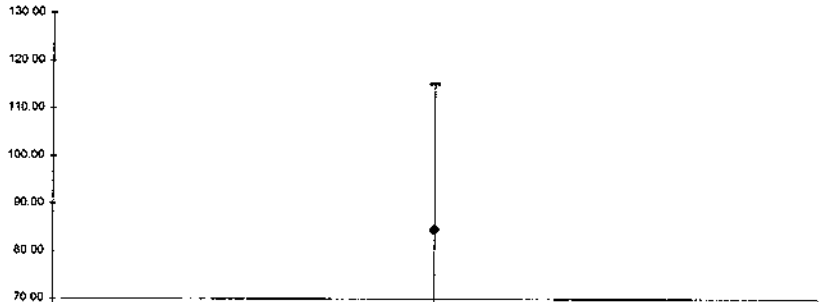
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
0.85	OK	OK			NA	OK

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11139	Ra228	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery

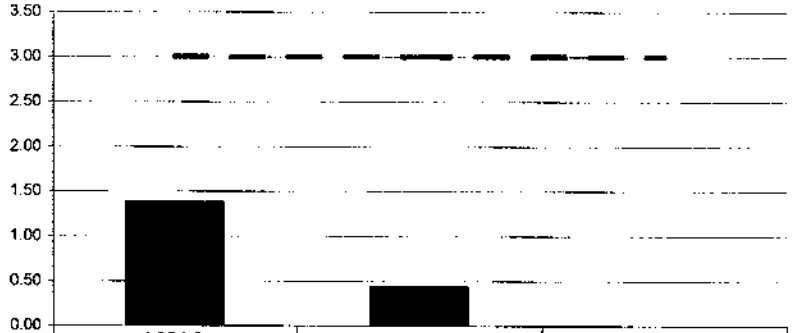


	RA-228
Lower Error	54.12
Upper Error	115.15
%R	84.63
LCL	80
Mean	100
UCL	120

Replicate Sample RPD

	RA-228
Lower Error	8.58
Upper Error	6.74
RPD	7.66
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	1.38	0.44	0.00
UCL	3	3	3

No Matrix Spike

Version

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO-U NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11139
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/22/11 16:54	CHEM	JDEMELAS	~~Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl, Centrifuged samples a~~nd passed through columns; ~~Rinsed G-Tubes with 20 ml 8N HCl and passed through columns, Washed columns~~ with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, ~~and 10 ml of 6.5N HCl, Eluted Uranium with 60 m~~l of 0.5N HCl into clean, labeled 100-ml beakers; ~~Dried down samples on hotplate, Dissolved samples in ~~10 ml of con~~centrated HCl, Transferred to new, labeled G-Tubes with deiononized water. Set samples aside for la~~ter ~~precipitation and filtering.~~ 11/23/11
2	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS

11/23/11

EBERLINE SERVICES **Work Order Analysis Notes**	**Oak Ridge Laboratory** **601 Scarboro Rd.** **Oak Ridge, TN 37830** **Voice: 865.481.0683** **www.eberlineservices.com**	Internal Work Order	11-11139
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS
2	11/28/11 16.34	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0 04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.

John DeMeles
11/28/11

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	11-11139
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS
2	11/28/11 16:34	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.
3	11/29/11 06:32	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES; LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY, COMPLETED PAPERWORK & SENT SET TO COUNT ROOM.

RMA
11/29/11

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11139	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
011745P	Anion Exchange Resin	Reagent Grade	JDEMELAS	11/28/2011
011763D01	Hydrochloric Acid	0.5N	JDEMELAS	11/28/2011
011733S	Hydrochloric Acid	6.5N	JDEMELAS	11/28/2011
011707P	Hydrochloric Acid	Reagent Grade	JDEMELAS	11/28/2011
011819S	Hydrochloric Acid	8N	JDEMELAS	11/28/2011
011823S	HCl - NH4I	8N - 0.1M	JDEMELAS	11/28/2011
011812S	HCl - HF	6.5N - 0.04N	JDEMELAS	11/28/2011
011816S	Carbon substrate	Solution	RMARTZ	11/29/2011
011507P	Hydrofluoric Acid	Reagent Grade	RMARTZ	11/29/2011
011549S	Neodymium Carrier	1 mg/ml	RMARTZ	11/29/2011
011433P	Reagent Alcohol	Reagent Grade	RMARTZ	11/29/2011
011655P	Titanous Chloride	Reagent Grade	RMARTZ	11/29/2011

Alpha #2

DATE	Sample #	Client	Lab Time	CT Time	Analysis	Tech
11/28/14	1110138A(10-20)	USA	0876	24hr	44250	[illegible]
~~11/28/14~~	~~1110138A(15-20)~~ 11/28/14					
11/28/14	1110138A (1-12)	USA	1205	24hr	74250	[illegible]
11/25/14	Daily Pulse	LAB	0822	10min	MA	[illegible]
11/25/14	1111138A(1-12)	Tox Blue	0852	24hr	44250	[illegible]

Alpha #3

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
11/28/11	1110057A(1-4)	UCOR	0808	2hr 50m	U4,Z50	C
11/28/11	1110057A(5-7)(9)	UCOR	0802	2hr 50m	U4N7	C
11/28/11	1110138A(1,2)	USA	0835	2hr 50m	U4Z50	C
11/28/11	1110002A(1-14)	USA	1055	2hr 50m	U4Z50	C
11/28/11	1110174A(13,14)	USA	1207	2hr 50m	Th,Z50	C
	~~[illegible]~~					
11/28/11	1110138A(15-20)	USA	1351	2hr 50m	Th	KB
11/28/11	1111027A(1-4)	Unitech	1404	2hr 50m	Th	KB
11/28/11	1110138A(1-14)	USA	1740	2hr 50m	Th	KB
11/29/11	Daily Pulse	LAB	0522	10min	N/A	C
11/29/11	1111143A(4,6,8,10)	UCOR	0808	2hr 50m	Am-241	C
11/29/11	1111143A(1-4,6,8,10)	UCOR	0811	2hr 50m	Am-241	C
11/29/11	1111139A(13-20)	Foxfire	1105	2hr 50m	U4,Z50	C
11/29/11	1111143A(1-4,6,8,10,13)	UCOR	1113	2hr 50m	Pu-Z50	C

RA-226 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11139
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11139
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	11/30/11 13:45	CHEM	TSMITH	Followed steps 12.2 to 12.8 in AP-006 rev. 9 . (Sringe filtered samples. Precipitated and filtered samples, obtained final weights, and took to count room)

11-30-11
JM

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11139	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
010032P	Acetic Acid	Reagent Grade	TSMITH	11/30/2011
011383P	Acetic Acid	Reagent Grade	TSMITH	11/30/2011

Alpha #1

DATE	Sample #	Client	Loc Time	CT Time	Analysis	Tech
12/1/11	1111139A(17-20)	Forfire	1704	2hr 50min	Ra6	KB
12/1/11	1111010A(1-3)	USA	1709	2hr 00min	Th	KB

Alpha #3

DATE	Sample #	Client	Lost Time	CT Time	Analysis	Tech
11/28/11	1110057A(1-4)	UCOR	0808	2hr50m	U-Th Iso	C
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U-Int	C
11/28/11	1110138A(1,2)	USA	0835	2hr50m	U-Iso	C
11/28/11	1110002A(1-14)	USA	1055	2hr50m	U-Th Iso	C
11/28/11	1110074A(13,14)	USA	1207	2hr50m	Th Iso	C
	~~1110074A~~					
11/28/11	1110138A(15-20)	USA	1351	2hr50m	Th	KB
11/28/11	1110027A(1-4)	Unitech	1404	2hr50m	Th	KB
11/28/11	1110138A(1-16)	USA	1740	2hr50m	Th	KB
11/29/11	Daily Pulse	LAB	0522	10min	N/A	C
11/29/11	1111147A(4,6,8,10)	UCOR	0808	2hr50m	Am-241	C
11/29/11	1111147A(1-4,6,8,10)	UCOR	0811	2hr50m	Am-241	C
11/29/11	1111138A(13-20)	Foxfire	1105	2hr50m	U-Iso	C
11/29/11	1111147A(1-4,6,8,10,13)	UCOR	1113	2hr50m	Pu-Iso	C
11/29/11	1110002A(4-19)	USA	1536	2hr50m	Th	KB
~~11/29/11~~	~~1111143A(4,6,8,10)~~	~~UCOR~~ KB 11/29/11	~~1527~~	~~2hr50m~~	~~PU-INT~~	~~KB~~
11/30/11	Daily Pulse	LAB	0517	10min	N/A	C
11/30/11	1110062A(1-4,6,8)	UCOR	0744	2hr50m	Am-241	C
11/30/11	1111140A(13-20)	Foxfire	0847	2hr50m	U-Iso	C
11/30/11	1111141A(1-8)	Foxfire	1052	2hr50m	U-Iso	C
11/30/11	1111141A(9,10)	Foxfire	1152	2hr50m	U-Iso	C
11/30/11	1110007A(1-6)	USA	1157	2hr50m	Th Iso	C
~~11/30/11~~	~~1110007A(10-16)~~	~~USA~~		~~2hr50m~~	~~iso-Th~~	~~AG~~
11/30/11	1110007A (9-20)	USA	1632	2hr50m	iso-U	AG
12/1/11	Daily Pulse	LAB	0574	10min	N/A	C
12/1/11	Daily Pulse	LAB	0751	10min	N/A	C
12/1/11	1111157A(1-4)	UCOR	0812	2hr50m	Am-241	C
12/1/11	1111157A(1-4)	UCOR	0815	2hr50m	Am-241	C
12/1/11	1111087A(1-4)	UCOR	0818	2hr50m	Am-241	C
12/1/11	1111157A(1-4)	UCOR	0821	2hr50m	U-Iso	C
12/1/11	1111010A(6-20)	USA	1122	2hr50m	U-Iso	C
12/1/11	1111157A(1-4)	UCOR	0821	2hr50m	U-Iso	C
12/1/11	1111139A(1-16)	Foxfire	1705	2hr50m	Rad	KB

RA-228 NOTES

EBERLINE SERVICES **Work Order Analysis Notes**	**Oak Ridge Laboratory** **601 Scarboro Rd.** **Oak Ridge, TN 37830** **Voice: 865.481.0683** **www.eberlineservices.com**	Internal Work Order	11-11139
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11139
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/02/11 16:01	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to samples and swirled.
3	12/02/11 16:51	CHEM	TSMITH	Followed steps 12.2 to 12.9 in AP-007 rev. 14 . (Chemical cleanup for Ra 228)
4	12/05/11 17:14	CHEM	TSMITH	Followed steps 12.2 to 12.9 in AP-007 rev. 14 . (Chemical cleanup for Ra 228)
5	12/06/11 09:30	CHEM	TSMITH	Followed steps 12.10 to 12.18 in AP-007 rev. 14 . (Precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated and filtered samples, obtained final weights, covered with aluminum foil, and took to count room)

12-6-11
JW

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11139	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
011821S	EDTA	0.25M	TSMITH	12/2/2011
010689D31	Ammonium Sulfide	2%	TSMITH	12/2/2011
011283D02	Lead Carrier	1.5 mg/ml	TSMITH	12/5/2011
011708P	Nitric Acid	Reagent Grade	TSMITH	12/5/2011
011314S	Yttrium Carrier	9 mg/ml	TSMITH	12/5/2011
010689D32	Ammonium Sulfide	2%	TSMITH	12/5/2011
011382D11	Nitric Acid	1N	TSMITH	12/6/2011
010411D15	Sodium Hydroxide	10M	TSMITH	12/6/2011
011795S	Sodium Hydroxide	18M	TSMITH	12/6/2011
011708D02	Nitric Acid	6N	TSMITH	12/6/2011
011660S	Ammonium Oxalate	5%	TSMITH	12/6/2011

LB 4110 Red

DATE	Sample#	Client	Load Time	Count Time	Analysis	Tech
12/6/14	BKGD QC	LAP	0600	60m	α/β	[illegible]
12/6/14	111170MP(1-75)	UCOR	0801	10m	MP-272	[illegible]
12/6/14	111108MP(1-12)	UCOR	0801	10m	MP-272	[illegible]
12/6/14	111139RA(1-12)	FoxFire	1117	2 hrs	Ra8	KCB

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

11-11139
UUISO
Run 1

Work Order	11-11139
Analysis Code	UUISO
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML U-02 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.356
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB1/2-1	80	11/18/11 14:18	1.0116E+00
04	DO	IB1/2-1	80	11/18/11 14:18	1.0085E+00
05	TRG	IB1/2-2	78	11/18/11 14:10	1.0032E+00
06	TRG	IB1/2-3	64	11/18/11 00:00	1.0114E+00
07	TRG	IB1/2-4	75	11/18/11 00:00	1.0203E+00
08	TRG	IB1/2-5	76	11/18/11 15:20	1.0092E+00
09	TRG	IB1/2-6	81	11/18/11 15:12	1.0022E+00
10	TRG	IB1/2-7	106	11/18/11 15:20	1.0163E+00
11	TRG	IB1/2-4A	82	11/18/11 00:00	1.0003E+00
12	TRG	IB1/2-4B	50	11/18/11 00:00	1.0130E+00
13	TRG	IB1/2-4C	52	11/18/11 00:00	1.0010E+00
14	TRG	IB1/2-4D	63	11/18/11 00:00	1.0004E+00
15	TRG	IB1/2-4E	57	11/18/11 00:00	1.0638E+00
16	TRG	IB3-1	44	11/18/11 15:47	1.0065E+00
17	TRG	IB3-2	84	11/18/11 15:42	1.0105E+00
18	TRG	IB3-3	68	11/18/11 15:40	1.0036E+00
19	TRG	IB3-4	49	11/18/11 15:50	1.0051E+00
20	TRG	IB3-5	47	11/18/11 15:37	1.0118E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
UUISO
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6161	11.9		0.00								
02	MBL	0.6132	11.9		0.00								
03	DUP	0.6135	11.9		0.00								
04	DO	0.6135	11.9		0.00								
05	TRG	0.6130	11.9		0.00								
06	TRG	0.6124	11.9		0.00								
07	TRG	0.6135	11.9		0.00								
08	TRG	0.6129	11.9		0.00								
09	TRG	0.6133	11.9		0.00								
10	TRG	0.6125	11.9		0.00								
11	TRG	0.6097	11.8		0.00								
12	TRG	0.6122	11.8		0.00								
13	TRG	0.6124	11.9		0.00								
14	TRG	0.6131	11.9		0.00								
15	TRG	0.6132	11.9		0.00								
16	TRG	0.6116	11.8		0.00								
17	TRG	0.6113	11.8		0.00								
18	TRG	0.6160	11.9		0.00								
19	TRG	0.6110	11.8		0.00								
20	TRG	0.6112	11.8		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
UUISO
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 06:40	JBARNARD				
02	MBL			11/23/11 06:40	JBARNARD				
03	DUP			11/23/11 06:40	JBARNARD				
04	DO	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
05	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
06	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
07	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
08	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
09	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
10	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
11	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
12	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
13	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
14	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
15	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
16	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
17	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
18	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
19	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				
20	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:40	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/g	7.59E+00	1.08E+00	8.96E-02	8.13E+00	93.35	OK		OK	
02	U-234	MBL	BLANK	pCi/g	5.23E-02	4.96E-02	6.08E-02					OK	OK
03	U-234	DUP	IB1/2-1	pCi/g	6.52E+00	9.08E-01	1.07E-01				OK	OK	
04	U-234	DO	IB1/2-1	pCi/g	5.95E+00	8.44E-01	8.28E-02					OK	
05	U-234	TRG	IB1/2-2	pCi/g	5.77E+00	7.87E-01	6.24E-02					OK	
06	U-234	TRG	IB1/2-3	pCi/g	2.68E+00	4.48E-01	7.16E-02					OK	
07	U-234	TRG	IB1/2-4	pCi/g	2.78E+00	4.61E-01	6.76E-02					OK	
08	U-234	TRG	IB1/2-5	pCi/g	2.09E+00	3.74E-01	6.09E-02					OK	
09	U-234	TRG	IB1/2-6	pCi/g	1.55E+00	3.06E-01	7.23E-02					OK	
10	U-234	TRG	IB1/2-7	pCi/g	2.51E+00	4.34E-01	5.88E-02					OK	
11	U-234	TRG	IB1/2-4A	pCi/g	2.73E+00	4.31E-01	5.11E-02					OK	
12	U-234	TRG	IB1/2-4B	pCi/g	3.13E+00	4.78E-01	8.41E-02					OK	
13	U-234	TRG	IB1/2-4C	pCi/g	2.98E+00	4.84E-01	5.04E-02					OK	
14	U-234	TRG	IB1/2-4D	pCi/g	2.66E+00	4.42E-01	4.92E-02					OK	
15	U-234	TRG	IB1/2-4E	pCi/g	2.55E+00	4.28E-01	6.85E-02					OK	
16	U-234	TRG	IB3-1	pCi/g	8.57E-01	2.15E-01	4.84E-02					OK	
17	U-234	TRG	IB3-2	pCi/g	1.60E+00	3.46E-01	8.54E-02					OK	
18	U-234	TRG	IB3-3	pCi/g	1.74E+00	3.27E-01	5.94E-02					OK	
19	U-234	TRG	IB3-4	pCi/g	7.69E-01	2.27E-01	6.13E-02					OK	
20	U-234	TRG	IB3-5	pCi/g	3.80E+00	5.90E-01	7.55E-02					OK	

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	11/22/11 00:00	1.00E+00	101.67	0.00	0.00			
02	U-234	MBL	11/22/11 00:00	1.00E+00	126.11	0.00	0.00			
03	U-234	DUP	11/18/11 14:18	1.01E+00	123.85	0.00	0.00			
04	U-234	DO	11/18/11 14:18	1.01E+00	124.20	0.00	0.00			
05	U-234	TRG	11/18/11 14:10	1.00E+00	137.02	0.00	0.00			
06	U-234	TRG	11/18/11 00:00	1.01E+00	143.50	0.00	0.00			
07	U-234	TRG	11/18/11 00:00	1.02E+00	129.85	0.00	0.00			
08	U-234	TRG	11/18/11 15:20	1.01E+00	143.25	0.00	0.00			
09	U-234	TRG	11/18/11 15:12	1.00E+00	125.13	0.00	0.00			
10	U-234	TRG	11/18/11 15:20	1.02E+00	110.95	0.00	0.00			
11	U-234	TRG	11/18/11 00:00	1.00E+00	142.82	0.00	0.00			
12	U-234	TRG	11/18/11 00:00	1.01E+00	145.65	0.00	0.00			
13	U-234	TRG	11/18/11 00:00	1.00E+00	110.20	0.00	0.00			
14	U-234	TRG	11/18/11 00:00	1.00E+00	120.62	0.00	0.00			
15	U-234	TRG	11/18/11 00:00	1.06E+00	123.80	0.00	0.00			
16	U-234	TRG	11/18/11 15:47	1.01E+00	118.56	0.00	0.00			
17	U-234	TRG	11/18/11 15:42	1.01E+00	102.11	0.00	0.00			
18	U-234	TRG	11/18/11 15:40	1.00E+00	146.83	0.00	0.00			
19	U-234	TRG	11/18/11 15:50	1.01E+00	96.39	0.00	0.00			
20	U-234	TRG	11/18/11 15:37	1.01E+00	108.87	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	11/29/11 08:52		A_Spec	Alpha_017	170.03	5.07 E+02	5.00 E-03	17.5
02	U-234	MBL	11/29/11 08:52		A_Spec	Alpha_020	170.02	5.15 E+00	5.00 E-03	20.7
03	U-234	DUP	11/29/11 08:52		A_Spec	Alpha_021	170.02	4.99 E+02	1.40 E-02	16.2
04	U-234	DO	11/29/11 08:52		A_Spec	Alpha_022	170	4.53 E+02	6.00 E-03	16.1
05	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_023	170.02	4.85 E+02	3.00 E-03	16.2
06	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_024	170.02	2.24 E+02	5.00 E-03	15.3
07	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_025	170	2.32 E+02	4.00 E-03	16.7
08	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_026	170.02	1.80 E+02	3.00 E-03	15.8
09	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_028	170.02	1.35 E+02	6.00 E-03	18.4
10	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_029	170	2.04 E+02	2.00 E-03	19.1
11	U-234	TRG	11/29/11 08:52		A_Spec	Alpha_030	170	2.66 E+02	2.00 E-03	17.4
12	U-234	TRG	11/29/11 08:53		A_Spec	Alpha_031	170	2.90 E+02	1.20 E-02	16.7
13	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_033	170	2.47 E+02	1.00 E-03	19.9
14	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_034	170	2.26 E+02	1.00 E-03	18.7
15	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_035	170	2.23 E+02	5.00 E-03	17.6
16	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_036	170	7.38 E+01	1.00 E-03	19.2
17	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_037	170	1.12 E+02	0.00 E+00	18.1
18	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_038	170	1.53 E+02	3.00 E-03	15.9
19	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_039	170	5.18 E+01	1.00 E-03	18.5
20	U-234	TRG	11/29/11 11:05		A_Spec	Alpha_040	170	3.02 E+02	0.00 E+00	19.1

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: TTLUU
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	Total U	LCS	LCS	ug/g	2.27E+01	3.23E+00	3.56E-01	2.36E+01	96.55	OK		OK	
02	Total U	MBL	BLANK	ug/g	9.59E-02	1.21E-01	2.02E-01					OK	INV
03	Total U	DUP	IB1/2-1	ug/g	1.79E+01	2.52E+00	2.94E-01				OK	OK	
04	Total U	DO	IB1/2-1	ug/g	1.88E+01	2.61E+00	2.31E-01					OK	
05	Total U	TRG	IB1/2-2	ug/g	1.69E+01	2.30E+00	1.82E-01					OK	
06	Total U	TRG	IB1/2-3	ug/g	8.92E+00	1.43E+00	2.93E-01					OK	
07	Total U	TRG	IB1/2-4	ug/g	9.33E+00	1.48E+00	1.89E-01					OK	
08	Total U	TRG	IB1/2-5	ug/g	5.54E+00	1.02E+00	2.38E-01					OK	
09	Total U	TRG	IB1/2-6	ug/g	3.69E+00	7.89E-01	3.16E-01					OK	
10	Total U	TRG	IB1/2-7	ug/g	6.25E+00	1.14E+00	1.94E-01					OK	
11	Total U	TRG	IB1/2-4A	ug/g	8.58E+00	1.32E+00	2.03E-01					OK	
12	Total U	TRG	IB1/2-4B	ug/g	9.10E+00	1.39E+00	3.63E-01					OK	
13	Total U	TRG	IB1/2-4C	ug/g	9.30E+00	1.48E+00	2.56E-01					OK	
14	Total U	TRG	IB1/2-4D	ug/g	8.40E+00	1.37E+00	1.86E-01					OK	
15	Total U	TRG	IB1/2-4E	ug/g	9.01E+00	1.42E+00	1.73E-01					OK	
16	Total U	TRG	IB3-1	ug/g	2.70E+00	6.56E-01	1.83E-01					OK	
17	Total U	TRG	IB3-2	ug/g	4.76E+00	1.03E+00	2.87E-01					OK	
18	Total U	TRG	IB3-3	ug/g	4.52E+00	8.86E-01	1.99E-01					OK	
19	Total U	TRG	IB3-4	ug/g	2.64E+00	7.37E-01	2.99E-01					OK	
20	Total U	TRG	IB3-5	ug/g	9.61E+00	1.55E+00	2.58E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: TTLUU
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	Total U	LCS	11/22/11 00:00	1.00E+00	101.67	0.00	0.00			
02	Total U	MBL	11/22/11 00:00	1.00E+00	126.11	0.00	0.00			
03	Total U	DUP	11/18/11 14:18	1.01E+00	123.85	0.00	0.00			
04	Total U	DO	11/18/11 14:18	1.01E+00	124.20	0.00	0.00			
05	Total U	TRG	11/18/11 14:10	1.00E+00	137.02	0.00	0.00			
06	Total U	TRG	11/18/11 00:00	1.01E+00	143.50	0.00	0.00			
07	Total U	TRG	11/18/11 00:00	1.02E+00	129.85	0.00	0.00			
08	Total U	TRG	11/18/11 15:20	1.01E+00	143.25	0.00	0.00			
09	Total U	TRG	11/18/11 15:12	1.00E+00	125.13	0.00	0.00			
10	Total U	TRG	11/18/11 15:20	1.02E+00	110.95	0.00	0.00			
11	Total U	TRG	11/18/11 00:00	1.00E+00	142.82	0.00	0.00			
12	Total U	TRG	11/18/11 00:00	1.01E+00	145.65	0.00	0.00			
13	Total U	TRG	11/18/11 00:00	1.00E+00	110.20	0.00	0.00			
14	Total U	TRG	11/18/11 00:00	1.00E+00	120.62	0.00	0.00			
15	Total U	TRG	11/18/11 00:00	1.06E+00	123.80	0.00	0.00			
16	Total U	TRG	11/18/11 15:47	1.01E+00	118.56	0.00	0.00			
17	Total U	TRG	11/18/11 15:42	1.01E+00	102.11	0.00	0.00			
18	Total U	TRG	11/18/11 15:40	1.00E+00	146.83	0.00	0.00			
19	Total U	TRG	11/18/11 15:50	1.01E+00	96.39	0.00	0.00			
20	Total U	TRG	11/18/11 15:37	1.01E+00	108.87	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: TTLUU
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	Total U	LCS	11/29/11 08:52		A_Spec	Alpha_017	170.03	5.10 E+02	9.00 E-03	17.5
02	Total U	MBL	11/29/11 08:52		A_Spec	Alpha_020	170.02	3.32 E+00	4.00 E-03	20.7
03	Total U	DUP	11/29/11 08:52		A_Spec	Alpha_021	170.02	4.59 E+02	7.00 E-03	16.2
04	Total U	DO	11/29/11 08:52		A_Spec	Alpha_022	170	4.79 E+02	2.00 E-03	16.1
05	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_023	170.02	4.77 E+02	1.00 E-03	16.2
06	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_024	170.02	2.49 E+02	9.00 E-03	15.3
07	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_025	170	2.61 E+02	1.00 E-03	16.7
08	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_026	170.02	1.59 E+02	0.00 E+00	15.8
09	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_028	170.02	1.06 E+02	1.50 E-02	18.4
10	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_029	170	1.70 E+02	1.00 E-03	19.1
11	Total U	TRG	11/29/11 08:52		A_Spec	Alpha_030	170	2.67 E+02	3.00 E-03	17.4
12	Total U	TRG	11/29/11 08:53		A_Spec	Alpha_031	170	2.83 E+02	2.60 E-02	16.7
13	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_033	170	2.57 E+02	0.00 E+00	19.9
14	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_034	170	2.40 E+02	1.00 E-03	18.7
15	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_035	170	2.63 E+02	1.00 E-03	17.6
16	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_036	170	7.78 E+01	1.00 E-03	19.2
17	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_037	170	1.12 E+02	0.00 E+00	18.1
18	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_038	170	1.34 E+02	2.00 E-03	15.9
19	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_039	170	6.00 E+01	0.00 E+00	18.5
20	Total U	TRG	11/29/11 11:05		A_Spec	Alpha_040	170	2.56 E+02	0.00 E+00	19.1

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/g	7.60E+00	1.08E+00	1.06E-01	7.92E+00	95.99	OK		OK	
02	U-238	MBL	BLANK	pCi/g	3.36E-02	4.03E-02	5.70E-02					OK	OK
03	U-238	DUP	IB1/2-1	pCi/g	5.98E+00	8.46E-01	8.58E-02				OK	OK	
04	U-238	DO	IB1/2-1	pCi/g	6.26E+00	8.78E-01	6.25E-02					OK	
05	U-238	TRG	IB1/2-2	pCi/g	5.64E+00	7.72E-01	4.94E-02					OK	
06	U-238	TRG	IB1/2-3	pCi/g	2.97E+00	4.82E-01	8.46E-02					OK	
07	U-238	TRG	IB1/2-4	pCi/g	3.11E+00	4.98E-01	4.98E-02					OK	
08	U-238	TRG	IB1/2-5	pCi/g	1.84E+00	3.43E-01	6.92E-02					OK	
09	U-238	TRG	IB1/2-6	pCi/g	1.22E+00	2.65E-01	9.59E-02					OK	
10	U-238	TRG	IB1/2-7	pCi/g	2.08E+00	3.82E-01	5.11E-02					OK	
11	U-238	TRG	IB1/2-4A	pCi/g	2.85E+00	4.43E-01	5.58E-02					OK	
12	U-238	TRG	IB1/2-4B	pCi/g	3.04E+00	4.69E-01	1.10E-01					OK	
13	U-238	TRG	IB1/2-4C	pCi/g	3.09E+00	4.97E-01	7.22E-02					OK	
14	U-238	TRG	IB1/2-4D	pCi/g	2.82E+00	4.59E-01	4.90E-02					OK	
15	U-238	TRG	IB1/2-4E	pCi/g	3.00E+00	4.78E-01	4.76E-02					OK	
16	U-238	TRG	IB3-1	pCi/g	9.00E-01	2.20E-01	4.82E-02					OK	
17	U-238	TRG	IB3-2	pCi/g	1.59E+00	3.45E-01	8.51E-02					OK	
18	U-238	TRG	IB3-3	pCi/g	1.51E+00	2.98E-01	5.39E-02					OK	
19	U-238	TRG	IB3-4	pCi/g	8.87E-01	2.48E-01	6.86E-02					OK	
20	U-238	TRG	IB3-5	pCi/g	3.21E+00	5.21E-01	7.52E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	11/22/11 00:00	1.00E+00	101.67	0.00	0.00			
02	U-238	MBL	11/22/11 00:00	1.00E+00	126.11	0.00	0.00			
03	U-238	DUP	11/18/11 14:18	1.01E+00	123.85	0.00	0.00			
04	U-238	DO	11/18/11 14:18	1.01E+00	124.20	0.00	0.00			
05	U-238	TRG	11/18/11 14:10	1.00E+00	137.02	0.00	0.00			
06	U-238	TRG	11/18/11 00:00	1.01E+00	143.50	0.00	0.00			
07	U-238	TRG	11/18/11 00:00	1.02E+00	129.85	0.00	0.00			
08	U-238	TRG	11/18/11 15:20	1.01E+00	143.25	0.00	0.00			
09	U-238	TRG	11/18/11 15:12	1.00E+00	126.13	0.00	0.00			
10	U-238	TRG	11/18/11 15:20	1.02E+00	110.95	0.00	0.00			
11	U-238	TRG	11/18/11 00:00	1.00E+00	142.82	0.00	0.00			
12	U-238	TRG	11/18/11 00:00	1.01E+00	145.65	0.00	0.00			
13	U-238	TRG	11/18/11 00:00	1.00E+00	110.20	0.00	0.00			
14	U-238	TRG	11/18/11 00:00	1.00E+00	120.62	0.00	0.00			
15	U-238	TRG	11/18/11 00:00	1.06E+00	123.80	0.00	0.00			
16	U-238	TRG	11/18/11 15:47	1.01E+00	118.56	0.00	0.00			
17	U-238	TRG	11/18/11 15:42	1.01E+00	102.11	0.00	0.00			
18	U-238	TRG	11/18/11 15:40	1.00E+00	146.83	0.00	0.00			
19	U-238	TRG	11/18/11 15:50	1.01E+00	96.39	0.00	0.00			
20	U-238	TRG	11/18/11 15:37	1.01E+00	108.87	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	11/29/11 08:52		A_Spec	Alpha_017	170.03	5.10 E+02	9.00 E-03	17.5
02	U-238	MBL	11/29/11 08:52		A_Spec	Alpha_020	170.02	3.32 E+00	4.00 E-03	20.7
03	U-238	DUP	11/29/11 08:52		A_Spec	Alpha_021	170.02	4.59 E+02	7.00 E-03	16.2
04	U-238	DO	11/29/11 08:52		A_Spec	Alpha_022	170	4.79 E+02	2.00 E-03	16.1
05	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_023	170.02	4.77 E+02	1.00 E-03	16.2
06	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_024	170.02	2.49 E+02	9.00 E-03	15.3
07	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_025	170	2.61 E+02	1.00 E-03	16.7
08	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_026	170.02	1.59 E+02	0.00 E+00	15.8
09	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_028	170.02	1.06 E+02	1.50 E-02	18.4
10	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_029	170	1.70 E+02	1.00 E-03	19.1
11	U-238	TRG	11/29/11 08:52		A_Spec	Alpha_030	170	2.67 E+02	3.00 E-03	17.4
12	U-238	TRG	11/29/11 08:53		A_Spec	Alpha_031	170	2.83 E+02	2.60 E-02	16.7
13	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_033	170	2.57 E+02	0.00 E+00	19.9
14	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_034	170	2.40 E+02	1.00 E-03	18.7
15	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_035	170	2.63 E+02	1.00 E-03	17.6
16	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_036	170	7.78 E+01	1.00 E-03	19.2
17	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_037	170	1.12 E+02	0.00 E+00	18.1
18	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_038	170	1.34 E+02	2.00 E-03	15.9
19	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_039	170	6.00 E+01	0.00 E+00	18.5
20	U-238	TRG	11/29/11 11:05		A_Spec	Alpha_040	170	2.56 E+02	0.00 E+00	19.1

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/g	2.89E-01	1.49E-01	8.82E-02					OK	
02	U-235	MBL	BLANK	pCi/g	-8.52E-03	2.59E-02	7.07E-02					OK	OK
03	U-235	DUP	IB1/2-1	pCi/g	2.82E-01	1.38E-01	8.47E-02				NA	OK	
04	U-235	DO	IB1/2-1	pCi/g	4.05E-01	1.68E-01	9.72E-02					OK	
05	U-235	TRG	IB1/2-2	pCi/g	2.86E-01	1.32E-01	7.69E-02					OK	
06	U-235	TRG	IB1/2-3	pCi/g	1.77E-01	1.06E-01	8.84E-02					OK	
07	U-235	TRG	IB1/2-4	pCi/g	1.48E-01	9.73E-02	8.86E-02					OK	
08	U-235	TRG	IB1/2-5	pCi/g	1.67E-01	9.89E-02	6.84E-02					OK	
09	U-235	TRG	IB1/2-6	pCi/g	1.65E-01	9.78E-02	6.77E-02					OK	
10	U-235	TRG	IB1/2-7	pCi/g	1.21E-01	9.02E-02	9.10E-02					OK	
11	U-235	TRG	IB1/2-4A	pCi/g	2.51E-01	1.18E-01	7.91E-02					OK	
12	U-235	TRG	IB1/2-4B	pCi/g	1.47E-01	9.16E-02	7.99E-02					OK	
13	U-235	TRG	IB1/2-4C	pCi/g	2.24E-01	1.19E-01	8.94E-02					OK	
14	U-235	TRG	IB1/2-4D	pCi/g	5.82E-02	6.40E-02	8.72E-02					OK	
15	U-235	TRG	IB1/2-4E	pCi/g	2.07E-01	1.10E-01	6.75E-02					OK	
16	U-235	TRG	IB3-1	pCi/g	4.30E-02	5.63E-02	8.59E-02					OK	
17	U-235	TRG	IB3-2	pCi/g	6.73E-02	6.96E-02	7.34E-02					OK	
18	U-235	TRG	IB3-3	pCi/g	6.99E-02	6.75E-02	8.38E-02					OK	
19	U-235	TRG	IB3-4	pCi/g	-3.11E-03	3.64E-02	7.64E-02					OK	
20	U-235	TRG	IB3-5	pCi/g	1.35E-01	9.28E-02	7.43E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	11/22/11 00:00	1.00E+00	101.67	0.00	0.00			
02	U-235	MBL	11/22/11 00:00	1.00E+00	126.11	0.00	0.00			
03	U-235	DUP	11/18/11 14:18	1.01E+00	123.85	0.00	0.00			
04	U-235	DO	11/18/11 14:18	1.01E+00	124.20	0.00	0.00			
05	U-235	TRG	11/18/11 14:10	1.00E+00	137.02	0.00	0.00			
06	U-235	TRG	11/18/11 00:00	1.01E+00	143.50	0.00	0.00			
07	U-235	TRG	11/18/11 00:00	1.02E+00	129.85	0.00	0.00			
08	U-235	TRG	11/18/11 15:20	1.01E+00	143.25	0.00	0.00			
09	U-235	TRG	11/18/11 15:12	1.00E+00	125.13	0.00	0.00			
10	U-235	TRG	11/18/11 15:20	1.02E+00	110.95	0.00	0.00			
11	U-235	TRG	11/18/11 00:00	1.00E+00	142.82	0.00	0.00			
12	U-235	TRG	11/18/11 00:00	1.01E+00	145.65	0.00	0.00			
13	U-235	TRG	11/18/11 00:00	1.00E+00	110.20	0.00	0.00			
14	U-235	TRG	11/18/11 00:00	1.00E+00	120.62	0.00	0.00			
15	U-235	TRG	11/18/11 00:00	1.06E+00	123.80	0.00	0.00			
16	U-235	TRG	11/18/11 15:47	1.01E+00	118.56	0.00	0.00			
17	U-235	TRG	11/18/11 15:42	1.01E+00	102.11	0.00	0.00			
18	U-235	TRG	11/18/11 15:40	1.00E+00	146.83	0.00	0.00			
19	U-235	TRG	11/18/11 15:50	1.01E+00	96.39	0.00	0.00			
20	U-235	TRG	11/18/11 15:37	1.01E+00	108.87	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	11/29/11 08:52		A_Spec	Alpha_017	170.03	1.57 E+01	2.00 E-03	17.5
02	U-235	MBL	11/29/11 08:52		A_Spec	Alpha_020	170.02	-6.80 E-01	4.00 E-03	20.7
03	U-235	DUP	11/29/11 08:52		A_Spec	Alpha_021	170.02	1.75 E+01	3.00 E-03	16.2
04	U-235	DO	11/29/11 08:52		A_Spec	Alpha_022	170	2.50 E+01	0.00 E+00	16.1
05	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_023	170.02	1.95 E+01	3.00 E-03	16.2
06	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_024	170.02	1.20 E+01	0.00 E+00	15.3
07	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_025	170	1.00 E+01	0.00 E+00	16.7
08	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_026	170.02	1.17 E+01	2.00 E-03	15.8
09	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_028	170.02	1.17 E+01	2.00 E-03	18.4
10	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_029	170	8.00 E+00	0.00 E+00	19.1
11	U-235	TRG	11/29/11 08:52		A_Spec	Alpha_030	170	1.90 E+01	0.00 E+00	17.4
12	U-235	TRG	11/29/11 08:53		A_Spec	Alpha_031	170	1.10 E+01	0.00 E+00	16.7
13	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_033	170	1.50 E+01	0.00 E+00	19.9
14	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_034	170	4.00 E+00	0.00 E+00	18.7
15	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_035	170	1.47 E+01	2.00 E-03	17.6
16	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_036	170	3.00 E+00	0.00 E+00	19.2
17	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_037	170	3.83 E+00	1.00 E-03	18.1
18	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_038	170	5.00 E+00	0.00 E+00	15.9
19	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_039	170	-1.70 E-01	1.00 E-03	18.5
20	U-235	TRG	11/29/11 11:05		A_Spec	Alpha_040	170	8.66 E+00	2.00 E-03	19.1

Count Room Report
Client: Foxfire Scientific, Inc.

11-11139-UUISO-1 (pCi/g) in SO
Tracer ID: U-10a

20L

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.6161	11.9252		0.00		
02	MBL	BLANK	11/22/11 00:00	1.0000	0.6132	11.8691		0.00		
03	DUP	IB1/2-1	11/18/11 14:18	1.0116	0.6135	11.8749		0.00		
04	DO	IB1/2-1	11/18/11 14:18	1.0085	0.6135	11.8749		0.00		
05	TRG	IB1/2-2	11/18/11 14:10	1.0032	0.6130	11.8652		0.00		
06	TRG	IB1/2-3	11/18/11 00:00	1.0114	0.6124	11.8536		0.00		
07	TRG	IB1/2-4	11/18/11 00:00	1.0203	0.6135	11.8749		0.00		
08	TRG	IB1/2-5	11/18/11 15:20	1.0092	0.6129	11.8633		0.00		
09	TRG	IB1/2-6	11/18/11 15:12	1.0022	0.6133	11.8710		0.00		
10	TRG	IB1/2-7	11/18/11 15:20	1.0163	0.6125	11.8556		0.00		
11	TRG	IB1/2-4A	11/18/11 00:00	1.0003	0.6097	11.8014		0.00		
12	TRG	IB1/2-4B	11/18/11 00:00	1.0130	0.6122	11.8497		0.00		
13	TRG	IB1/2-4C	11/18/11 00:00	1.0010	0.6124	11.8536		0.00		
14	TRG	IB1/2-4D	11/18/11 00:00	1.0004	0.6131	11.8672		0.00		
15	TRG	IB1/2-4E	11/18/11 00:00	1.0638	0.6132	11.8691		0.00		
16	TRG	IB3-1	11/18/11 15:47	1.0065	0.6116	11.8381		0.00		
17	TRG	IB3-2	11/18/11 15:42	1.0105	0.6113	11.8323		0.00		
18	TRG	IB3-3	11/18/11 15:40	1.0036	0.6160	11.9233		0.00		
19	TRG	IB3-4	11/18/11 15:50	1.0051	0.6110	11.8265		0.00		
20	TRG	IB3-5	11/18/11 15:37	1.0118	0.6112	11.8304		0.00		

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 6:40 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11139	1	UUISO	11/23/2011 6:39	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
U-234	U-8a	35.240	11/23/2011	0.500	0.5119				8.13	0.293	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	11/23/2011	0.500	0.5119				7.92	0.285	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	U-232	U-10a	19.356	11/23/2011	0.6161	0.6200
02	U-232	U-10a	19.356	11/23/2011	0.6132	0.6200
03	U-232	U-10a	19.356	11/23/2011	0.6135	0.6200
04	U-232	U-10a	19.356	11/23/2011	0.6135	0.6200
05	U-232	U-10a	19.356	11/23/2011	0.6130	0.6200
06	U-232	U-10a	19.356	11/23/2011	0.6124	0.6200
07	U-232	U-10a	19.356	11/23/2011	0.6135	0.6200
08	U-232	U-10a	19.356	11/23/2011	0.6129	0.6200
09	U-232	U-10a	19.356	11/23/2011	0.6133	0.6200
10	U-232	U-10a	19.356	11/23/2011	0.6125	0.6200
11	U-232	U-10a	19.356	11/23/2011	0.6097	0.6200
12	U-232	U-10a	19.356	11/23/2011	0.6122	0.6200
13	U-232	U-10a	19.356	11/23/2011	0.6124	0.6200
14	U-232	U-10a	19.356	11/23/2011	0.6131	0.6200
15	U-232	U-10a	19.356	11/23/2011	0.6132	0.6200
16	U-232	U-10a	19.356	11/23/2011	0.6116	0.6200
17	U-232	U-10a	19.356	11/23/2011	0.6113	0.6200
18	U-232	U-10a	19.356	11/23/2011	0.6160	0.6200
19	U-232	U-10a	19.356	11/23/2011	0.6110	0.6200
20	U-232	U-10a	19.356	11/23/2011	0.6112	0.6200

Balance Printer Tapes

Tracer	LCS
0.6161 g 0.6132 g 0.6135 g 0.6135 g 0.6130 g 0.6124 g 0.6135 g 0.6129 g 0.6133 g 0.6125 g 0.6097 g 0.6122 g 0.6124 g 0.6131 g 0.6132 g 0.6116 g 0.6113 g 0.6160 g 0.6110 g 0.6112 g	0.5119 g

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11139	1	UUISO	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	IB1/2-1	DUP					1.0116E+00	1.0116E+00				
04	IB1/2-1	DO					1.0085E+00	1.0085E+00				
05	IB1/2-2	TRG					1.0032E+00	1.0032E+00				
06	IB1/2-3	TRG					1.0114E+00	1.0114E+00			1.0116 g	
07	IB1/2-4	TRG					1.0203E+00	1.0203E+00			1.0085 g	
08	IB1/2-5	TRG					1.0092E+00	1.0092E+00			1.0032 g	
09	IB1/2-6	TRG					1.0022E+00	1.0022E+00			1.0114 g	
10	IB1/2-7	TRG					1.0163E+00	1.0163E+00			1.0203 g	
11	IB1/2-4A	TRG					1.0003E+00	1.0003E+00			1.0092 g	
12	IB1/2-4B	TRG					1.0130E+00	1.0130E+00			1.0022 g	
13	IB1/2-4C	TRG					1.0010E+00	1.0010E+00			1.0163 g	
14	IB1/2-4D	TRG					1.0004E+00	1.0004E+00			1.0003 g	
15	IB1/2-4E	TRG					1.0638E+00	1.0638E+00			1.0130 g	
16	IB3-1	TRG					1.0065E+00	1.0065E+00			1.0010 g	
17	IB3-2	TRG					1.0105E+00	1.0105E+00			1.0004 g	
18	IB3-3	TRG					1.0036E+00	1.0036E+00			1.0638 g	
19	IB3-4	TRG					1.0051E+00	1.0051E+00			1.0065 g	
20	IB3-5	TRG					1.0118E+00	1.0118E+00			1.0105 g	
											1.0036 g	
											1.0051 g	
											1.0118 g	

Comments	

Technician: JB Date: 11/23/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11139	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	IB1/2-1	13.4800	253.0700	177.7300	239.5900	164.2500	31.45%	68.55%			
05	IB1/2-2	13.5100	257.3100	182.8000	243.8000	169.2900	30.56%	69.44%			
06	IB1/2-3	13.4700	232.9400	179.7000	219.4700	166.2300	24.26%	75.74%			
07	IB1/2-4	13.5000	192.6800	146.9300	179.1800	133.4300	25.53%	74.47%			
08	IB1/2-5	13.4300	259.1000	185.6800	245.6700	172.2500	29.89%	70.11%			
09	IB1/2-6	13.4800	249.6600	190.1300	236.1800	176.6500	25.21%	74.79%			
10	IB1/2-7	13.4200	207.9200	148.6500	194.5000	135.2300	30.47%	69.53%			
11	IB1/2-4A	13.5200	206.8700	156.5900	193.3500	143.0700	26.00%	74.00%			
12	IB1/2-4B	13.5200	209.6700	155.5400	196.1500	142.0200	27.60%	72.40%			
13	IB1/2-4C	13.4100	208.3500	159.5700	194.9400	146.1600	25.02%	74.98%			
14	IB1/2-4D	13.4500	168.3400	129.2400	154.8900	115.7900	25.24%	74.76%			
15	IB1/2-4E	13.6300	207.2400	159.0500	193.6100	145.4200	24.89%	75.11%			
16	IB3-1	13.7400	272.2200	234.9100	258.4800	221.1700	14.43%	85.57%			
17	IB3-2	13.6900	285.1000	205.9500	271.4100	192.2600	29.16%	70.84%			
18	IB3-3	13.4900	223.8000	181.1200	210.3100	167.6300	20.29%	79.71%			
19	IB3-4	13.3200	283.8400	247.9700	270.5200	234.6500	13.26%	86.74%			
20	IB3-5	13.4300	247.0500	195.7800	233.6200	182.3500	21.95%	78.05%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

1CB
11/29/11

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010615.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_017
Chamber Serial Number:
Detector Serial Number: 17
Env. Background: System Bkgd 9997
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/29/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:50 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6161 mL
Effective Efficiency: 0.1775 +/- 0.0102
Counting Efficiency: 0.1746 +/- 0.0028 on 9/4/2011 10:54:36 AM
Chem. Recovery Factor: 1.0167 +/- 0.0609

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: 0.9357
Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.288	358.00	10.37	0.00	0.00E+000	5.2
U-234		4.735	507.15	8.71	0.85	0.00E+000	26.0
U-235		4.385	15.66	50.15	0.34	0.00E+000	4.7
U-238		4.153	510.47	8.69	1.53	0.00E+000	43.7

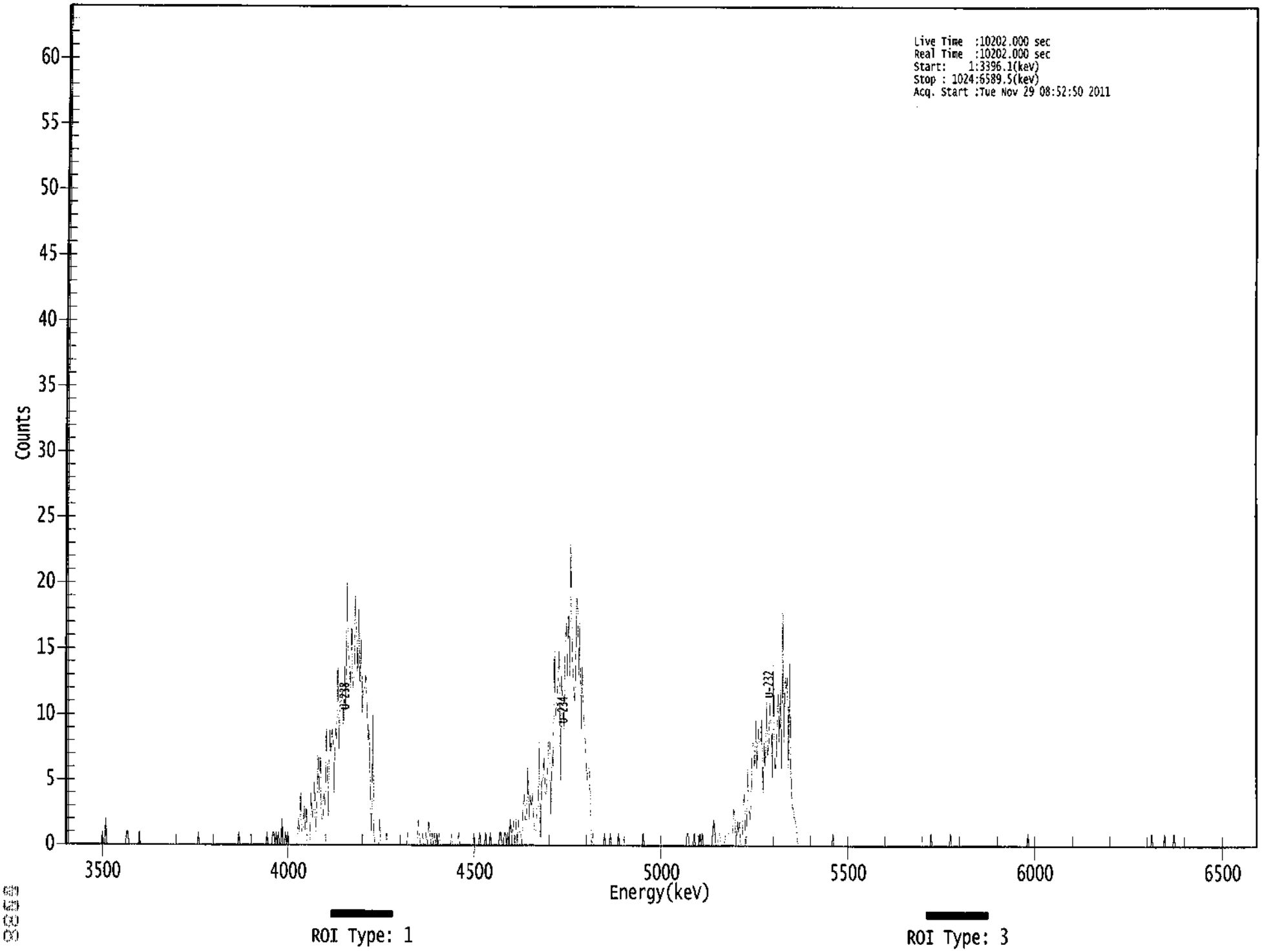
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.996	5302.50*	5.35E+000 +/- 6.06E-001	8.97E-002 +/- 1.01E-002
U-234	0.989	4761.50*	7.59E+000 +/- 1.08E+000	8.96E-002 +/- 1.01E-002
U-235	1.000	4385.50*	2.89E-001 +/- 1.49E-001	8.82E-002 +/- 9.98E-003
U-238	0.984	4184.40*	7.60E+000 +/- 1.08E+000	1.06E-001 +/- 1.20E-002

AG
11/30/11

0000010615.CNF



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*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 01

Elapsed Live time: 10202
Elapsed Real Time: 10202

Channel								
1:	10202	10202	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	1	0	0	2	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	1	0
57:	0	0	0	0	0	0	0	0
65:	1	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	1	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	1	0
177:	0	0	0	1	1	0	1	0
185:	1	0	0	2	0	0	1	0
193:	1	0	0	0	0	0	0	0
201:	0	2	1	4	1	1	3	1
209:	3	0	0	0	4	2	3	5
217:	1	3	7	4	7	2	2	4
225:	3	9	6	2	9	7	9	8
233:	4	9	8	14	7	11	11	12
241:	9	14	10	20	15	14	12	17
249:	12	13	19	16	13	18	12	16
257:	10	12	12	13	11	8	9	3
265:	1	10	1	0	0	0	0	2
273:	0	0	0	0	0	1	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	0	0
305:	2	1	0	0	1	0	0	1
313:	0	2	1	0	1	0	1	0
321:	1	0	1	0	0	0	0	0
329:	0	0	0	0	0	1	0	0
337:	0	0	0	1	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	0	1	0	0
361:	0	0	1	0	0	0	1	0

369:	0	0	0	0	0	0	1	1

Sample Title: 01

Channel								
377:	0	0	1	1	0	1	0	2
385:	1	1	2	0	2	0	2	1
393:	1	0	3	4	2	2	6	2
401:	4	3	4	2	1	1	3	3
409:	8	0	5	5	7	4	4	6
417:	8	8	2	7	6	15	10	11
425:	13	15	5	13	11	9	15	17
433:	13	18	13	23	15	13	11	12
441:	19	18	13	17	9	14	10	9
449:	7	5	6	6	3	0	1	0
457:	0	0	0	0	0	0	0	0
465:	1	0	0	0	0	1	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	1	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	1	0	0	0	0	1	0	0
545:	0	0	1	0	1	0	0	0
553:	0	0	0	0	0	1	2	1
561:	0	0	1	1	0	0	0	0
569:	1	1	1	1	1	1	1	3
577:	2	0	2	1	2	0	0	3
585:	4	0	1	6	3	2	4	8
593:	8	6	10	6	9	8	8	10
601:	4	8	6	11	7	8	11	9
609:	5	14	6	6	9	12	8	12
617:	6	18	8	13	12	13	6	14
625:	6	3	3	2	2	1	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	1	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	1	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	1	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	1	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	1	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

FCB
11/29/11

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010616.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_020
Chamber Serial Number:
Detector Serial Number: 20
Env. Background: System Bkgd 9999
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/29/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:51 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6132 mL
Effective Efficiency: 0.2614 +/- 0.0129
Counting Efficiency: 0.2073 +/- 0.0033 on 9/4/2011 11:23:25 AM
Chem. Recovery Factor: 1.2611 +/- 0.0654

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.284	524.83	8.56	0.17	0.00E+000	8.7
U-234		4.726	5.15	94.34	0.85	0.00E+000	3.3
U-235		4.396	-0.68	304.41	0.68	0.00E+000	0.0
U-238		4.125	3.32	119.77	0.68	0.00E+000	3.3

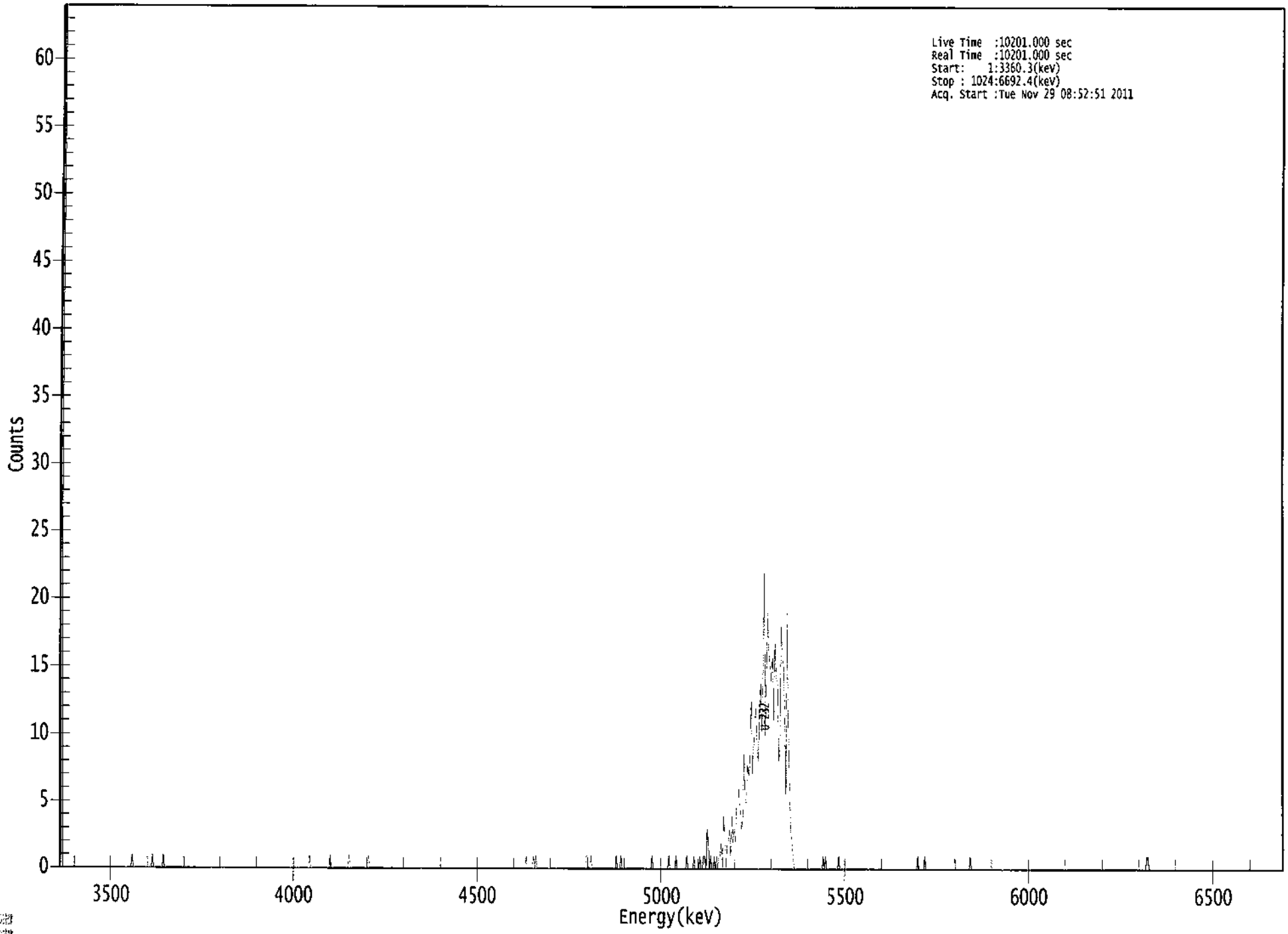
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.33E+000 +/- 5.16E-001	4.24E-002 +/- 4.10E-003
U-234	0.980	4761.50*	5.23E-002 +/- 4.96E-002	6.08E-002 +/- 5.88E-003
U-235	0.998	4385.50*	-8.52E-003 +/- 2.59E-002	7.07E-002 +/- 6.84E-003
U-238	0.945	4184.40*	3.36E-002 +/- 4.03E-002	5.70E-002 +/- 5.52E-003

AG
11/30/11

0000010616.CNF



ROI Type: 1

ROI Type: 3

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	1	0
81:	0	0	0	0	0	0	0	1
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	1	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	1	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	1
393:	0	0	0	0	0	1	0	1
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	1	1	0	0	1	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	1	0	0	0	1	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	1	0	0	0
521:	0	0	0	0	0	1	0	0
529:	0	0	0	1	0	0	0	0
537:	1	0	0	1	1	0	3	2
545:	0	1	0	0	1	0	1	0
553:	1	1	2	0	4	2	0	2
561:	2	3	1	4	2	3	2	5
569:	5	6	4	3	4	9	5	5
577:	8	7	8	13	7	9	11	12
585:	9	8	12	14	10	14	22	10
593:	15	19	16	15	14	16	11	17
601:	14	14	8	9	18	16	15	11
609:	5	19	11	6	3	2	1	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	1
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	1	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	1	0
721:	0	0	0	0	1	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	1	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	1	1	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KCB
11/29/11

Apex-Alpha™

Sample Description: IB1/2-1-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010617.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_021
Chamber Serial Number:
Detector Serial Number: 21
Env. Background: System Bkgd 10000
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:52 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6135 mL
Effective Efficiency: 0.2006 +/- 0.0110
Counting Efficiency: 0.1620 +/- 0.0026 on 9/4/2011 11:24:40 AM
Chem. Recovery Factor: 1.2385 +/- 0.0710

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.292	402.96	9.79	2.04	0.00E+000	13.0
U-234		4.737	498.62	8.80	2.38	0.00E+000	51.2
U-235		4.389	17.49	47.66	0.51	0.00E+000	4.8
U-238		4.159	458.81	9.16	1.19	0.00E+000	37.3

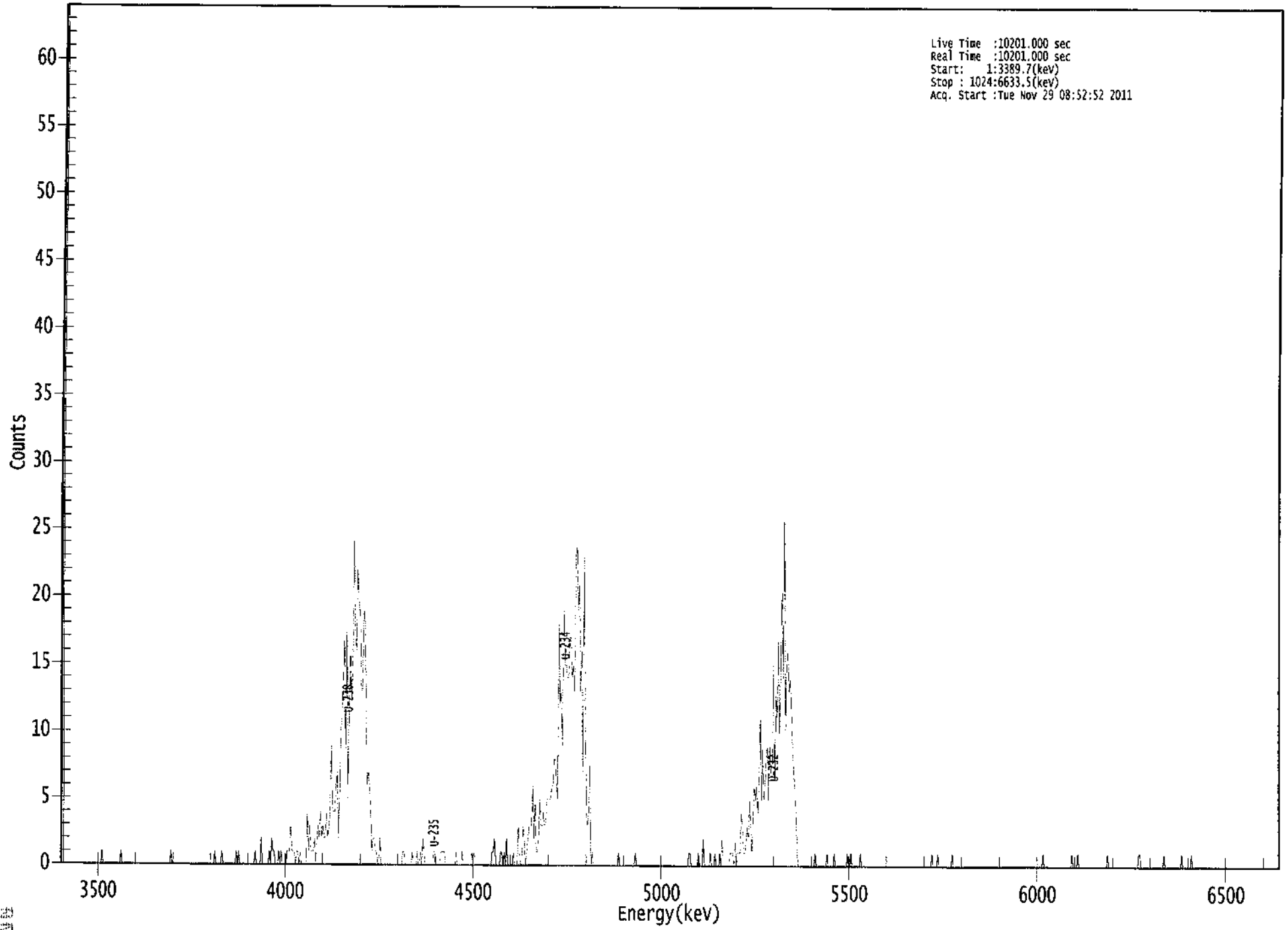
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.998	5302.50*	5.27E+000 +/- 5.68E-001	1.02E-001 +/- 1.10E-002
U-234	0.991	4761.50*	6.52E+000 +/- 9.08E-001	1.07E-001 +/- 1.16E-002
U-235	1.000	4385.50*	2.82E-001 +/- 1.38E-001	8.47E-002 +/- 9.13E-003
U-238	0.990	4184.40*	5.98E+000 +/- 8.46E-001	8.58E-002 +/- 9.25E-003

AG
11/30/11

0000010617.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	1	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	1	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	1	0	0	0
169:	0	2	0	0	0	0	0	0
177:	1	0	2	1	1	0	0	0
185:	1	0	1	0	0	0	0	1
193:	1	1	3	1	1	1	0	1
201:	1	0	1	0	0	0	0	0
209:	4	1	3	1	1	1	2	0
217:	2	3	2	4	2	3	2	2
225:	4	2	3	4	9	4	4	4
233:	6	7	2	5	10	11	14	17
241:	8	18	5	11	16	12	15	25
249:	17	16	22	19	19	13	13	19
257:	18	12	6	7	6	4	1	2
265:	2	1	1	0	0	2	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	1	0	0	0	0	0	0
297:	1	0	0	0	1	0	0	1
305:	0	2	1	0	0	0	0	0
313:	0	0	1	1	0	0	0	0
321:	1	1	1	1	0	0	0	0
329:	0	0	0	0	0	1	0	0
337:	0	0	1	0	0	0	0	0
345:	0	0	1	0	1	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	1	1	2	0	0

369:	0	0	1	1	0	1	0	2

Sample Title: 03

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	3	1	0	0	3	2	0
393:	1	2	3	3	3	6	2	5
401:	1	1	2	5	3	3	4	3
409:	3	5	5	5	5	6	6	8
417:	8	6	5	18	12	13	9	19
425:	15	15	14	14	17	17	14	15
433:	13	23	24	19	21	13	16	7
441:	23	11	4	3	4	8	0	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	1	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	1	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	1	0	0	0	0	0	0
537:	1	0	0	0	2	0	0	0
545:	0	0	1	0	0	0	1	0
553:	0	0	1	0	2	0	0	0
561:	0	0	0	1	1	1	0	2
569:	0	1	1	1	4	3	1	1
577:	2	3	2	5	3	1	4	6
585:	5	6	4	7	11	5	9	5
593:	6	8	9	5	9	7	8	15
601:	6	13	11	17	10	15	21	14
609:	27	10	15	16	13	14	12	9
617:	7	6	4	1	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	1	0	0	0	0	0
641:	0	0	0	0	1	0	0	0
649:	0	0	1	0	0	0	0	0
657:	0	0	0	0	0	1	0	0
665:	1	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	1	0	0	0
737:	0	1	0	0	0	0	0	0
745:	0	0	0	0	0	1	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	1	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	1	0	0	0	0	1	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	1	1	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	1	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	1	0	0
945:	0	0	0	0	0	1	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	1

ICB
11/29/11

Apex-Alpha™

Sample Description: IB1/2-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010618.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_022
Chamber Serial Number:
Detector Serial Number: 22
Env. Background: System Bkgd 10001
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:52 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6135 mL
Effective Efficiency: 0.2004 +/- 0.0110
Counting Efficiency: 0.1614 +/- 0.0026 on 9/4/2011 11:25:40 AM
Chem. Recovery Factor: 1.2420 +/- 0.0712

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.268	402.47	9.79	1.53	0.00E+000	4.7
U-234		4.721	452.98	9.22	1.02	0.00E+000	22.6
U-235		4.393	25.00	39.98	0.00	0.00E+000	3.1
U-238		4.145	478.66	8.96	0.34	0.00E+000	37.3

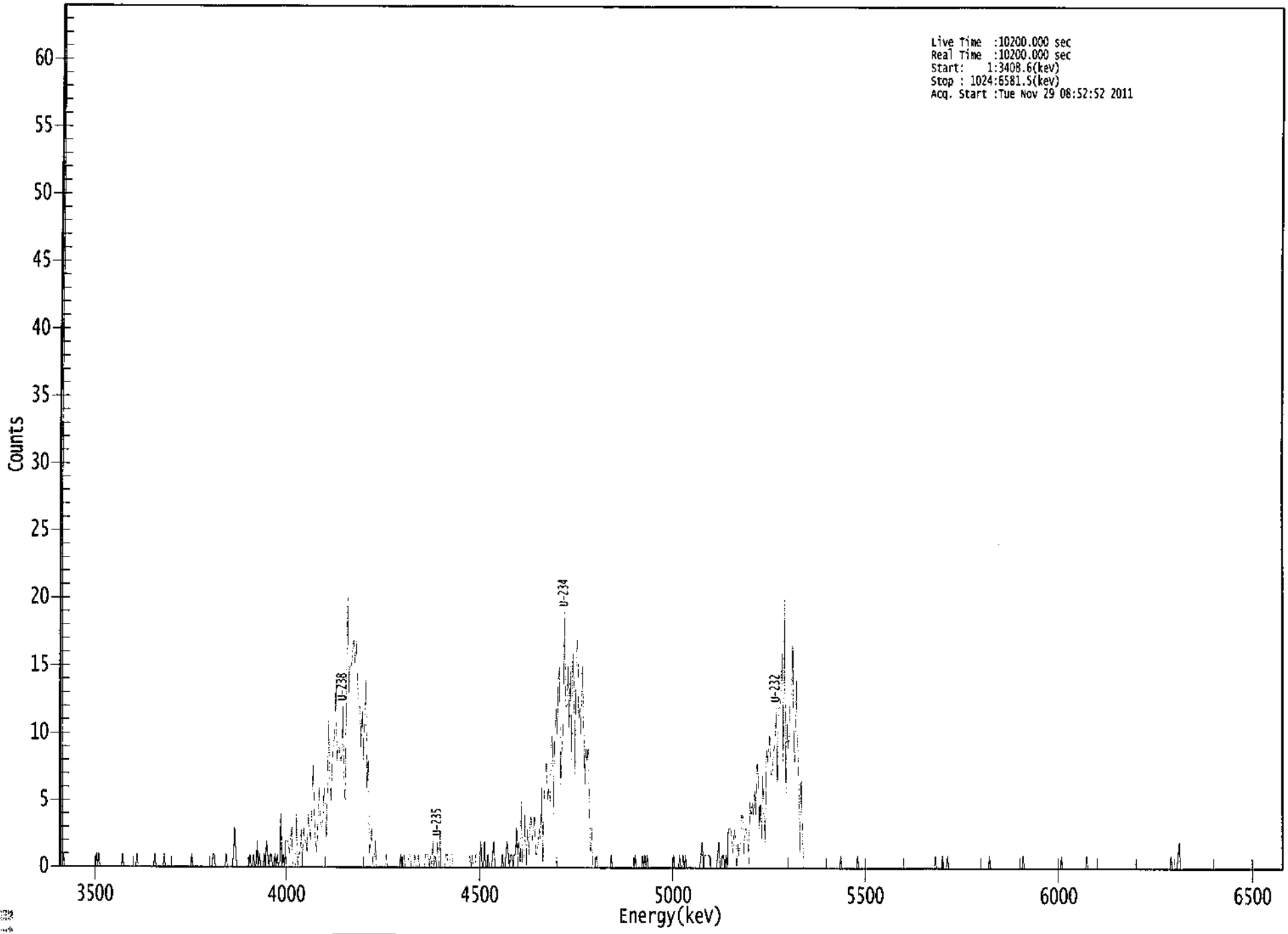
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.981	5302.50*	5.29E+000 +/- 5.70E-001	9.34E-002 +/- 1.01E-002
U-234	0.974	4761.50*	5.95E+000 +/- 8.44E-001	8.28E-002 +/- 8.92E-003
U-235	0.999	4385.50*	4.05E-001 +/- 1.68E-001	9.72E-002 +/- 1.05E-002
U-238	0.976	4184.40*	6.26E+000 +/- 8.78E-001	6.25E-002 +/- 6.74E-003

AG
11/30/11

0000010618.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	1	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	1
33:	0	1	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	0	0
57:	0	0	0	0	0	0	0	0
65:	0	1	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	1	0	0	0	0	0	0	0
89:	1	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	1
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	1	1	0	0	0	0	0
137:	0	0	0	0	1	0	0	0
145:	0	0	1	3	1	0	0	0
153:	0	0	0	0	0	0	0	0
161:	1	0	0	1	0	0	2	0
169:	1	0	0	0	1	0	2	1
177:	0	1	1	0	0	1	0	1
185:	0	0	4	0	1	0	2	2
193:	2	1	2	3	0	0	0	4
201:	0	1	1	3	0	3	2	2
209:	1	4	3	2	4	8	4	2
217:	1	3	6	4	3	3	6	5
225:	2	6	11	6	5	8	9	10
233:	14	8	9	9	8	8	12	6
241:	5	13	20	13	15	15	16	17
249:	15	17	14	12	12	9	12	8
257:	11	14	6	8	1	2	3	0
265:	0	2	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	1	0	0	0	1	1	0
297:	0	0	1	0	0	1	0	0
305:	0	0	0	1	1	1	0	1
313:	0	2	0	1	0	2	0	3
321:	0	0	0	0	1	1	0	0
329:	1	1	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	1	0	1	0	0	1	1	0
353:	0	2	0	0	2	0	0	1
361:	0	0	0	1	2	0	0	0

369:	0	0	0	1	0	0	1	2

Sample Title: 04

Channel								
377:	1	0	1	1	0	1	1	3
385:	1	2	0	5	0	0	4	0
393:	3	1	3	4	2	3	4	1
401:	1	2	3	2	6	0	5	7
409:	8	5	6	5	9	10	4	10
417:	12	10	14	15	6	9	10	19
425:	12	12	15	10	15	8	16	14
433:	7	16	17	11	12	10	15	12
441:	6	9	8	9	4	1	3	0
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	1	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	1	0	0	0	0	0
489:	1	0	1	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	1
521:	0	0	1	0	1	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	2	0	1	1	1	1
545:	1	0	0	0	0	0	0	1
553:	2	0	0	1	1	0	1	0
561:	3	3	3	2	1	3	2	0
569:	2	1	2	4	4	1	3	3
577:	2	1	5	4	5	4	6	4
585:	8	7	3	5	2	7	3	2
593:	9	8	9	10	7	7	9	9
601:	12	6	12	12	13	16	8	20
609:	5	11	9	10	13	13	17	8
617:	8	14	10	6	1	7	3	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	1	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	1	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	1	0	0
737:	0	0	0	1	0	0	0	1
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	1	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	1	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	1	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	1	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	1	0	0	0	0	0	1
937:	2	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
11/29/11

Apex-Alpha™

Sample Description: IB1/2-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010620.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_023
Chamber Serial Number:
Detector Serial Number: 23
Env. Background: System Bkgd 10002
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:53 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6130 mL
Effective Efficiency: 0.2226 +/- 0.0117
Counting Efficiency: 0.1625 +/- 0.0026 on 9/4/2011 12:49:03 AM
Chem. Recovery Factor: 1.3702 +/- 0.0755

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.301	446.81	9.29	1.19	0.00E+000	27.0
U-234		4.753	485.49	8.90	0.51	0.00E+000	10.1
U-235		4.414	19.49	45.07	0.51	0.00E+000	4.7
U-238		4.179	476.83	8.98	0.17	0.00E+000	32.3

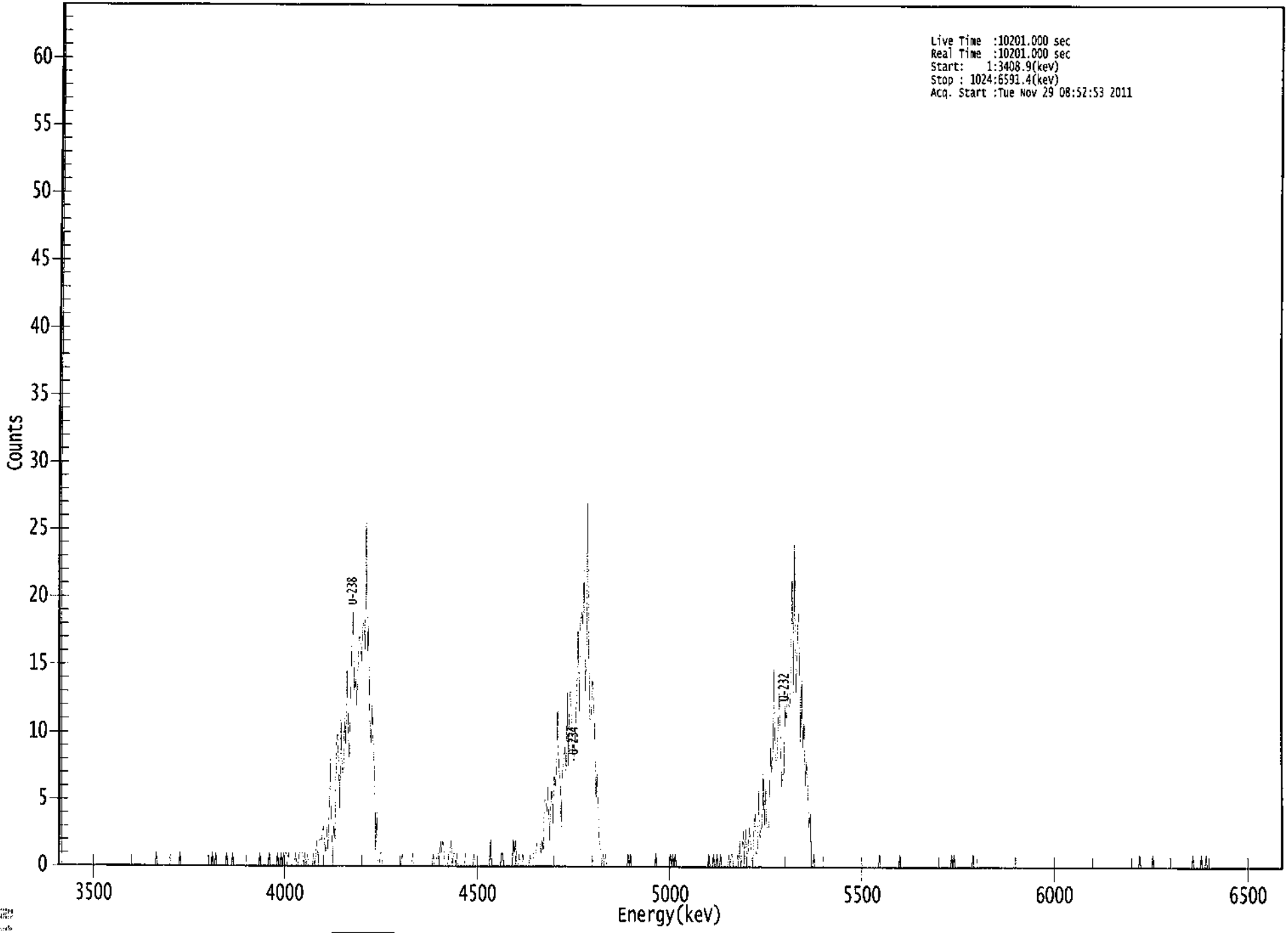
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.31E+000 +/- 5.48E-001	7.83E-002 +/- 8.09E-003
U-234	0.999	4761.50*	5.77E+000 +/- 7.87E-001	6.24E-002 +/- 6.44E-003
U-235	0.987	4385.50*	2.86E-001 +/- 1.32E-001	7.69E-002 +/- 7.94E-003
U-238	0.999	4184.40*	5.64E+000 +/- 7.72E-001	4.94E-002 +/- 5.10E-003

AG
11/30/11

0000010620.CNF



ROI Type: 1

ROI Type: 3

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 05

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	1	0	0	1	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	0	1	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	1	0	0	0	0	0	0
177:	0	1	0	0	0	0	0	0
185:	1	0	0	1	0	1	1	1
193:	0	1	0	0	0	0	0	1
201:	0	0	1	1	1	1	0	1
209:	0	1	0	0	0	0	1	0
217:	1	2	0	2	2	2	3	2
225:	1	3	1	4	8	3	0	3
233:	2	9	10	8	4	11	7	7
241:	11	9	15	10	8	12	17	19
249:	13	14	12	15	17	17	15	18
257:	18	16	26	16	18	11	9	12
265:	9	7	1	4	0	0	1	1
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	0	0	0	0	0	0	0
297:	0	1	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	1	0	0	1	1	0
321:	2	1	2	1	0	0	0	1
329:	1	2	0	1	1	0	1	0
337:	0	0	0	0	0	1	0	0
345:	0	0	0	0	1	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	2	0	0	0	0	0

369:	0	0	0	1	1	0	0	0

Sample Title: 05

Channel								
377:	0	0	0	0	0	2	1	2
385:	0	0	1	0	0	1	0	0
393:	0	0	0	1	0	0	1	1
401:	1	2	2	2	1	2	1	5
409:	5	4	6	2	4	6	3	7
417:	6	7	12	7	7	3	7	8
425:	9	7	13	7	13	13	9	8
433:	8	11	13	18	11	18	19	18
441:	22	13	15	27	16	11	11	14
449:	13	10	5	7	4	2	1	0
457:	1	0	1	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	1	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	1	0	0	0
505:	0	0	0	0	0	0	0	0
513:	1	0	1	0	1	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	1	0	0	0	1	0	0	1
553:	0	0	1	0	0	0	0	0
561:	0	1	0	1	1	0	0	0
569:	1	0	2	0	1	3	0	3
577:	1	1	3	2	1	0	3	4
585:	1	1	6	2	3	3	7	3
593:	6	3	3	3	9	7	9	15
601:	8	8	10	13	11	6	7	7
609:	12	11	13	12	12	15	22	13
617:	24	13	15	19	18	9	14	9
625:	11	6	8	6	3	4	0	0
633:	1	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	1
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	1	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	1	0	1	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	1	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	1	0	0	0	0	0	0	0
913:	0	0	0	1	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	1	0	0	0
953:	0	0	0	1	0	0	0	1
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB
11/30/11

Apex-Alpha™

Sample Description: IB1/2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010621.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_024
Chamber Serial Number:
Detector Serial Number: 24
Env. Background: System Bkgd 10003
Reagent Blank: <not performed>

Sample Size: 1.011E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:54 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6124 mL
Effective Efficiency: 0.2195 +/- 0.0116
Counting Efficiency: 0.1530 +/- 0.0025 on 9/4/2011 10:44:18 AM
Chem. Recovery Factor: 1.4350 +/- 0.0795

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.288	440.15	9.35	0.85	0.00E+000	12.3
U-234		4.743	224.15	13.12	0.85	0.00E+000	14.7
U-235		4.389	12.00	58.89	0.00	0.00E+000	4.7
U-238		4.165	249.47	12.45	1.53	0.00E+000	36.0

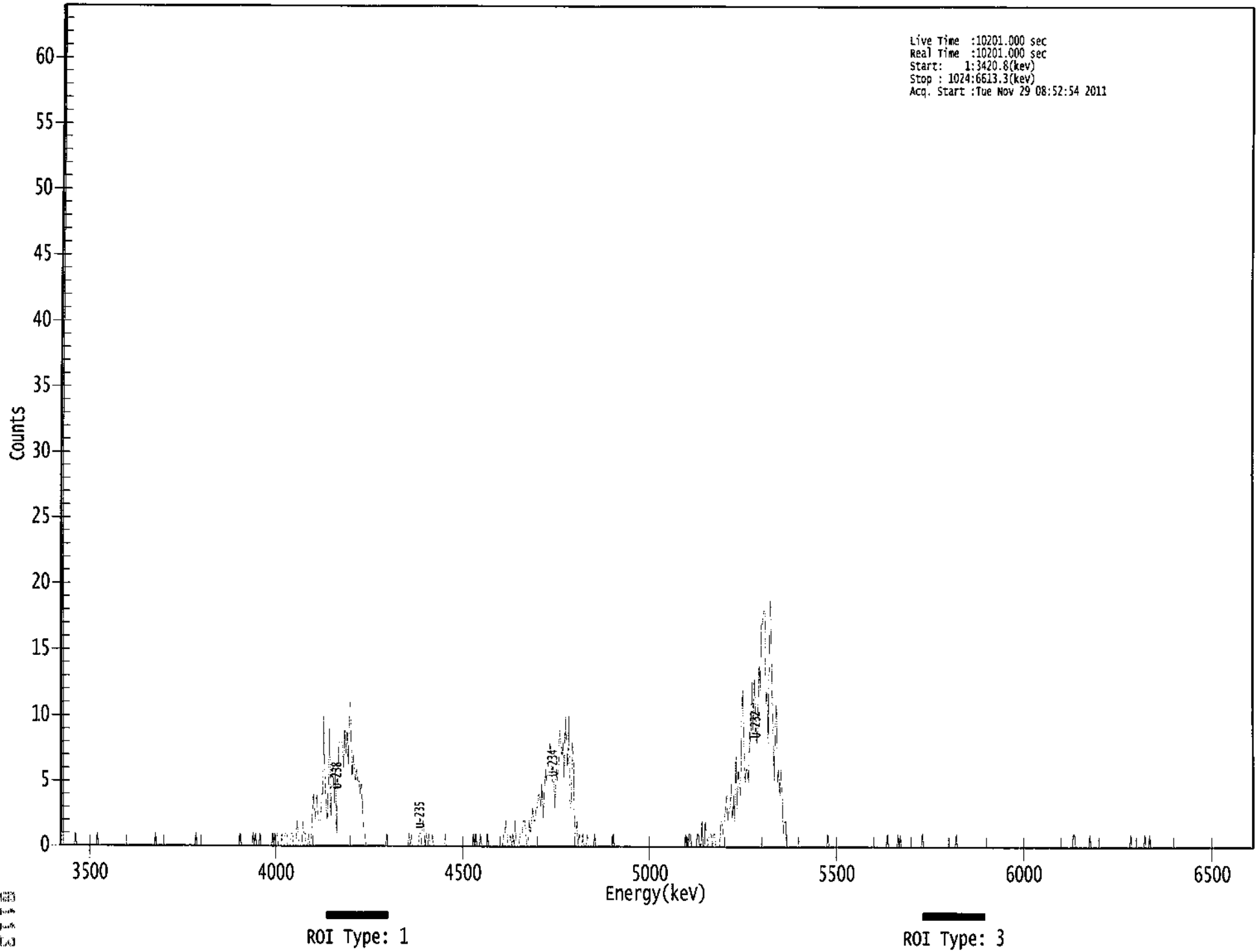
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.26E+000 +/- 5.47E-001	7.16E-002 +/- 7.44E-003
U-234	0.994	4761.50*	2.68E+000 +/- 4.48E-001	7.16E-002 +/- 7.43E-003
U-235	1.000	4385.50*	1.77E-001 +/- 1.06E-001	8.84E-002 +/- 9.18E-003
U-238	0.994	4184.40*	2.97E+000 +/- 4.82E-001	8.46E-002 +/- 8.79E-003

AG
11/30/11

0000010621.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 06

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	1	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	1	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	1	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	1	0	0	0	0
161:	0	0	0	0	0	0	1	0
169:	1	0	0	0	1	0	0	0
177:	0	0	0	0	0	0	0	1
185:	0	1	1	1	0	0	0	1
193:	0	0	1	1	0	0	0	1
201:	1	0	0	0	2	1	0	0
209:	0	2	1	1	0	0	1	0
217:	0	2	4	3	2	4	2	2
225:	2	4	4	10	5	3	2	5
233:	9	2	6	6	3	6	1	4
241:	8	8	8	8	6	9	7	9
249:	6	11	11	5	7	6	5	6
257:	5	5	4	5	3	1	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	1	0	1	0
305:	0	0	0	0	0	1	1	0
313:	2	1	0	1	0	1	0	0
321:	1	0	0	0	0	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	1	0	0
361:	0	1	0	0	0	0	0	1

369:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
377:	0	0	0	0	0	1	1	2
385:	1	0	0	1	0	1	0	2
393:	0	0	0	1	1	1	2	2
401:	1	0	0	2	1	2	3	2
409:	2	3	3	4	4	3	5	2
417:	4	6	5	6	7	8	7	5
425:	5	3	6	5	6	9	8	7
433:	8	5	10	8	6	10	3	3
441:	8	7	1	1	2	0	1	0
449:	0	1	0	0	0	1	0	0
457:	0	0	0	1	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	0	0	1	1	0	0
545:	0	0	0	1	1	0	0	2
553:	0	0	2	1	0	1	1	1
561:	0	1	1	0	0	0	0	2
569:	2	1	2	3	4	2	3	3
577:	5	2	4	2	7	3	6	5
585:	4	10	12	8	5	6	6	5
593:	9	8	13	9	13	11	8	9
601:	14	12	17	17	18	18	11	12
609:	8	17	19	13	10	5	9	11
617:	5	6	4	6	4	1	2	2
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	1	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	1	0
713:	0	0	0	0	0	0	0	1
721:	0	1	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	1	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	1	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	1	1	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	0	0	0	0	0	0
929:	0	0	1	0	0	0	1	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
4/29/11

Apex-Alpha™

Sample Description: IB1/2-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010619.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_025
Chamber Serial Number:
Detector Serial Number: 25
Env. Background: System Bkgd 10004
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:55 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6135 mL
Effective Efficiency: 0.2172 +/- 0.0115
Counting Efficiency: 0.1672 +/- 0.0027 on 9/4/2011 10:45:06 AM
Chem. Recovery Factor: 1.2985 +/- 0.0721

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	436.15	9.40	0.85	0.00E+000	17.0
U-234		4.734	232.32	12.88	0.68	0.00E+000	15.6
U-235		4.370	10.00	65.01	0.00	0.00E+000	4.7
U-238		4.157	260.83	12.14	0.17	0.00E+000	23.0

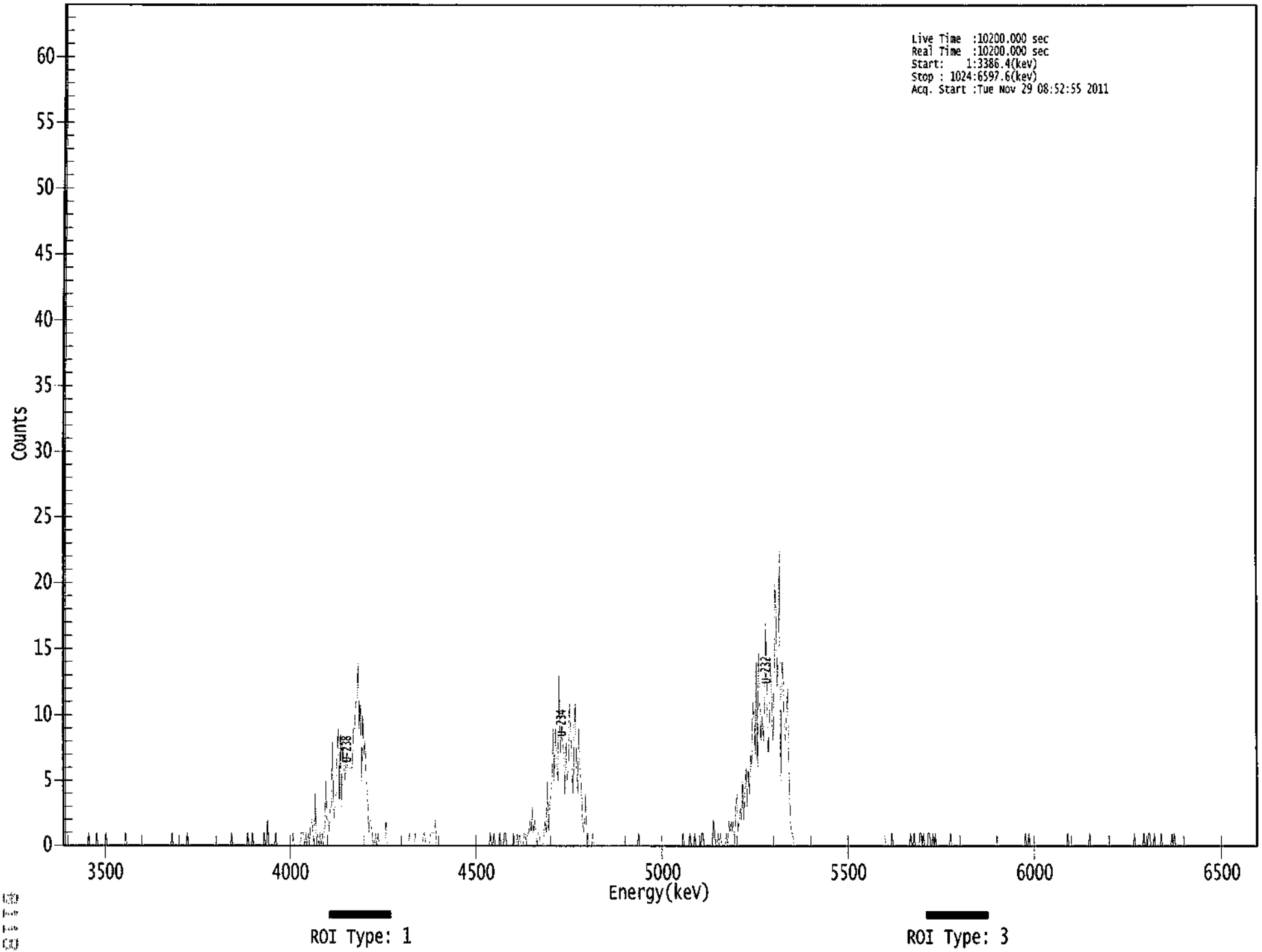
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.23E+000 +/- 5.45E-001	7.18E-002 +/- 7.48E-003
U-234	0.988	4761.50*	2.78E+000 +/- 4.61E-001	6.76E-002 +/- 7.04E-003
U-235	0.996	4385.50*	1.48E-001 +/- 9.73E-002	8.86E-002 +/- 9.24E-003
U-238	0.988	4184.40*	3.11E+000 +/- 4.98E-001	4.98E-002 +/- 5.19E-003

AG
11/30/11

0000010619.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	1	0
25:	0	0	0	0	0	1	0	0
33:	0	0	0	0	0	1	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	1	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	1	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	1	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	1
161:	0	0	0	1	0	0	0	0
169:	0	0	0	0	0	1	0	0
177:	2	0	0	0	0	0	0	1
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	0	0	1	1	1
209:	0	1	0	1	0	2	2	1
217:	0	4	0	1	0	1	0	1
225:	0	1	5	2	2	1	3	3
233:	8	2	3	3	7	9	3	9
241:	3	8	6	5	7	6	6	6
249:	6	6	9	9	11	11	14	9
257:	11	5	10	7	8	5	4	1
265:	2	2	1	0	0	1	0	1
273:	0	0	0	0	0	0	2	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	0	0	0	1
305:	0	0	0	0	0	0	1	1
313:	0	0	0	0	1	1	1	1
321:	2	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	1

369:	0	0	1	0	0	0	0	1

Sample Title: 07

Channel								
377:	0	0	0	1	1	0	0	0
385:	0	0	0	1	0	0	1	0
393:	1	0	0	0	1	1	0	1
401:	1	2	1	3	1	2	1	0
409:	1	1	0	0	0	1	2	1
417:	5	1	3	4	5	9	5	9
425:	6	5	13	7	9	8	7	4
433:	8	5	6	11	9	6	4	9
441:	11	6	4	9	6	5	2	1
449:	2	4	0	1	0	0	0	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	1	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	0	1	0	0	0	1	0
545:	0	0	0	0	1	1	0	0
553:	0	0	0	0	0	0	2	1
561:	0	0	1	0	1	0	0	0
569:	0	1	0	2	1	2	1	2
577:	0	3	4	1	2	3	2	5
585:	2	4	6	3	6	4	7	6
593:	11	10	7	14	6	15	11	8
601:	10	8	11	17	12	7	9	14
609:	12	8	9	20	18	12	14	23
617:	5	14	14	9	8	10	12	6
625:	2	1	1	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	1
729:	0	0	1	0	0	0	0	1
737:	1	0	1	0	0	0	1	1
745:	0	0	1	0	1	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	1	0	0	1	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	1	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	1	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	0	0	0	0	1	0
929:	0	0	1	1	0	0	0	1
937:	0	0	0	0	0	1	0	0
945:	0	0	0	0	0	0	1	0
953:	1	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 11/29/11

Apex-Alpha™

Sample Description: IB1/2-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010622.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_026
Chamber Serial Number:
Detector Serial Number: 26
Env. Background: System Bkgd 10005
Reagent Blank: <not performed>

Sample Size: 1.009E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:56 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6129 mL
Effective Efficiency: 0.2268 +/- 0.0119
Counting Efficiency: 0.1583 +/- 0.0026 on 9/4/2011 10:46:49 AM
Chem. Recovery Factor: 1.4325 +/- 0.0784

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.275	455.15	9.20	0.85	0.00E+000	26.6
U-234		4.734	180.49	14.61	0.51	0.00E+000	11.6
U-235		4.415	11.66	58.37	0.34	0.00E+000	4.8
U-238		4.155	159.00	15.59	0.00	0.00E+000	4.9

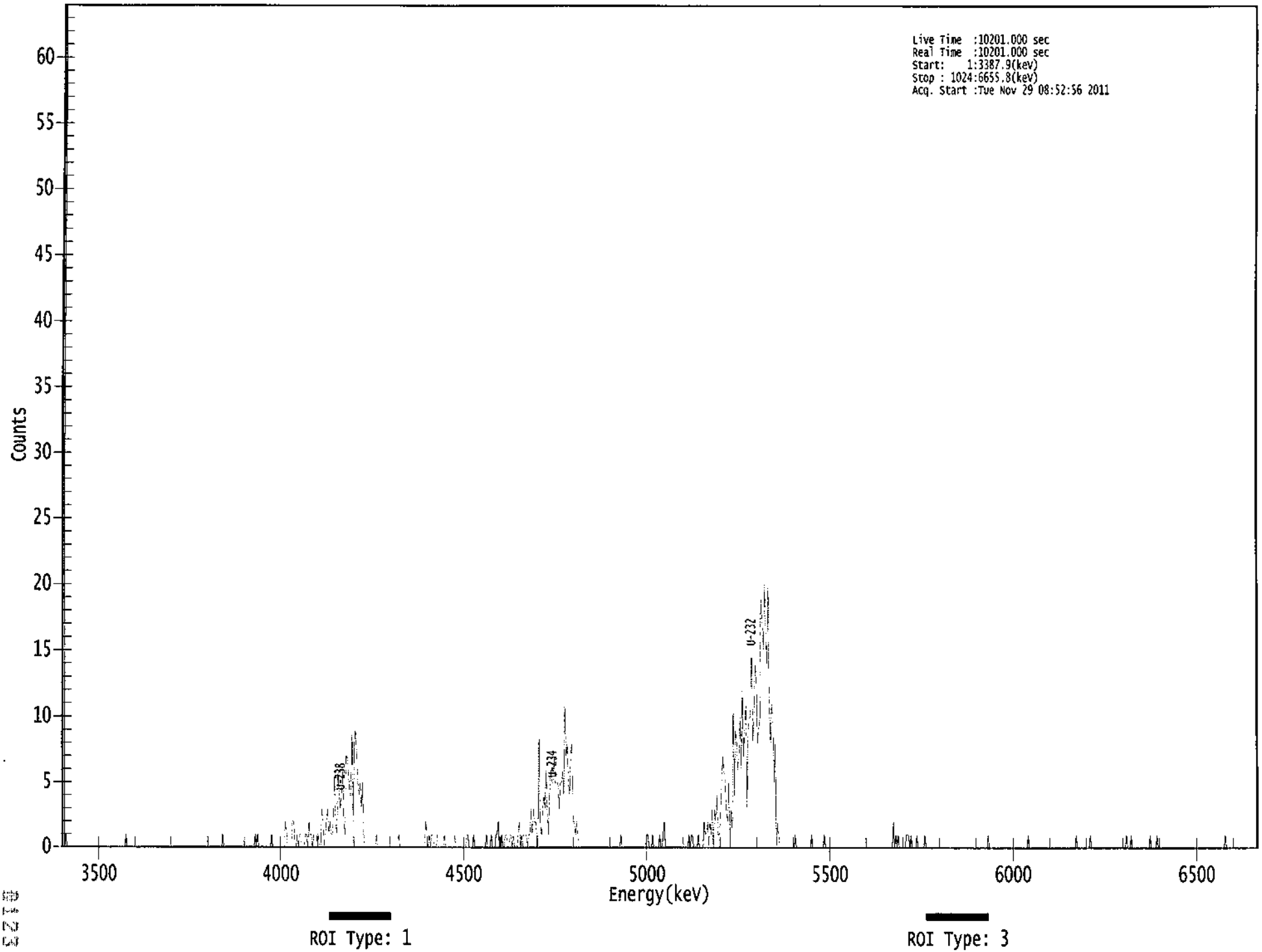
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.988	5302.50*	5.28E+000 +/- 5.41E-001	6.95E-002 +/- 7.11E-003
U-234	0.988	4761.50*	2.09E+000 +/- 3.74E-001	6.09E-002 +/- 6.23E-003
U-235	0.986	4385.50*	1.67E-001 +/- 9.89E-002	6.84E-002 +/- 7.01E-003
U-238	0.986	4184.40*	1.84E+000 +/- 3.43E-001	6.92E-002 +/- 7.09E-003

AG
11/30/11

0000010622.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 08

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	1	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	1
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	1	0
169:	1	0	0	0	0	0	0	0
177:	0	0	0	0	1	0	0	0
185:	0	0	0	0	0	0	0	0
193:	2	1	0	0	0	0	2	2
201:	0	0	1	0	1	1	0	0
209:	0	1	1	0	2	1	1	0
217:	1	0	0	1	1	0	0	3
225:	2	0	1	2	3	1	2	1
233:	1	2	6	2	1	6	4	3
241:	4	6	2	1	7	7	6	4
249:	4	9	2	8	9	7	5	4
257:	5	3	5	1	0	0	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	1	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	2	1	0	1	0	1	1	0
321:	0	0	1	0	0	0	0	0
329:	1	0	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	0
345:	0	0	0	1	1	0	0	0
353:	0	1	0	0	0	0	0	0
361:	0	0	0	0	1	0	0	0

369:	1	0	0	0	1	1	2	0

Sample Title: 08

Channel								
377:	0	1	0	0	1	1	0	0
385:	1	1	0	1	0	0	0	1
393:	2	0	1	0	1	1	1	0
401:	1	1	3	1	3	2	2	1
409:	0	9	2	1	3	4	3	6
417:	3	1	4	6	5	5	7	5
425:	5	5	3	5	5	6	4	11
433:	7	8	5	4	7	8	2	2
441:	1	2	1	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	1	1	0
505:	0	0	1	0	0	0	0	0
513:	1	0	0	1	2	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	0	1	1	0	0	0
545:	0	1	0	0	0	0	2	1
553:	1	2	0	2	1	3	0	3
561:	2	4	1	1	2	5	7	6
569:	5	3	2	5	0	3	1	11
577:	4	9	8	6	7	10	6	12
585:	7	9	11	3	9	10	10	15
593:	8	10	14	13	8	9	10	19
601:	17	15	20	16	14	20	11	8
609:	11	10	5	8	0	2	1	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	1	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	1	0	0	0	0	0
649:	0	0	0	0	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	2	0	1	0	1	0	0	0
721:	0	0	0	1	1	1	0	1
729:	0	0	0	0	1	0	0	0
737:	0	0	0	1	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	1	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	1	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	1	0	0	0
873:	0	0	0	0	0	0	0	0
881:	1	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	1
913:	0	0	0	1	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	1	0	0	0	0
937:	0	1	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	1	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KS 11/29/11

Apex-Alpha™

Sample Description: IB1/2-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010623.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_028
Chamber Serial Number:
Detector Serial Number: 28
Env. Background: System Bkgd 10007
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:57 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6133 mL
Effective Efficiency: 0.2308 +/- 0.0120
Counting Efficiency: 0.1845 +/- 0.0034 on 11/6/2011 1:01:18 PM
Chem. Recovery Factor: 1.2513 +/- 0.0689

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.279	463.49	9.11	0.51	0.00E+000	30.2
U-234		4.735	134.98	16.94	1.02	0.00E+000	7.0
U-235		4.386	11.66	58.37	0.34	0.00E+000	3.1
U-238		4.163	106.45	19.26	2.55	0.00E+000	4.1

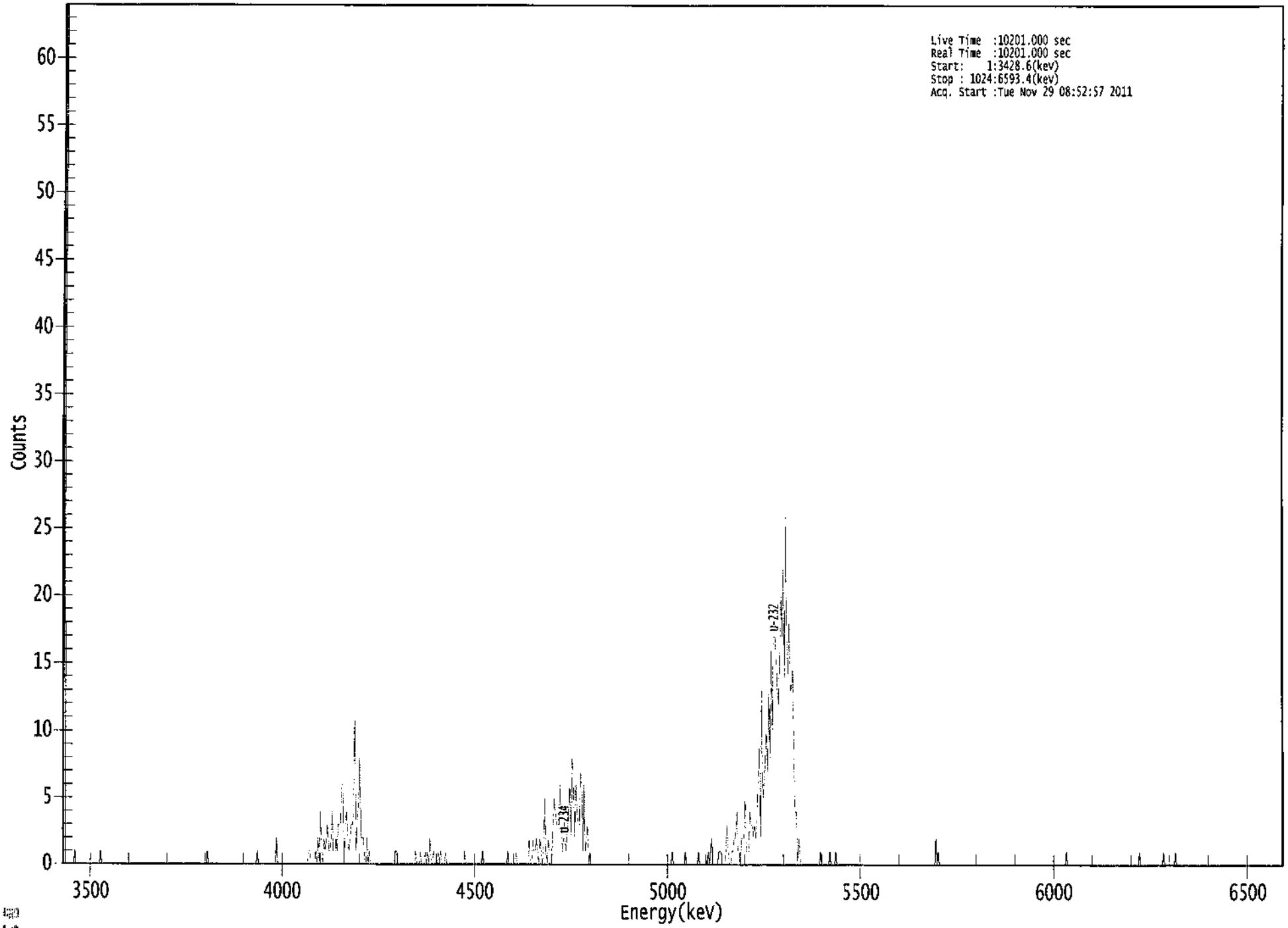
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.32E+000 +/- 5.41E-001	6.02E-002 +/- 6.12E-003
U-234	0.989	4761.50*	1.55E+000 +/- 3.06E-001	7.23E-002 +/- 7.35E-003
U-235	1.000	4385.50*	1.65E-001 +/- 9.78E-002	6.77E-002 +/- 6.88E-003
U-238	0.993	4184.40*	1.22E+000 +/- 2.65E-001	9.59E-002 +/- 9.74E-003

AG
11/30/11

0000010623.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 09

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	1	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	1	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	1	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	1	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	2	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	1
209:	1	0	0	0	0	1	0	2
217:	0	4	1	0	2	1	2	3
225:	1	1	2	4	0	0	2	1
233:	3	3	3	6	6	0	3	4
241:	2	1	2	3	3	4	11	1
249:	3	5	8	2	2	2	0	0
257:	2	0	1	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	1	0	0	0	1	0	0
305:	0	1	0	1	0	2	0	0
313:	1	0	0	0	1	0	1	0
321:	0	0	1	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	1	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	1	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	1	0

Sample Title: 09

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	2	0	0	2	1	1	2	1
401:	0	2	1	0	1	5	1	0
409:	2	1	1	1	3	5	4	3
417:	3	3	6	3	1	2	2	1
425:	3	4	6	2	8	7	2	6
433:	4	3	3	7	6	1	6	1
441:	2	3	0	1	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	1	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	1	0
545:	1	2	0	0	0	0	0	1
553:	1	1	0	0	0	1	3	1
561:	0	0	1	1	2	2	4	1
569:	1	0	2	2	2	5	1	1
577:	1	4	3	3	2	3	2	3
585:	7	9	2	13	5	6	8	10
593:	7	13	8	16	10	17	17	16
601:	13	12	16	20	17	22	14	26
609:	17	14	18	13	13	15	8	4
617:	4	0	2	1	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	1	0	0	0
641:	0	0	0	0	1	0	0	0
649:	0	1	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	2	0	1
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 09

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	1	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	1
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	1	0	0	0	0
929:	0	0	0	0	0	1	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 11/29/11

Apex-Alpha™

Sample Description: IB1/2-7
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010624.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_029
Chamber Serial Number:
Detector Serial Number: 29
Env. Background: System Bkgd 10008
Reagent Blank: <not performed>

Sample Size: 1.016E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:58 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6125 mL
Effective Efficiency: 0.2123 +/- 0.0114
Counting Efficiency: 0.1913 +/- 0.0037 on 10/23/2011 12:20:56 PM
Chem. Recovery Factor: 1.1095 +/- 0.0633

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	425.66	9.50	0.34	0.00E+000	12.2
U-234		4.731	203.66	13.75	0.34	0.00E+000	14.0
U-235		4.370	8.00	73.50	0.00	0.00E+000	3.1
U-238		4.150	169.83	15.05	0.17	0.00E+000	6.7

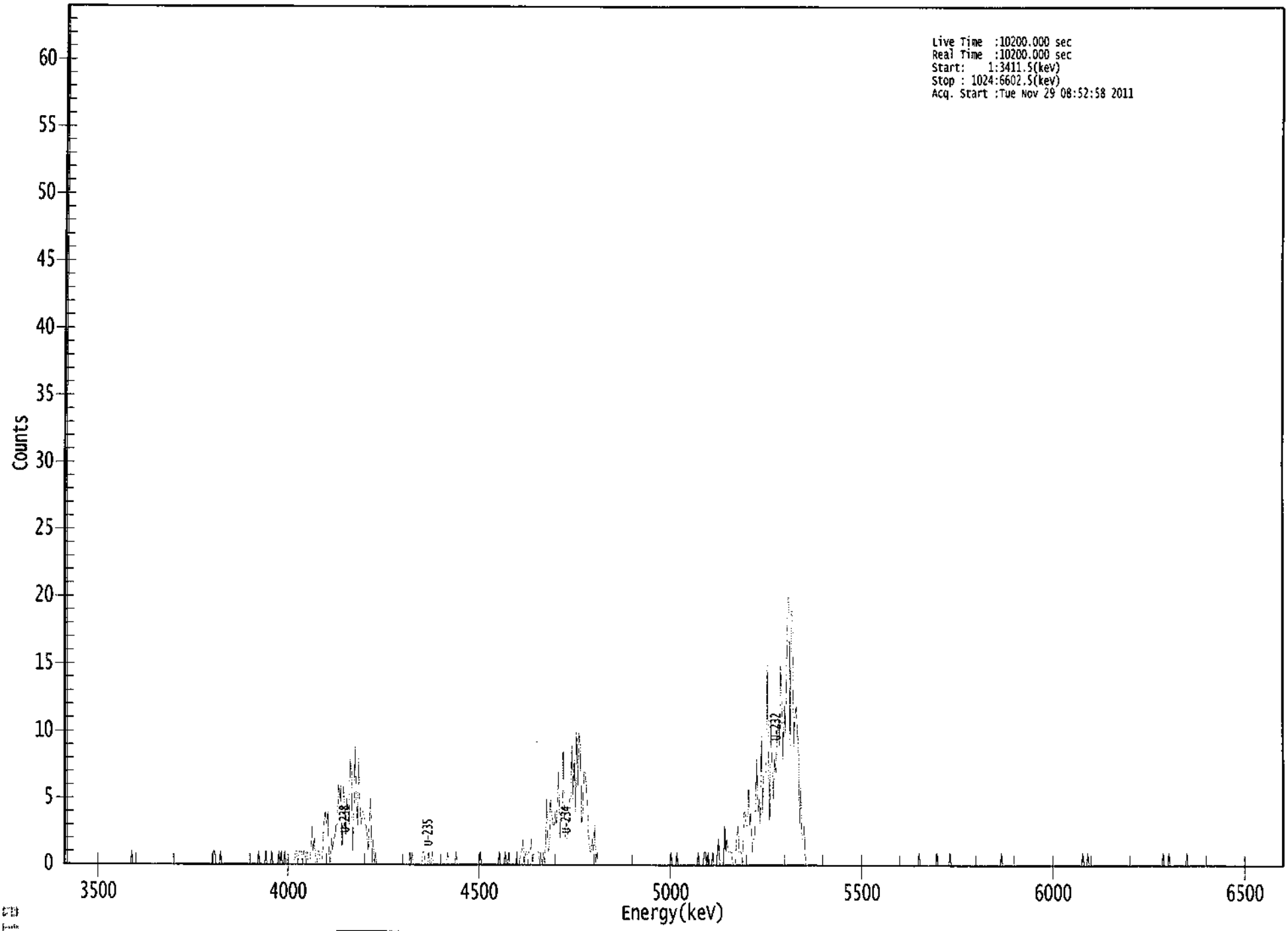
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.993	5302.50*	5.24E+000 +/- 5.51E-001	5.89E-002 +/- 6.19E-003
U-234	0.985	4761.50*	2.51E+000 +/- 4.34E-001	5.88E-002 +/- 6.19E-003
U-235	0.996	4385.50*	1.21E-001 +/- 9.02E-002	9.10E-002 +/- 9.58E-003
U-238	0.981	4184.40*	2.08E+000 +/- 3.82E-001	5.11E-002 +/- 5.38E-003

AG
11/30/11

0000010624.CNF



ROI Type: 1

ROI Type: 3

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	1	1
129:	0	0	0	0	1	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	1	0	0	0
169:	0	0	1	0	0	0	0	1
177:	0	0	0	0	0	1	0	1
185:	0	0	1	0	0	0	0	0
193:	0	0	0	1	1	0	1	1
201:	1	0	1	1	0	1	0	0
209:	1	3	1	2	0	0	1	1
217:	0	0	1	3	4	3	4	1
225:	0	2	1	2	2	3	3	6
233:	5	6	1	6	5	2	5	4
241:	3	8	7	1	4	9	5	3
249:	8	4	3	4	4	3	3	2
257:	1	4	5	0	2	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	1	0	0
297:	0	0	0	0	0	0	1	1
305:	0	0	0	1	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	1	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	1	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	1	0

369:	0	0	0	1	0	0	1	0

Sample Title: 10

Channel								
377:	0	0	0	0	0	1	1	0
385:	1	1	2	0	1	1	0	1
393:	1	2	0	1	1	1	1	1
401:	0	1	0	1	0	2	5	1
409:	1	5	4	3	3	4	3	5
417:	7	2	4	4	9	3	2	2
425:	3	5	5	9	5	8	4	10
433:	6	10	9	3	4	7	7	6
441:	4	2	1	1	2	1	3	0
449:	1	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	1	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	1	0	0
537:	0	0	1	1	0	1	0	0
545:	0	1	0	0	0	1	2	0
553:	0	0	0	3	1	2	1	1
561:	1	1	0	0	0	2	3	1
569:	1	1	0	4	4	3	3	6
577:	3	4	1	2	2	5	8	4
585:	5	3	10	4	7	7	7	15
593:	8	3	11	8	5	8	7	9
601:	11	9	15	12	8	12	10	15
609:	20	20	9	19	19	9	11	12
617:	10	9	3	6	2	2	3	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	1	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	1	0	0
737:	0	0	0	0	0	0	0	0
745:	1	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	1	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	1
857:	0	0	0	1	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	1	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

1CB
11/30/11

Apex-Alpha™

Sample Description: IB1/2-4A
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010626.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_030
Chamber Serial Number:
Detector Serial Number: 30
Env. Background: System Bkgd 10009
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:52:59 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6097 mL
Effective Efficiency: 0.2483 +/- 0.0125
Counting Efficiency: 0.1739 +/- 0.0033 on 10/22/2011 1:05:39 PM
Chem. Recovery Factor: 1.4282 +/- 0.0769

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.275	495.66	8.81	0.34	0.00E+000	21.3
U-234		4.726	255.66	12.27	0.34	0.00E+000	16.0
U-235		4.390	19.00	46.13	0.00	0.00E+000	4.7
U-238		4.150	267.49	12.00	0.51	0.00E+000	19.7

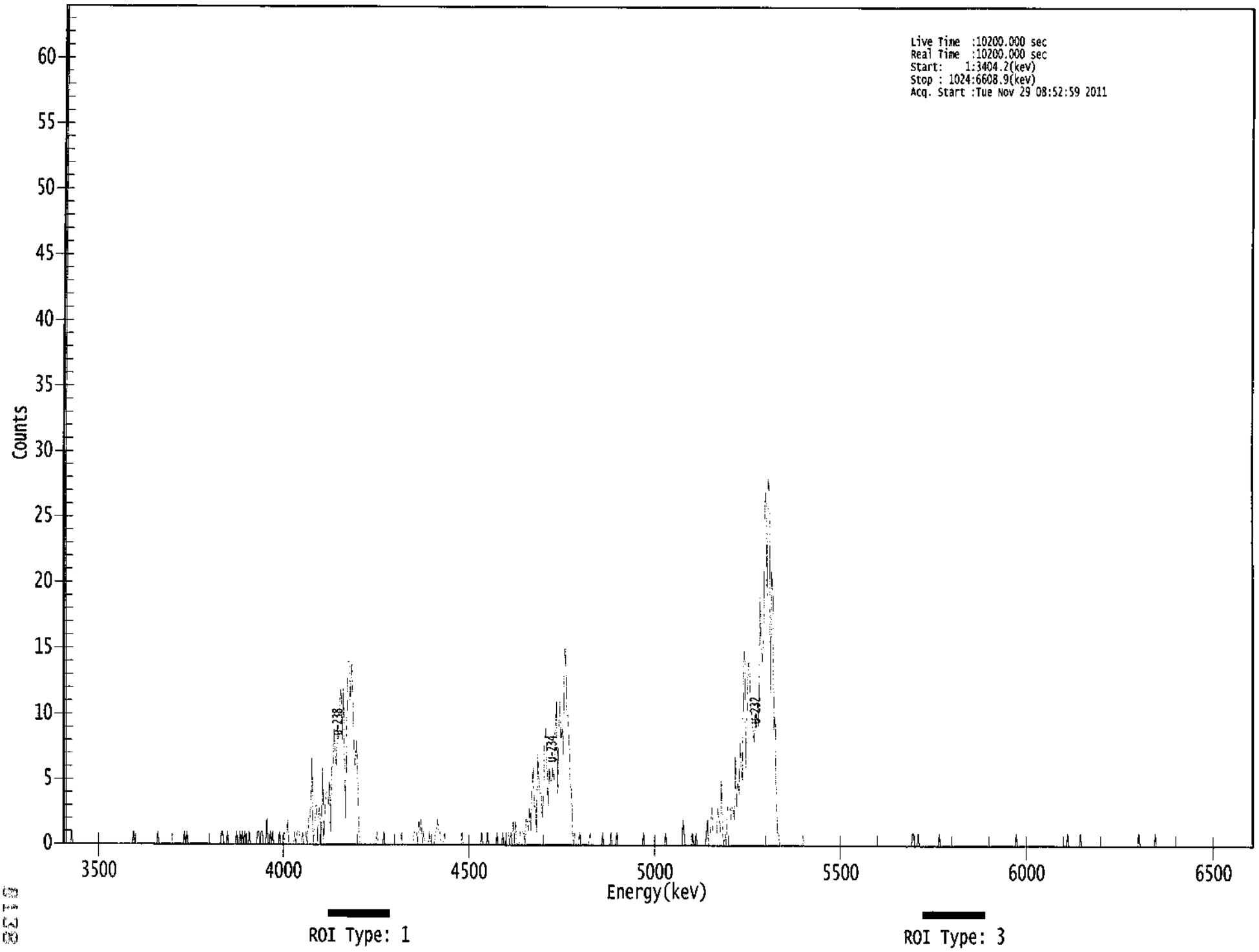
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.988	5302.50*	5.30E+000 +/- 5.24E-001	5.11E-002 +/- 5.06E-003
U-234	0.980	4761.50*	2.73E+000 +/- 4.31E-001	5.11E-002 +/- 5.06E-003
U-235	1.000	4385.50*	2.51E-001 +/- 1.18E-001	7.91E-002 +/- 7.82E-003
U-238	0.981	4184.40*	2.85E+000 +/- 4.43E-001	5.58E-002 +/- 5.53E-003

AG
11/30/11

0000010626.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	1
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	1	0	1	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	1	1	0	0	0	1	0
145:	0	0	0	0	0	0	1	0
153:	0	1	0	1	0	1	0	0
161:	0	1	0	0	0	0	0	0
169:	1	1	0	1	1	0	0	0
177:	2	0	0	1	0	1	0	0
185:	0	0	0	1	0	0	0	1
193:	0	0	2	0	0	0	0	0
201:	1	0	1	1	1	0	0	1
209:	0	0	1	0	2	2	3	7
217:	0	1	3	3	0	3	2	0
225:	6	0	3	4	4	3	5	1
233:	6	6	9	7	6	9	8	11
241:	12	8	12	7	2	9	14	14
249:	11	14	12	7	6	8	6	2
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	1
273:	0	0	0	0	0	1	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	1	0	0	0
297:	0	0	0	0	0	0	0	1
305:	1	1	0	2	1	2	0	1
313:	0	0	0	0	1	0	0	0
321:	0	1	1	2	1	1	0	0
329:	0	1	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	1	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	1	0	0	0	0	1	0

369:	0	0	0	0	0	0	1	0

Sample Title: 11

Channel								
377:	0	0	0	1	0	0	1	1
385:	1	0	1	0	2	0	2	0
393:	0	0	1	1	1	1	0	2
401:	2	1	3	1	4	6	3	3
409:	1	7	5	4	4	2	4	8
417:	9	6	3	6	5	5	6	5
425:	9	11	4	9	11	8	9	7
433:	15	15	10	10	8	5	4	1
441:	0	1	0	0	0	1	0	0
449:	0	0	0	0	0	0	1	0
457:	0	0	0	0	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	1	0	0	0	0	1	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	1	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	1
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	2	1
537:	0	0	0	0	0	0	1	0
545:	0	1	0	0	0	0	0	0
553:	0	0	1	2	0	0	2	3
561:	1	1	1	1	3	2	1	5
569:	1	0	1	0	3	3	3	2
577:	3	3	2	7	3	5	4	8
585:	6	5	14	15	6	10	14	14
593:	11	10	9	8	10	9	11	9
601:	19	15	14	16	26	27	19	28
609:	27	11	21	19	9	10	4	1
617:	1	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	1	1	0	0	0
737:	1	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	1	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 11

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	1	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	0	0	0	1	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	1	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	1	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICR 11 ka 11

Apex-Alpha™

Sample Description: IB1/2-4B
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010625.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_031
Chamber Serial Number:
Detector Serial Number: 31
Env. Background: System Bkgd 10010
Reagent Blank: <not performed>

Sample Size: 1.013E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 8:53:00 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6122 mL
Effective Efficiency: 0.2427 +/- 0.0123
Counting Efficiency: 0.1667 +/- 0.0031 on 10/22/2011 1:05:44 PM
Chem. Recovery Factor: 1.4565 +/- 0.0790

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.288	486.49	8.89	0.51	0.00E+000	30.5
U-234		4.740	289.96	11.56	2.04	0.00E+000	14.4
U-235		4.369	11.00	61.72	0.00	0.00E+000	3.1
U-238		4.162	282.58	11.77	4.42	0.00E+000	18.9

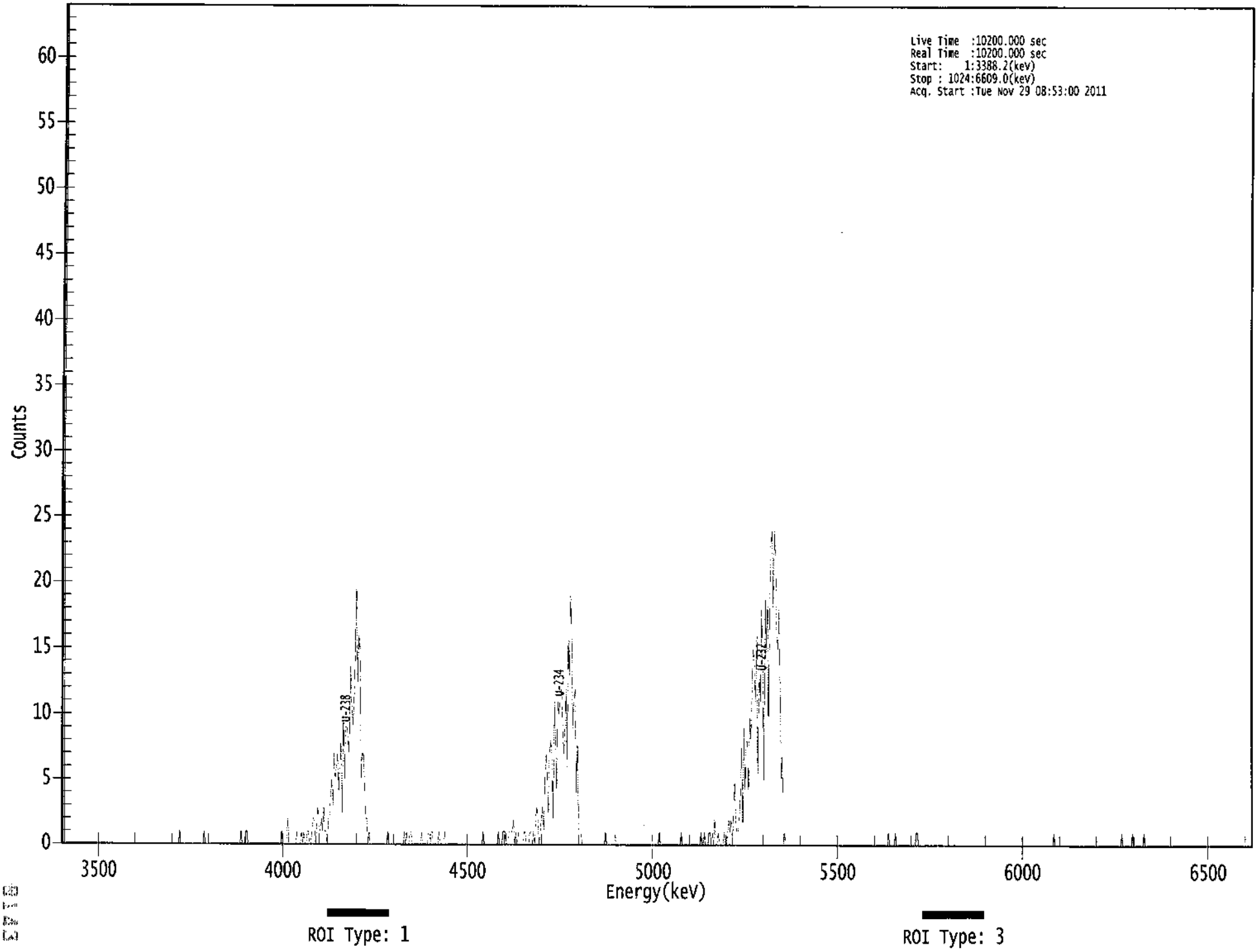
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.25E+000 +/- 5.24E-001	5.67E-002 +/- 5.65E-003
U-234	0.992	4761.50*	3.13E+000 +/- 4.78E-001	8.41E-002 +/- 8.38E-003
U-235	0.996	4385.50*	1.47E-001 +/- 9.16E-002	7.99E-002 +/- 7.96E-003
U-238	0.992	4184.40*	3.04E+000 +/- 4.69E-001	1.10E-001 +/- 1.09E-002

AG
11/30/11

0000010625.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 12

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	1	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	1	0	0	0	1
161:	1	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	1	0
193:	0	0	0	2	0	0	0	0
201:	0	0	0	1	0	0	0	1
209:	0	1	0	0	1	1	0	0
217:	1	2	2	0	1	3	1	1
225:	2	1	3	1	1	0	2	2
233:	4	5	3	7	5	6	7	4
241:	6	8	2	10	5	9	9	8
249:	7	14	11	9	11	15	20	12
257:	16	15	5	7	7	5	2	2
265:	0	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	1	0	0	1	1	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	1	1	1	1
321:	0	0	0	0	0	1	0	0
329:	0	0	1	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	1	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
377:	1	0	0	0	1	1	1	0
385:	0	1	1	1	1	2	0	1
393:	0	1	0	0	0	0	1	1
401:	0	0	0	1	1	0	1	0
409:	2	3	2	0	1	2	3	1
417:	5	7	6	2	7	8	7	2
425:	11	8	4	11	10	11	12	10
433:	7	8	12	6	16	13	19	16
441:	9	11	12	4	8	1	1	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	1	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	1	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	1	0
553:	0	1	0	0	0	1	1	0
561:	1	0	2	0	0	1	0	0
569:	0	0	1	0	0	1	2	1
577:	2	0	2	5	2	1	1	2
585:	4	8	1	9	4	8	8	4
593:	10	8	12	15	14	11	16	5
601:	13	11	18	13	5	19	15	19
609:	9	19	23	24	18	24	22	16
617:	15	18	12	5	7	0	1	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	0	0	1	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	1
737:	1	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	1	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	1
913:	0	0	0	0	0	0	0	0
921:	1	0	0	0	0	0	0	0
929:	0	0	1	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

1CB
11/29/11

Apex-Alpha™

Sample Description: IB1/2-4C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010634.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_033
Chamber Serial Number: 06027396A
Detector Serial Number: 91132
Env. Background: System Bkgd 10011
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:35 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6124 mL
Effective Efficiency: 0.2195 +/- 0.0116
Counting Efficiency: 0.1992 +/- 0.0032 on 8/30/2011 7:34:55 PM
Chem. Recovery Factor: 1.1020 +/- 0.0610

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	440.00	9.35	0.00	0.00E+000	36.4
U-234		4.735	246.83	12.48	0.17	0.00E+000	16.7
U-235		4.380	15.00	52.27	0.00	0.00E+000	4.5
U-238		4.157	257.00	12.25	0.00	0.00E+000	39.0

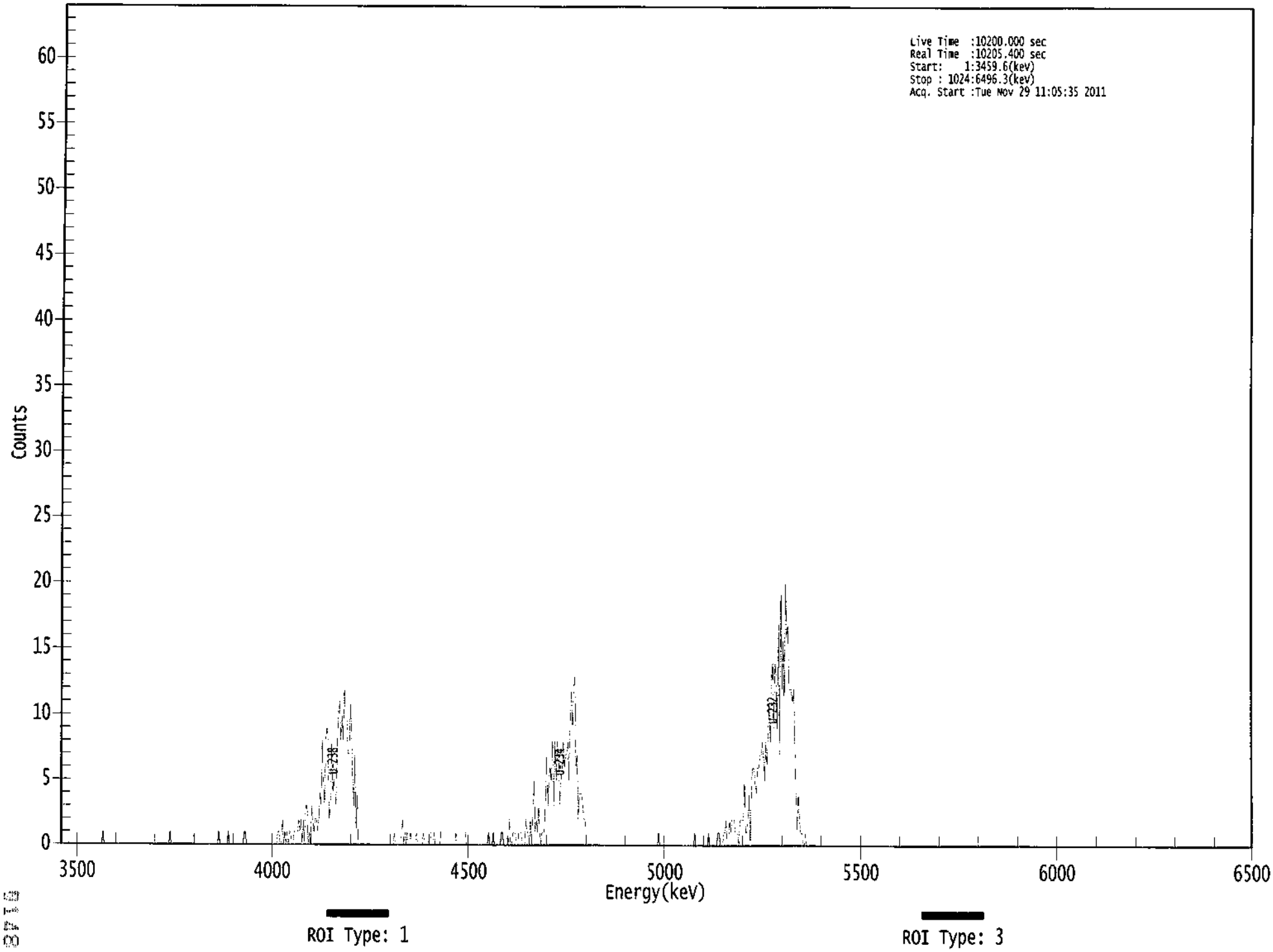
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.32E+000 +/- 5.52E-001	7.25E-002 +/- 7.53E-003
U-234	0.989	4761.50*	2.98E+000 +/- 4.84E-001	5.04E-002 +/- 5.24E-003
U-235	1.000	4385.50*	2.24E-001 +/- 1.19E-001	8.94E-002 +/- 9.28E-003
U-238	0.988	4184.40*	3.09E+000 +/- 4.97E-001	7.22E-002 +/- 7.49E-003

AG
11/30/11

0000010634.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 13

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	1	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	1	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	0	0	0	0
145:	1	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	1	1
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	1	1	0	0	2
193:	0	1	0	1	0	1	1	0
201:	0	1	1	1	1	2	1	2
209:	0	2	0	3	3	0	1	0
217:	3	2	1	2	2	1	2	4
225:	3	8	5	3	8	9	8	2
233:	3	8	4	5	4	3	8	10
241:	11	8	10	8	12	10	10	7
249:	7	11	9	5	3	7	1	4
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	1
289:	0	0	0	0	0	1	2	0
297:	1	0	1	0	0	1	0	0
305:	0	0	1	0	0	0	0	0
313:	1	0	0	0	0	1	1	0
321:	0	1	0	0	0	0	0	1
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	1	0	0	0
345:	0	0	0	0	1	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	1	0	0	0	1	0	0	0

Sample Title: 13

Channel								
377:	0	0	0	1	1	0	0	0
385:	0	0	2	0	0	1	1	1
393:	0	0	1	1	1	0	0	0
401:	2	1	1	0	2	0	3	5
409:	1	2	1	3	1	0	1	1
417:	1	4	7	3	5	6	5	8
425:	3	8	5	8	7	3	5	6
433:	8	6	7	7	8	5	10	12
441:	9	12	13	6	7	2	4	4
449:	4	3	2	2	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	0	1	0	0
561:	0	0	0	0	0	1	1	0
569:	0	0	1	1	2	0	0	2
577:	1	2	2	2	1	1	1	0
585:	2	2	2	2	5	1	1	2
593:	4	0	5	6	6	5	4	6
601:	6	7	7	8	7	5	8	6
609:	9	11	8	13	14	9	14	13
617:	9	17	7	20	12	16	11	20
625:	16	17	12	12	12	11	12	8
633:	4	1	4	2	1	1	0	0
641:	1	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB 11/29/11

Apex-Alpha™

Sample Description: IB1/2-4D
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010635.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 14
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_034
Chamber Serial Number: 06027396B
Detector Serial Number: 91136
Env. Background: System Bkgd 10012
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:37 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6131 mL
Effective Efficiency: 0.2251 +/- 0.0118
Counting Efficiency: 0.1866 +/- 0.0030 on 8/30/2011 7:34:54 PM
Chem. Recovery Factor: 1.2062 +/- 0.0661

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.275	451.83	9.22	0.17	0.00E+000	5.7
U-234		4.734	225.83	13.05	0.17	0.00E+000	7.4
U-235		4.402	4.00	109.57	0.00	0.00E+000	3.0
U-238		4.157	239.83	12.66	0.17	0.00E+000	10.4

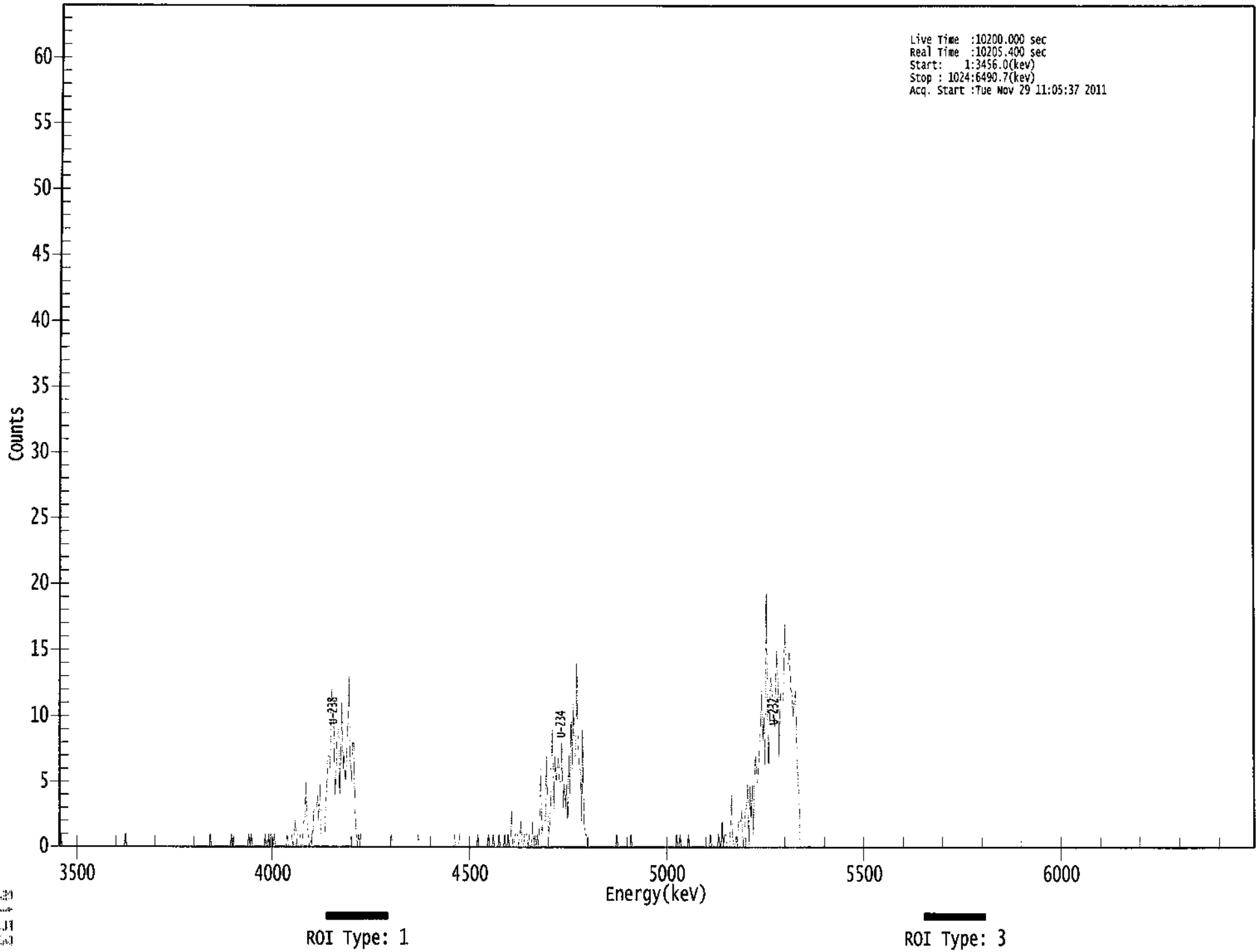
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.988	5302.50*	5.33E+000 +/- 5.47E-001	4.92E-002 +/- 5.05E-003
U-234	0.988	4761.50*	2.66E+000 +/- 4.42E-001	4.92E-002 +/- 5.05E-003
U-235	0.996	4385.50*	5.82E-002 +/- 6.40E-002	8.72E-002 +/- 8.95E-003
U-238	0.988	4184.40*	2.82E+000 +/- 4.59E-001	4.90E-002 +/- 5.03E-003

AG
11/30/11

0000010635.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 14

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	1	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	1	0	0
169:	0	0	0	0	0	0	0	0
177:	0	1	0	0	1	0	1	1
185:	0	1	0	0	0	0	0	0
193:	0	0	0	0	1	0	0	0
201:	1	0	1	2	0	1	1	1
209:	0	0	2	2	5	2	1	0
217:	0	1	1	3	3	3	4	2
225:	5	1	1	1	1	3	5	7
233:	7	6	12	11	9	4	6	9
241:	9	4	8	11	6	7	5	7
249:	9	13	7	5	8	8	3	1
257:	0	1	0	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	1	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	1
361:	0	0	0	0	0	0	0	0

369:	1	0	0	0	1	0	0	0

Sample Title: 14

Channel								
377:	0	1	0	0	0	0	1	0
385:	0	1	0	0	3	0	0	1
393:	1	1	0	1	2	0	0	1
401:	1	1	0	1	0	0	2	0
409:	1	0	1	0	2	6	1	2
417:	2	2	7	3	1	2	6	9
425:	3	7	5	6	7	5	5	8
433:	3	5	3	5	2	7	4	10
441:	6	11	7	7	14	8	6	6
449:	2	9	2	1	1	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	0
489:	0	0	1	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	1	0	0	1	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	1	0
561:	0	0	0	0	0	1	0	0
569:	2	0	1	1	0	0	0	1
577:	4	1	0	0	1	0	2	2
585:	2	3	0	1	3	3	5	0
593:	5	2	5	1	6	7	5	5
601:	8	9	12	8	10	6	20	11
609:	6	11	13	12	11	9	12	15
617:	13	7	12	11	11	12	17	14
625:	14	14	15	12	12	10	11	12
633:	8	5	4	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 14

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

LCB
11/29/11

Apex-Alpha™

Sample Description: IB1/2-4E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010633.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 15
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_035
Chamber Serial Number: 04026477A
Detector Serial Number: 58771
Env. Background: System Bkgd 10013
Reagent Blank: <not performed>

Sample Size: 1.064E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:25 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6132 mL
Effective Efficiency: 0.2180 +/- 0.0116
Counting Efficiency: 0.1761 +/- 0.0028 on 8/30/2011 7:34:52 PM
Chem. Recovery Factor: 1.2380 +/- 0.0686

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.278	437.66	9.37	0.34	0.00E+000	19.7
U-234		4.732	223.15	13.15	0.85	0.00E+000	6.8
U-235		4.387	14.66	51.88	0.34	0.00E+000	3.0
U-238		4.155	262.83	12.09	0.17	0.00E+000	6.9

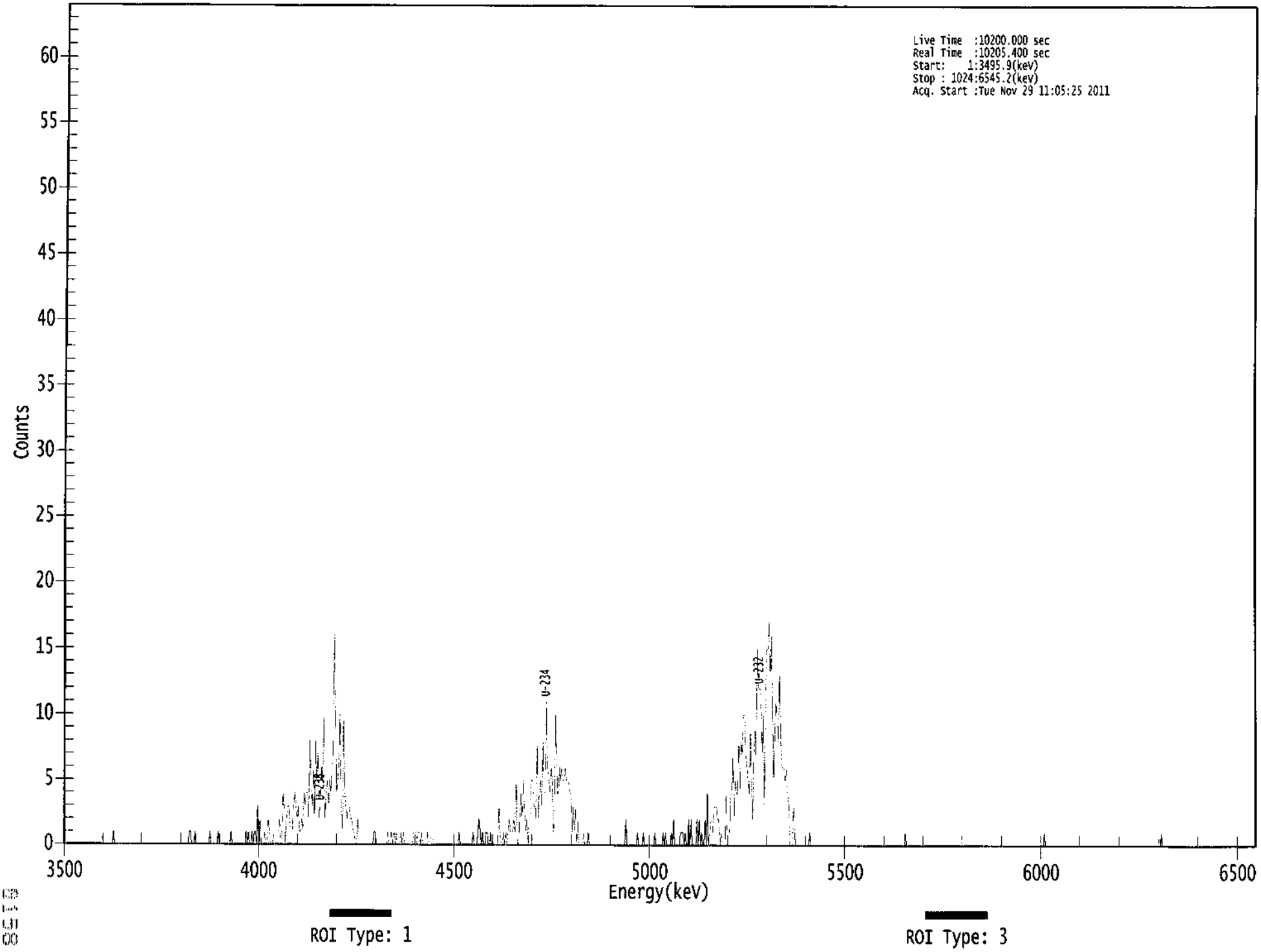
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.990	5302.50*	5.01E+000 +/- 5.21E-001	5.47E-002 +/- 5.69E-003
U-234	0.986	4761.50*	2.55E+000 +/- 4.28E-001	6.85E-002 +/- 7.13E-003
U-235	1.000	4385.50*	2.07E-001 +/- 1.10E-001	6.75E-002 +/- 7.02E-003
U-238	0.986	4184.40*	3.00E+000 +/- 4.78E-001	4.76E-002 +/- 4.95E-003

AG
11/30/11

0000010633.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 15

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	1	0	0
113:	0	1	0	0	0	0	0	0
121:	0	0	0	0	0	0	1	0
129:	0	0	0	0	0	1	0	0
137:	0	0	0	0	0	0	0	0
145:	1	0	0	0	0	0	0	0
153:	0	0	0	0	0	1	0	1
161:	0	0	1	0	1	1	0	3
169:	0	2	0	0	0	1	0	0
177:	2	1	0	0	0	1	1	1
185:	1	1	2	0	0	4	3	0
193:	2	3	3	1	1	1	3	4
201:	3	2	3	1	1	2	1	4
209:	3	4	4	2	8	5	3	6
217:	2	8	5	7	2	3	6	5
225:	10	2	4	5	3	5	4	6
233:	7	16	11	4	5	6	10	3
241:	1	10	4	3	2	3	3	2
249:	2	1	1	0	0	2	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	1	1	0	0	0
273:	0	0	0	0	0	0	0	1
281:	0	0	1	0	1	0	1	0
289:	0	0	1	0	1	0	0	0
297:	0	0	0	0	0	1	1	1
305:	0	1	1	0	1	0	0	0
313:	0	1	0	0	1	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	1	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	1	2	1	0
361:	1	0	0	1	1	0	0	1

369:	0	0	0	0	0	0	3	1

Sample Title: 15

Channel								
377:	0	0	1	0	1	0	1	2
385:	1	1	1	2	1	5	0	0
393:	2	4	2	5	3	1	2	0
401:	2	2	5	5	3	3	2	8
409:	2	4	5	3	8	4	4	11
417:	6	5	4	6	5	1	2	10
425:	4	4	6	5	6	5	5	6
433:	5	5	5	4	4	1	3	1
441:	3	0	2	0	0	0	0	1
449:	0	0	0	1	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	2	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	1	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	1	0	1	0	0
521:	0	0	1	0	2	0	0	0
529:	0	0	1	1	1	0	1	0
537:	0	2	0	2	0	0	0	0
545:	2	0	2	0	1	0	0	2
553:	0	4	0	1	2	2	1	3
561:	3	3	2	2	0	1	0	0
569:	0	4	1	1	1	4	4	7
577:	2	5	4	4	8	4	8	7
585:	10	10	7	6	5	4	9	5
593:	2	7	9	7	15	12	12	12
601:	7	10	3	11	15	15	17	13
609:	16	10	5	9	11	10	8	13
617:	9	6	6	6	5	6	4	3
625:	0	0	0	3	1	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	1	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 15

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	1	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
1/12/14

Apex-Alpha™

Sample Description: IB3-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010632.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 16
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_036
Chamber Serial Number: 04026477B
Detector Serial Number: 84167
Env. Background: System Bkgd 10014
Reagent Blank: <not performed>

Sample Size: 1.007E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:27 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6116 mL
Effective Efficiency: 0.2273 +/- 0.0119
Counting Efficiency: 0.1917 +/- 0.0031 on 8/30/2011 7:34:51 PM
Chem. Recovery Factor: 1.1856 +/- 0.0648

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.276	455.00	9.20	0.00	0.00E+000	30.3
U-234		4.740	73.83	22.84	0.17	0.00E+000	5.9
U-235		4.402	3.00	130.67	0.00	0.00E+000	3.0
U-238		4.147	77.83	22.25	0.17	0.00E+000	4.9

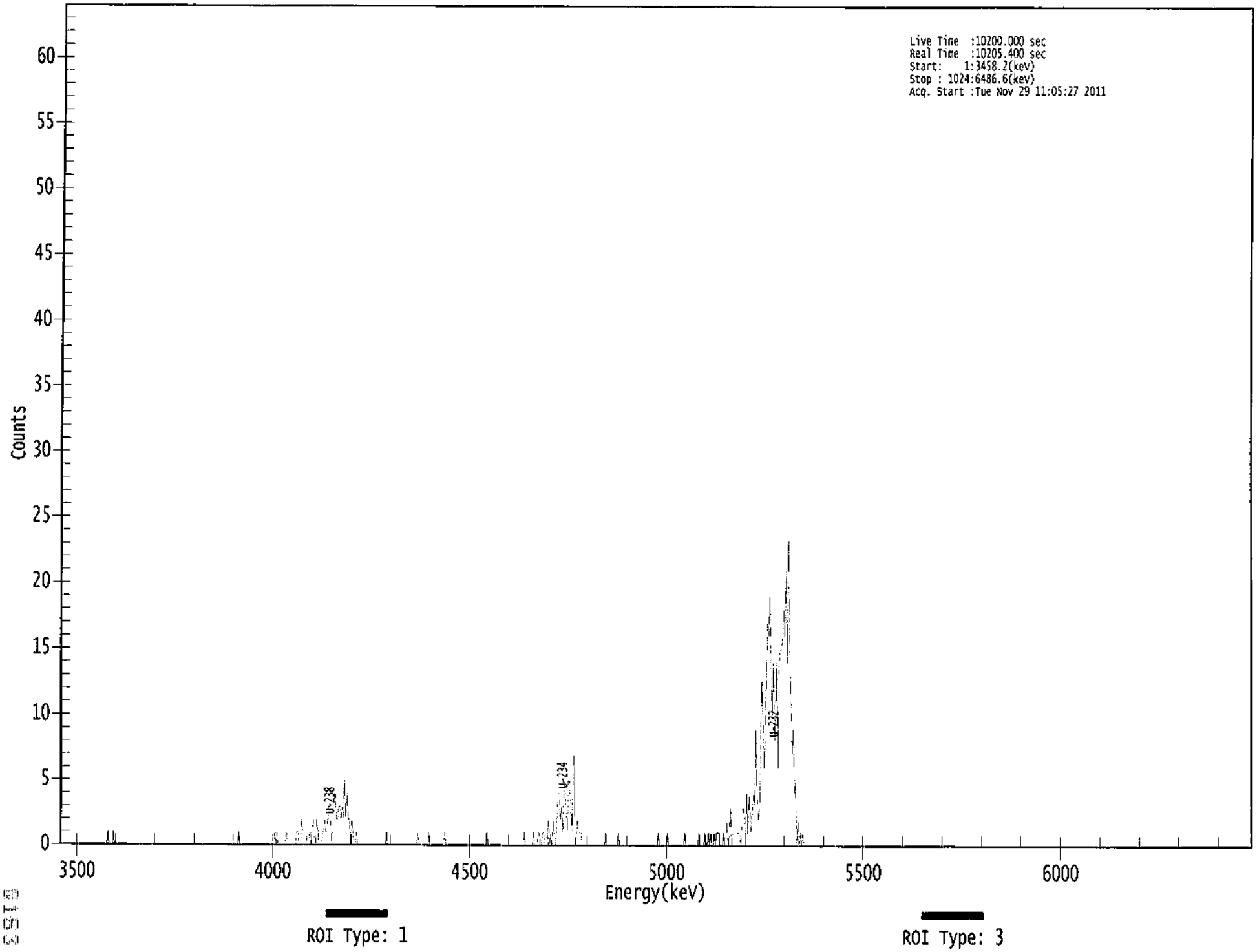
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.988	5302.50*	5.28E+000 +/- 5.41E-001	6.96E-002 +/- 7.13E-003
U-234	0.993	4761.50*	8.57E-001 +/- 2.15E-001	4.84E-002 +/- 4.96E-003
U-235	0.996	4385.50*	4.30E-002 +/- 5.63E-002	8.59E-002 +/- 8.80E-003
U-238	0.978	4184.40*	9.00E-001 +/- 2.20E-001	4.82E-002 +/- 4.94E-003

AG
11/30/11

0000010632.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 16

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	1	0	0	0	0	1	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	1	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	1	0	1	0	0	0	0
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	1	1	0	0
209:	2	1	1	1	1	0	0	1
217:	0	1	2	0	0	2	1	0
225:	0	0	1	1	2	1	1	3
233:	3	2	0	3	3	4	2	2
241:	3	3	2	3	2	5	2	4
249:	2	2	0	2	1	0	0	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	1

369:	0	0	0	0	0	0	0	0

Sample Title: 16

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	0	0	0	0	1
409:	0	0	0	1	1	0	0	1
417:	1	0	0	1	2	0	1	0
425:	2	0	0	2	4	4	2	3
433:	1	4	5	3	1	5	5	3
441:	1	6	7	0	1	2	1	1
449:	1	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	1	0	0
473:	0	0	0	0	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	0
521:	0	0	1	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	0	0	1	0	0
553:	0	0	1	0	0	1	0	1
561:	0	0	1	0	1	1	1	0
569:	0	0	1	0	0	2	0	1
577:	3	0	1	1	1	1	1	1
585:	1	0	2	3	2	0	4	1
593:	4	2	1	3	4	3	9	4
601:	2	3	7	13	9	6	9	13
609:	17	16	19	14	10	14	8	10
617:	14	6	14	15	15	16	18	16
625:	21	14	24	16	12	7	9	4
633:	5	0	2	0	1	0	1	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 16

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
11/29/11

Apex-Alpha™

Sample Description: IB3-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010628.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 17
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_037
Chamber Serial Number: 04026478A
Detector Serial Number: 91133
Env. Background: System Bkgd 10015
Reagent Blank: <not performed>

Sample Size: 1.010E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:29 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6113 mL
Effective Efficiency: 0.1844 +/- 0.0105
Counting Efficiency: 0.1806 +/- 0.0029 on 8/30/2011 7:34:50 PM
Chem. Recovery Factor: 1.0211 +/- 0.0604

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.312	369.00	10.22	0.00	0.00E+000	27.8
U-234		4.766	112.00	18.60	0.00	0.00E+000	5.1
U-235		4.368	3.83	102.72	0.17	0.00E+000	3.0
U-238		4.176	112.00	18.60	0.00	0.00E+000	6.6

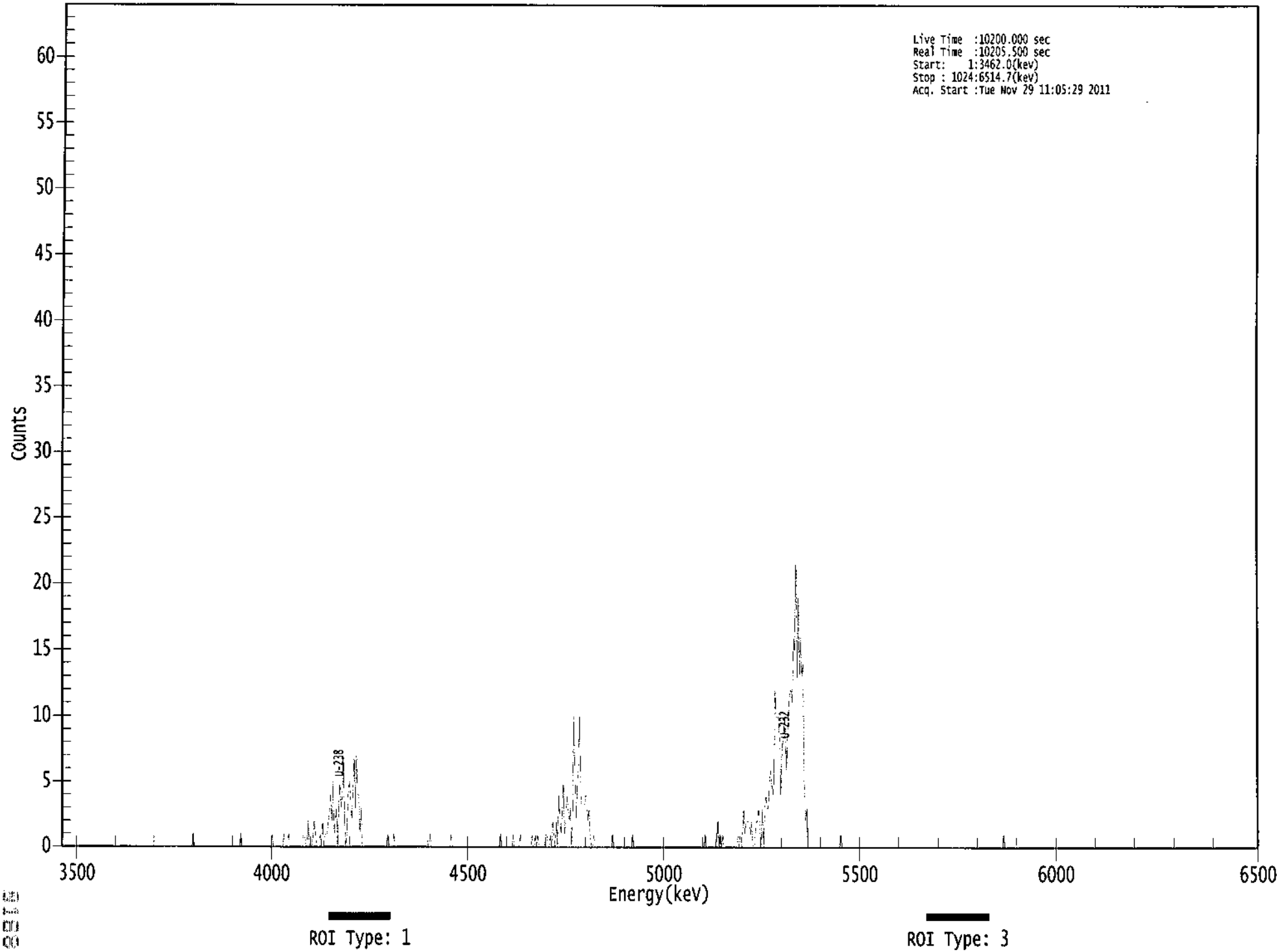
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.999	5302.50*	5.26E+000 +/- 5.87E-001	8.55E-002 +/- 9.54E-003
U-234	1.000	4761.50*	1.60E+000 +/- 3.46E-001	8.54E-002 +/- 9.54E-003
U-235	0.995	4385.50*	6.73E-002 +/- 6.96E-002	7.34E-002 +/- 8.19E-003
U-238	0.999	4184.40*	1.59E+000 +/- 3.45E-001	8.51E-002 +/- 9.50E-003

AG
11/30/11

0000010628.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 17

Elapsed Live time: 10200
Elapsed Real Time: 10206

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	1	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	1	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	0	0	0	0	0	1
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	1	1	0	0	2	0	0	0
217:	1	2	1	0	0	0	1	0
225:	2	0	1	1	1	2	3	4
233:	2	5	1	2	3	0	3	5
241:	3	4	7	2	0	1	4	5
249:	4	2	4	7	3	7	4	4
257:	1	3	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	0	0	0	0	1	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	1	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 17

Channel								
377:	1	0	0	0	0	0	0	0
385:	0	0	0	1	0	0	0	0
393:	0	1	0	0	0	0	0	0
401:	0	0	0	1	0	0	1	0
409:	1	0	0	0	0	0	0	1
417:	1	0	0	1	0	2	1	0
425:	2	0	4	2	1	3	5	1
433:	2	4	3	2	3	0	3	10
441:	5	2	5	6	10	4	3	3
449:	3	4	4	2	3	1	0	0
457:	1	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	1	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	1	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	1
553:	0	0	0	0	0	0	0	0
561:	0	1	2	0	1	0	1	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	1	0	1	1	1
585:	3	1	2	2	2	2	1	2
593:	0	0	1	2	2	3	1	0
601:	3	0	3	4	3	3	5	6
609:	5	4	5	12	10	10	10	8
617:	4	8	8	10	8	6	9	11
625:	12	12	11	16	15	22	13	19
633:	13	16	13	14	4	2	3	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	1	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	1	0

Sample Title: 17

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
11/29/11

Apex-Alpha™

Sample Description: IB3-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010629.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 18
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_038
Chamber Serial Number: 04026478B
Detector Serial Number: 91134
Env. Background: System Bkgd 10016
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:30 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6160 mL
Effective Efficiency: 0.2336 +/- 0.0120
Counting Efficiency: 0.1591 +/- 0.0026 on 8/30/2011 7:34:48 PM
Chem. Recovery Factor: 1.4683 +/- 0.0793

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.289	471.00	9.04	0.00	0.00E+000	16.6
U-234		4.733	153.49	15.85	0.51	0.00E+000	16.8
U-235		4.390	5.00	96.02	0.00	0.00E+000	3.0
U-238		4.160	133.66	16.98	0.34	0.00E+000	4.9

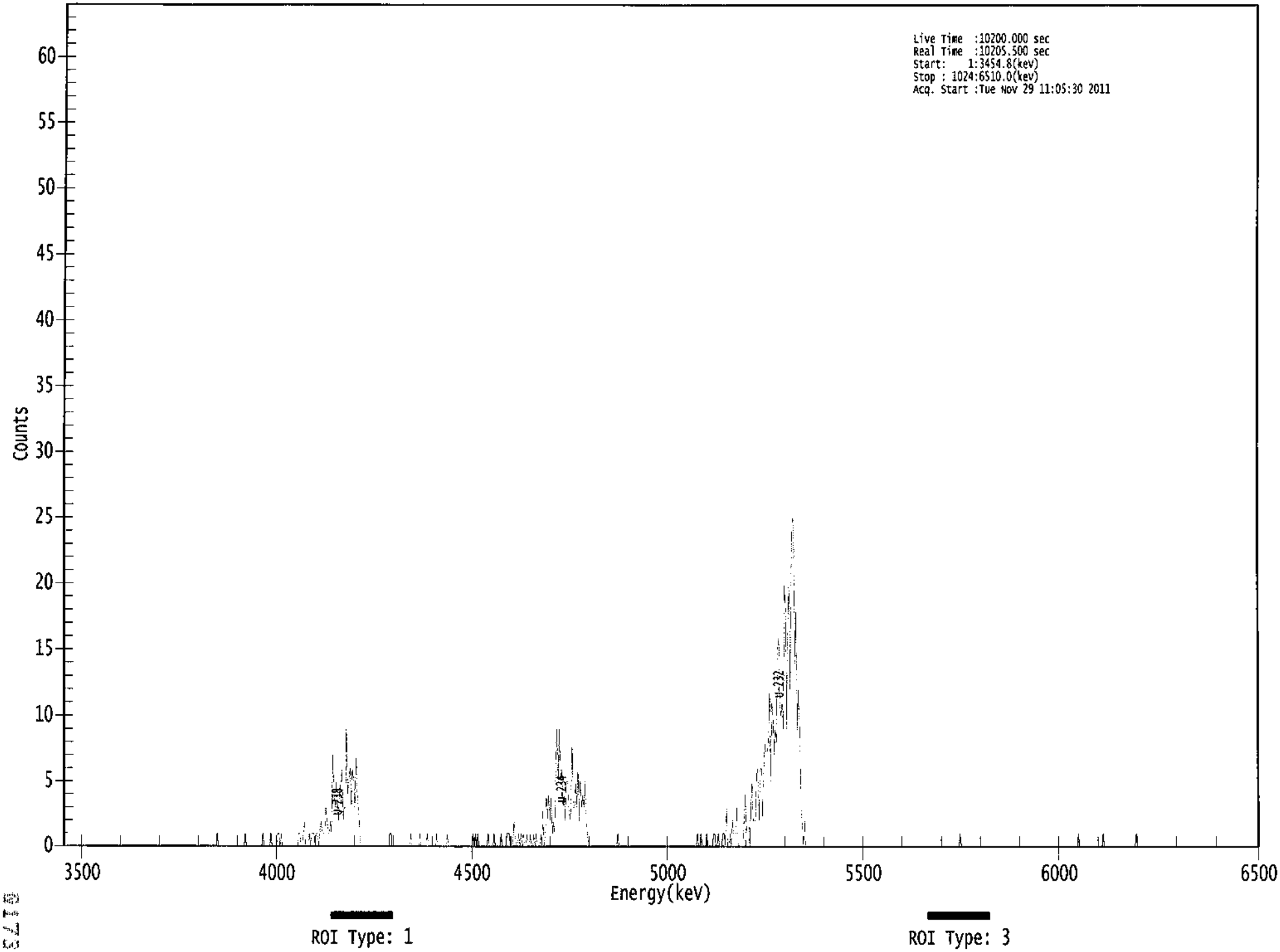
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.34E+000 +/- 5.39E-001	6.79E-002 +/- 6.86E-003
U-234	0.988	4761.50*	1.74E+000 +/- 3.27E-001	5.94E-002 +/- 6.00E-003
U-235	1.000	4385.50*	6.99E-002 +/- 6.75E-002	8.38E-002 +/- 8.46E-003
U-238	0.991	4184.40*	1.51E+000 +/- 2.98E-001	5.39E-002 +/- 5.45E-003

AG
11/30/11

0000010629.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 18

Elapsed Live time: 10200
Elapsed Real Time: 10206

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	1	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	1	0	0	0	0
177:	0	0	1	0	0	0	0	0
185:	1	1	0	1	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	1	1	0	0	1	2
209:	0	0	0	1	0	1	1	1
217:	0	1	1	0	1	2	1	1
225:	1	3	2	1	1	2	1	7
233:	5	3	5	3	2	4	5	6
241:	2	3	3	9	4	5	6	3
249:	6	5	3	7	4	3	1	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	0	0	0	0
305:	0	0	1	0	0	0	0	0
313:	1	0	0	0	0	0	0	0
321:	1	0	0	0	0	0	0	0
329:	0	1	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	1
353:	0	1	0	1	0	0	0	0
361:	0	0	0	0	1	0	0	0

369:	0	1	0	0	0	0	0	1

Sample Title: 18

Channel								
377:	0	0	0	0	1	1	1	0
385:	0	0	2	1	0	0	1	0
393:	1	0	1	0	0	1	0	0
401:	1	0	0	1	0	1	0	0
409:	0	1	0	3	0	1	4	2
417:	4	2	4	1	2	1	5	9
425:	5	9	5	6	3	4	2	5
433:	5	3	2	3	8	3	3	5
441:	3	6	2	5	3	4	3	5
449:	2	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	1	0	0	0	0	1
553:	0	0	0	0	0	1	1	0
561:	0	1	0	0	0	1	1	0
569:	3	0	0	1	0	2	1	1
577:	1	3	0	0	0	0	0	2
585:	4	1	2	2	0	3	5	2
593:	2	2	6	6	2	6	6	2
601:	6	8	7	7	8	12	5	11
609:	10	7	9	8	15	16	11	10
617:	11	9	20	18	9	17	20	12
625:	21	25	25	14	18	9	12	9
633:	3	2	0	2	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	1	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 18

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	1	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	1	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
11/29/11

Apex-Alpha™

Sample Description: IB3-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010630.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 19
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10017
Reagent Blank: <not performed>

Sample Size: 1.005E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:32 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6110 mL
Effective Efficiency: 0.1780 +/- 0.0103
Counting Efficiency: 0.1847 +/- 0.0030 on 8/30/2011 7:34:47 PM
Chem. Recovery Factor: 0.9639 +/- 0.0579

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.307	356.00	10.40	0.00	0.00E+000	19.2
U-234		4.760	51.83	27.28	0.17	0.00E+000	3.3
U-235		4.397	-0.17	1169.4	0.17	0.00E+000	0.0
U-238		4.179	60.00	25.51	0.00	0.00E+000	3.7

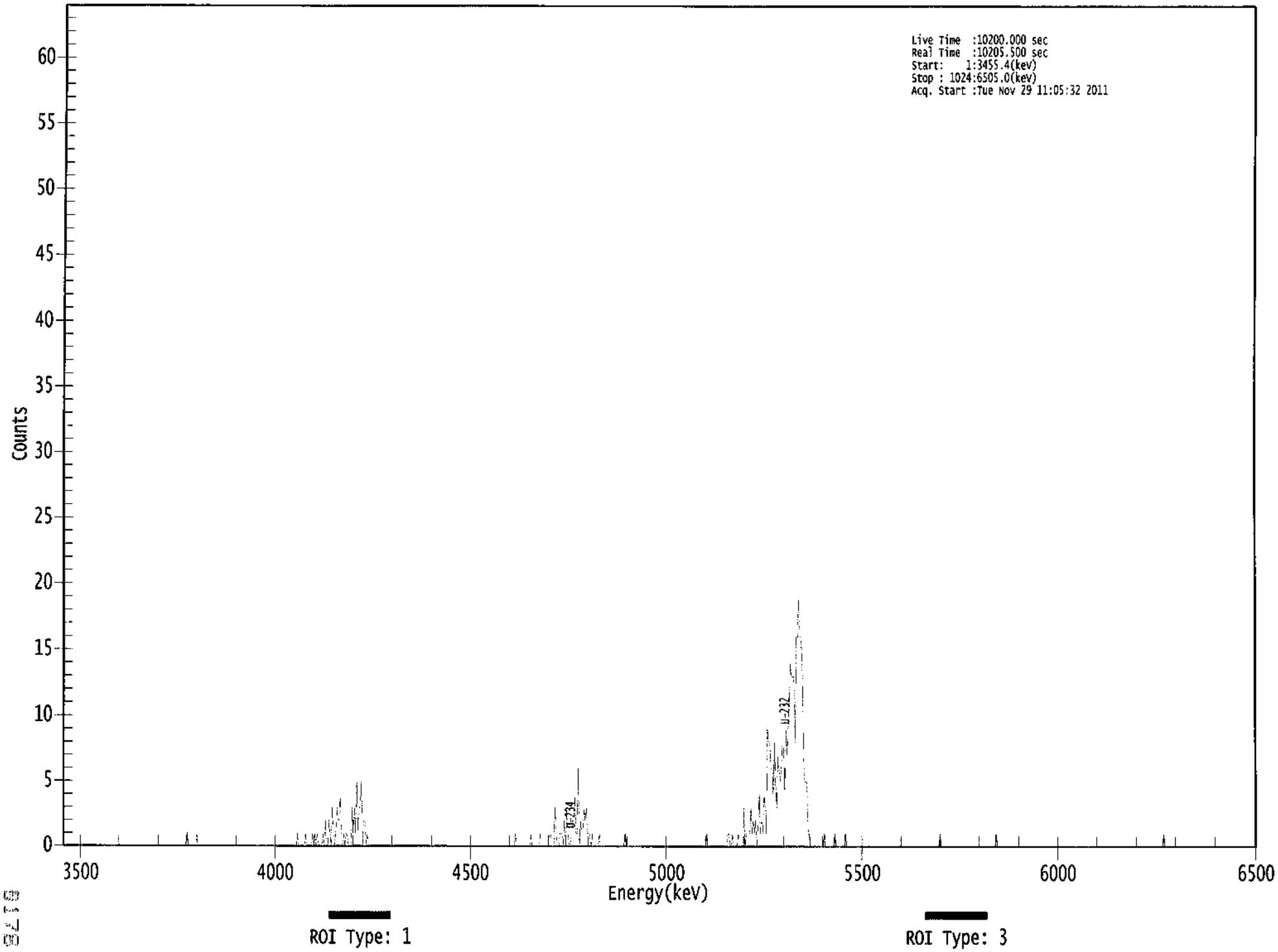
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.29E+000 +/- 5.99E-001	8.90E-002 +/- 1.01E-002
U-234	1.000	4761.50*	7.69E-001 +/- 2.27E-001	6.19E-002 +/- 7.02E-003
U-235	0.998	4385.50*	-3.11E-003 +/- 3.64E-002	7.64E-002 +/- 8.66E-003
U-238	1.000	4184.40*	8.87E-001 +/- 2.48E-001	8.86E-002 +/- 1.00E-002

AG
11/30/11

0000010630.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 19

Elapsed Live time: 10200
Elapsed Real Time: 10206

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	1	0	0	0	0	0
209:	0	1	0	0	0	0	0	1
217:	0	1	0	1	0	0	0	0
225:	1	0	2	0	0	2	1	0
233:	3	1	0	1	3	2	2	4
241:	0	0	1	0	1	1	0	0
249:	0	3	1	3	1	5	1	3
257:	3	5	0	2	2	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 19

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	1	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	1	0	0	0	0	0
409:	0	0	1	0	0	0	0	0
417:	0	0	1	1	0	0	0	3
425:	1	0	0	1	1	1	0	2
433:	0	3	1	0	0	1	2	2
441:	4	1	1	6	0	2	1	1
449:	3	2	3	1	1	1	0	1
457:	0	0	0	0	0	1	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	1	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	1	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	1	1	0	0	1
577:	0	0	0	0	1	0	0	0
585:	0	3	0	1	1	1	1	3
593:	1	2	1	2	0	1	4	1
601:	2	1	4	3	1	9	8	8
609:	6	6	4	8	5	3	7	6
617:	5	6	8	8	4	9	7	9
625:	11	14	13	13	13	8	16	16
633:	19	16	16	14	7	5	5	5
641:	1	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	1	0
657:	0	0	0	0	0	0	0	1
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	1	0	0	0	0	0	0

Sample Title: 19

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

LB 11/29/11

Apex-Alpha™

Sample Description: IB3-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010631.Cnf
Batch Identification: 1111139A-UU
Sample Identification: 20
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10018
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:13:28 AM
Acquisition Date/Time: 11/29/2011 11:05:33 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6112 mL
Effective Efficiency: 0.2083 +/- 0.0113
Counting Efficiency: 0.1914 +/- 0.0031 on 8/30/2011 7:34:46 PM
Chem. Recovery Factor: 1.0887 +/- 0.0614

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	416.83	9.60	0.17	0.00E+000	46.0
U-234		4.732	302.00	11.30	0.00	0.00E+000	14.9
U-235		4.353	8.66	68.12	0.34	0.00E+000	3.0
U-238		4.154	256.00	12.27	0.00	0.00E+000	18.9

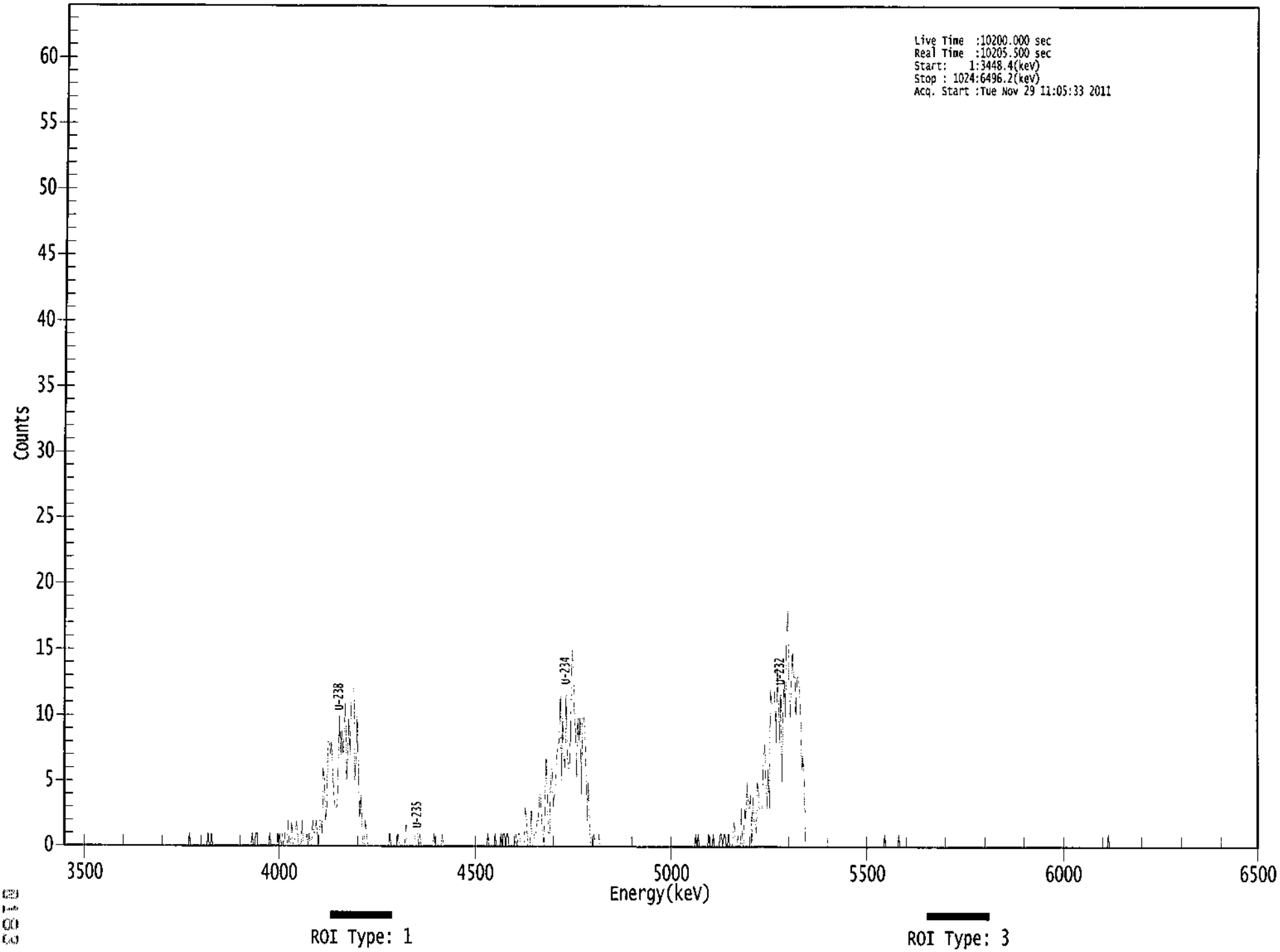
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.25E+000 +/- 5.57E-001	5.26E-002 +/- 5.58E-003
U-234	0.986	4761.50*	3.80E+000 +/- 5.90E-001	7.55E-002 +/- 8.01E-003
U-235	0.983	4385.50*	1.35E-001 +/- 9.28E-002	7.43E-002 +/- 7.88E-003
U-238	0.986	4184.40*	3.21E+000 +/- 5.21E-001	7.52E-002 +/- 7.98E-003

AG
11/30/11

0000010631.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 20

Elapsed Live time: 10200
Elapsed Real Time: 10206

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	1	0	0	1
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	0	0	1	1	0
169:	0	0	0	0	0	0	0	0
177:	0	1	0	0	0	0	0	0
185:	1	0	1	0	1	0	1	0
193:	0	2	0	0	2	0	0	1
201:	2	1	0	0	0	2	0	0
209:	0	1	0	1	0	0	2	1
217:	1	2	1	0	2	2	1	6
225:	5	2	3	8	8	7	8	6
233:	4	3	3	3	7	10	7	9
241:	7	9	11	5	7	10	7	12
249:	12	12	5	7	10	5	2	4
257:	2	0	0	2	1	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	2	0
297:	0	0	0	0	0	0	1	1
305:	1	0	1	0	0	0	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	0	0	1	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	1	0	0	0

369:	0	0	1	0	0	0	0	1

Sample Title: 20

Channel								
377:	0	1	1	0	1	1	0	0
385:	0	0	0	0	1	0	1	1
393:	0	0	0	0	3	2	0	0
401:	0	3	0	0	1	1	2	2
409:	4	4	2	1	0	4	7	3
417:	1	1	6	6	3	4	4	7
425:	8	8	12	5	10	7	6	12
433:	7	6	6	10	15	14	10	9
441:	5	10	8	10	4	10	10	9
449:	6	2	5	2	0	0	0	1
457:	0	0	0	1	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	1	0
545:	1	0	0	0	0	0	0	0
553:	0	1	0	0	0	1	0	0
561:	0	0	0	1	1	0	1	1
569:	0	0	1	0	0	0	1	2
577:	0	0	1	0	0	3	0	0
585:	3	2	5	3	3	4	0	4
593:	2	2	1	5	4	2	2	2
601:	7	8	5	3	6	3	12	11
609:	11	11	12	8	14	11	8	12
617:	5	10	13	10	16	18	13	10
625:	12	15	13	13	10	13	13	12
633:	10	6	7	5	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	1	0	0	0	0	0	0	0
713:	0	0	0	0	1	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 20

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	1
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

11/29/2011 5:36:58 AM

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 11/29/2011
Time : 5:36:58 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	11/29/2011 5:23:04 AM
Alpha_010	AIM21F	ALL	Passed	11/29/2011 5:23:05 AM
Alpha_011	AIM21F	ALL	Passed	11/29/2011 5:23:06 AM
Alpha_012	AIM21F	ALL	Passed	11/29/2011 5:23:07 AM
Alpha_013	AIM21F	ALL	Passed	11/29/2011 5:23:07 AM
Alpha_014	AIM21F	ALL	Passed	11/29/2011 5:23:08 AM
Alpha_015	AIM21F	ALL	Passed	11/29/2011 5:23:09 AM
Alpha_017	AIM730	ALL	Passed	11/29/2011 5:23:10 AM
Alpha_020	AIM730	ALL	Passed	11/29/2011 5:23:11 AM
Alpha_021	AIM730	ALL	Passed	11/29/2011 5:23:12 AM
Alpha_022	AIM730	ALL	Passed	11/29/2011 5:23:12 AM
Alpha_023	AIM730	ALL	Passed	11/29/2011 5:23:13 AM
Alpha_024	AIM730	ALL	Passed	11/29/2011 5:23:14 AM
Alpha_025	AIM730	ALL	Passed	11/29/2011 5:23:15 AM
Alpha_026	AIM730	ALL	Passed	11/29/2011 5:23:16 AM
Alpha_028	AIM730	ALL	Passed	11/29/2011 5:23:17 AM
Alpha_029	AIM730	ALL	Passed	11/29/2011 5:23:17 AM
Alpha_030	AIM730	ALL	Passed	11/29/2011 5:23:18 AM
Alpha_031	AIM730	ALL	Passed	11/29/2011 5:23:19 AM
Alpha_033	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:20 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:22 AM
Alpha_035	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:23 AM
Alpha_036	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:25 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:26 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:27 AM
Alpha_039	Alpha Analyst100DC	ALL	Passed	11/28/2011 5:59:26 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:30 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:32 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:33 AM
Alpha_043	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:35 AM
Alpha_044	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:36 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:38 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:39 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:41 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	11/29/2011 5:23:42 AM

APPROVED BY: _____

11/29/11

SECTION IX

ANALYTICAL DATA (RADIUM-226)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

11-11139
Ra226
Run 1

Work Order	11-11139
Analysis Code	Ra226
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB1/2-1	80	11/18/11 14:18	9.9980E-01
04	DO	IB1/2-1	80	11/18/11 14:18	1.0208E+00
05	TRG	IB1/2-2	78	11/18/11 14:10	1.0079E+00
06	TRG	IB1/2-3	64	11/18/11 00:00	1.0205E+00
07	TRG	IB1/2-4	75	11/18/11 00:00	5.0610E-01
08	TRG	IB1/2-5	76	11/18/11 15:20	1.0345E+00
09	TRG	IB1/2-6	81	11/18/11 15:12	9.9980E-01
10	TRG	IB1/2-7	106	11/18/11 15:20	1.0155E+00
11	TRG	IB1/2-4A	82	11/18/11 00:00	5.1455E-01
12	TRG	IB1/2-4B	50	11/18/11 00:00	1.0465E+00
13	TRG	IB1/2-4C	52	11/18/11 00:00	1.0068E+00
14	TRG	IB1/2-4D	63	11/18/11 00:00	9.9940E-01
15	TRG	IB1/2-4E	57	11/18/11 00:00	1.0205E+00
16	TRG	IB3-1	44	11/18/11 15:47	1.0214E+00
17	TRG	IB3-2	84	11/18/11 15:42	1.0093E+00
18	TRG	IB3-3	68	11/18/11 15:40	1.0014E+00
19	TRG	IB3-4	49	11/18/11 15:50	1.0001E+00
20	TRG	IB3-5	47	11/18/11 15:37	1.0042E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9119	1010.8	466.9	102.54		0.0237	0.0300	0.0063		102.54	2.27	1.00
02	MBL	0.9056	1003.8	467.2	103.32		0.0232	0.0293	0.0061		103.32	2.20	1.00
03	DUP	0.9024	1000.3	439.6	97.56		0.0237	0.0300	0.0063		97.56	2.27	1.00
04	DO	0.9030	1001.0	403.7	89.54		0.0236	0.0297	0.0061		89.54	2.20	1.00
05	TRG	0.9030	1001.0	395.3	87.67		0.0235	0.0296	0.0061		87.67	2.20	1.00
06	TRG	0.9015	999.3	416.9	92.62		0.0233	0.0303	0.0070		92.62	2.50	1.00
07	TRG	0.9013	999.1	432.2	96.04		0.0236	0.0293	0.0057		96.04	2.04	1.00
08	TRG	0.9015	999.3	404.9	89.95		0.0236	0.0298	0.0062		89.95	2.23	1.00
09	TRG	0.9010	998.7	386.4	85.89		0.0235	0.0300	0.0065		85.89	2.34	1.00
10	TRG	0.8993	996.8	410.2	91.35		0.0234	0.0294	0.0060		91.35	2.16	1.00
11	TRG	0.8994	997.0	406.6	90.54		0.0237	0.0291	0.0054		90.54	1.91	1.00
12	TRG	0.8992	996.7	358.1	79.76		0.0238	0.0309	0.0071		79.76	2.53	1.00
13	TRG	0.9006	998.3	366.3	81.46		0.0236	0.0295	0.0059		81.46	2.12	1.00
14	TRG	0.8989	996.4	383.0	85.33		0.0239	0.0294	0.0055		85.33	1.95	1.00
15	TRG	0.8986	996.1	404.0	90.04		0.0238	0.0298	0.0060		90.04	2.16	1.00
16	TRG	0.8980	995.4	429.8	95.86		0.0227	0.0309	0.0082		95.86	2.82	1.00
17	TRG	0.8963	993.5	340.7	76.13		0.0230	0.0305	0.0075		76.13	2.64	1.00
18	TRG	0.8964	993.6	362.3	80.95		0.0231	0.0311	0.0080		80.95	2.77	1.00
19	TRG	0.8980	995.4	385.2	85.91		0.0230	0.0307	0.0077		85.91	2.69	1.00
20	TRG	0.8958	993.0	396.8	88.71		0.0230	0.0298	0.0068		88.71	2.44	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
02	MBL			11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
03	DUP			11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
04	DO	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
05	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
06	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
07	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
08	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
09	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
10	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
11	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
12	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
13	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
14	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
15	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
16	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
17	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
18	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
19	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		
20	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:42	JBARNARD	11/30/11 10:34	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-Ra226-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11139
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/g	9.51E+00	1.09E+00	1.26E-01	1.02E+01	92.85	OK		OK	
02	RA-226	MBL	BLANK	pCi/g	5.18E-02	8.78E-02	1.49E-01					OK	OK
03	RA-226	DUP	IB1/2-1	pCi/g	1.36E+01	1.42E+00	2.49E-01				OK	OK	
04	RA-226	DO	IB1/2-1	pCi/g	1.25E+01	1.32E+00	1.39E-01					OK	
05	RA-226	TRG	IB1/2-2	pCi/g	1.14E+01	1.32E+00	1.52E-01					OK	
06	RA-226	TRG	IB1/2-3	pCi/g	1.19E+01	1.47E+00	2.49E-01					OK	
07	RA-226	TRG	IB1/2-4	pCi/g	8.05E+00	1.39E+00	2.88E-01					OK	
08	RA-226	TRG	IB1/2-5	pCi/g	1.12E+01	1.25E+00	1.59E-01					OK	
09	RA-226	TRG	IB1/2-6	pCi/g	1.04E+01	1.32E+00	3.17E-01					OK	
10	RA-226	TRG	IB1/2-7	pCi/g	9.33E+00	1.12E+00	1.83E-01					OK	
11	RA-226	TRG	IB1/2-4A	pCi/g	9.75E+00	1.46E+00	2.24E-01					OK	
12	RA-226	TRG	IB1/2-4B	pCi/g	1.38E+01	1.55E+00	1.98E-01					OK	
13	RA-226	TRG	IB1/2-4C	pCi/g	9.83E+00	1.21E+00	2.16E-01					OK	
14	RA-226	TRG	IB1/2-4D	pCi/g	8.64E+00	1.12E+00	1.43E-01					OK	
15	RA-226	TRG	IB1/2-4E	pCi/g	8.94E+00	1.15E+00	2.18E-01					OK	
16	RA-226	TRG	IB3-1	pCi/g	2.37E+00	6.58E-01	2.61E-01					OK	
17	RA-226	TRG	IB3-2	pCi/g	1.26E+01	1.62E+00	3.60E-01					OK	
18	RA-226	TRG	IB3-3	pCi/g	7.92E+00	1.23E+00	2.80E-01					OK	
19	RA-226	TRG	IB3-4	pCi/g	2.13E+00	5.87E-01	2.84E-01					OK	
20	RA-226	TRG	IB3-5	pCi/g	4.45E+00	8.08E-01	2.65E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11139
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	11/22/11 00:00	1.00E+00	100.00	0.00	102.54		11/30/2011 10:34	
02	RA-226	MBL	11/22/11 00:00	1.00E+00	100.00	0.00	103.32		11/30/2011 10:34	
03	RA-226	DUP	11/18/11 14:18	1.00E+00	97.56	0.00	97.56		11/30/2011 10:34	
04	RA-226	DO	11/18/11 14:18	1.02E+00	89.54	0.00	89.54		11/30/2011 10:34	
05	RA-226	TRG	11/18/11 14:10	1.01E+00	87.67	0.00	87.67		11/30/2011 10:34	
06	RA-226	TRG	11/18/11 00:00	1.02E+00	92.62	0.00	92.62		11/30/2011 10:34	
07	RA-226	TRG	11/18/11 00:00	5.06E-01	96.04	0.00	96.04		11/30/2011 10:34	
08	RA-226	TRG	11/18/11 15:20	1.03E+00	89.95	0.00	89.95		11/30/2011 10:34	
09	RA-226	TRG	11/18/11 15:12	1.00E+00	85.89	0.00	85.89		11/30/2011 10:34	
10	RA-226	TRG	11/18/11 15:20	1.02E+00	91.35	0.00	91.35		11/30/2011 10:34	
11	RA-226	TRG	11/18/11 00:00	5.15E-01	90.54	0.00	90.54		11/30/2011 10:34	
12	RA-226	TRG	11/18/11 00:00	1.05E+00	79.76	0.00	79.76		11/30/2011 10:34	
13	RA-226	TRG	11/18/11 00:00	1.01E+00	81.46	0.00	81.46		11/30/2011 10:34	
14	RA-226	TRG	11/18/11 00:00	9.99E-01	85.33	0.00	85.33		11/30/2011 10:34	
15	RA-226	TRG	11/18/11 00:00	1.02E+00	90.04	0.00	90.04		11/30/2011 10:34	
16	RA-226	TRG	11/18/11 15:47	1.02E+00	95.86	0.00	95.86		11/30/2011 10:34	
17	RA-226	TRG	11/18/11 15:42	1.01E+00	76.13	0.00	76.13		11/30/2011 10:34	
18	RA-226	TRG	11/18/11 15:40	1.00E+00	80.95	0.00	80.95		11/30/2011 10:34	
19	RA-226	TRG	11/18/11 15:50	1.00E+00	85.91	0.00	85.91		11/30/2011 10:34	
20	RA-226	TRG	11/18/11 15:37	1.00E+00	88.71	0.00	88.71		11/30/2011 10:34	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-Ra226-1

Client	Eberline Services Work Order	Analysis Code	Run
Foxfire Scientific, Inc.	11-11139	Ra226	1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	12/01/11 17:05		A_Spec	Alpha_033	170	3.15 E+02	1.00 E-03	19.9
02	RA-226	MBL	12/01/11 17:05		A_Spec	Alpha_034	170	1.66 E+00	2.00 E-03	18.7
03	RA-226	DUP	12/01/11 17:05		A_Spec	Alpha_035	170	3.87 E+02	9.00 E-03	17.6
04	RA-226	DO	12/01/11 17:05		A_Spec	Alpha_036	170	3.76 E+02	1.00 E-03	19.2
05	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_037	170	3.13 E+02	1.00 E-03	18.1
06	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_038	170	2.69 E+02	4.00 E-03	15.9
07	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_039	170	1.34 E+02	2.00 E-03	18.5
08	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_040	170	3.38 E+02	2.00 E-03	19.1
09	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_041	170	2.55 E+02	1.20 E-02	17.7
10	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_042	170	2.87 E+02	4.00 E-03	19
11	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_043	170	1.82 E+02	1.00 E-03	20.3
12	RA-226	TRG	12/01/11 17:05		A_Spec	Alpha_044	170	3.33 E+02	2.00 E-03	19.4
13	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_045	170	2.73 E+02	0.00 E+00	19
14	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_046	170	2.53 E+02	1.00 E-03	17.7
15	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_047	170	2.46 E+02	0.00 E+00	17.1
16	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_048	170	5.13 E+01	4.00 E-03	16.5
17	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_003	170.02	2.56 E+02	1.00 E-02	18.6
18	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_010	170	1.69 E+02	5.00 E-03	19.3
19	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_011	170	5.35 E+01	9.00 E-03	20.8
20	RA-226	TRG	12/01/11 17:06		A_Spec	Alpha_012	170.02	1.23 E+02	1.00 E-02	20.1

Count Room Report
Client: Foxfire Scientific, Inc.

11-11139-Ra226-1 (pCi/g) in SO
Tracer ID: Ba-6a

25

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9119	1010.8165	466.9000	102.54	2.27	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9056	1003.8331	467.2000	103.32	2.20	1.00
03	DUP	IB1/2-1	11/18/11 14:18	0.9998	0.9024	1000.2860	439.6000	97.56	2.27	1.00
04	DO	IB1/2-1	11/18/11 14:18	1.0208	0.9030	1000.9511	403.7000	89.54	2.20	1.00
05	TRG	IB1/2-2	11/18/11 14:10	1.0079	0.9030	1000.9511	395.3000	87.67	2.20	1.00
06	TRG	IB1/2-3	11/18/11 00:00	1.0205	0.9015	999.2884	416.9000	92.62	2.50	1.00
07	TRG	IB1/2-4	11/18/11 00:00	0.5061	0.9013	999.0667	432.2000	96.04	2.04	1.00
08	TRG	IB1/2-5	11/18/11 15:20	1.0345	0.9015	999.2884	404.9000	89.95	2.23	1.00
09	TRG	IB1/2-6	11/18/11 15:12	0.9998	0.9010	998.7342	386.4000	85.89	2.34	1.00
10	TRG	IB1/2-7	11/18/11 15:20	1.0155	0.8993	996.8498	410.2000	91.35	2.16	1.00
11	TRG	IB1/2-4A	11/18/11 00:00	0.5146	0.8994	996.9606	406.6000	90.54	1.91	1.00
12	TRG	IB1/2-4B	11/18/11 00:00	1.0465	0.8992	996.7389	358.1000	79.76	2.53	1.00
13	TRG	IB1/2-4C	11/18/11 00:00	1.0068	0.9006	998.2908	366.3000	81.46	2.12	1.00
14	TRG	IB1/2-4D	11/18/11 00:00	0.9994	0.8989	996.4064	383.0000	85.33	1.95	1.00
15	TRG	IB1/2-4E	11/18/11 00:00	1.0205	0.8986	996.0738	404.0000	90.04	2.16	1.00
16	TRG	IB3-1	11/18/11 15:47	1.0214	0.8980	995.4088	429.8000	95.86	2.82	1.00
17	TRG	IB3-2	11/18/11 15:42	1.0093	0.8963	993.5243	340.7000	76.13	2.64	1.00
18	TRG	IB3-3	11/18/11 15:40	1.0014	0.8964	993.6352	362.3000	80.95	2.77	1.00
19	TRG	IB3-4	11/18/11 15:50	1.0001	0.8980	995.4088	385.2000	85.91	2.69	1.00
20	TRG	IB3-5	11/18/11 15:37	1.0042	0.8958	992.9701	396.8000	88.71	2.44	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 6:42 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11139	1	Ra226	11/23/2011 6:41	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-226	Ra-5b	44.098	11/23/2011	0.500	0.5155				10.24	0.471	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9119	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9056	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9024	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9030	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9030	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9015	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9013	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9015	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9010	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.8993	0.9100
11	Ba-133	Ba-6a	1108.473	11/23/2011	0.8994	0.9100
12	Ba-133	Ba-6a	1108.473	11/23/2011	0.8992	0.9100
13	Ba-133	Ba-6a	1108.473	11/23/2011	0.9006	0.9100
14	Ba-133	Ba-6a	1108.473	11/23/2011	0.8989	0.9100
15	Ba-133	Ba-6a	1108.473	11/23/2011	0.8986	0.9100
16	Ba-133	Ba-6a	1108.473	11/23/2011	0.8980	0.9100
17	Ba-133	Ba-6a	1108.473	11/23/2011	0.8963	0.9100
18	Ba-133	Ba-6a	1108.473	11/23/2011	0.8964	0.9100
19	Ba-133	Ba-6a	1108.473	11/23/2011	0.8980	0.9100
20	Ba-133	Ba-6a	1108.473	11/23/2011	0.8958	0.9100

Balance Printer Tapes

Tracer

0.9119 g
0.9056 g
0.9024 g
0.9030 g
0.9030 g
0.9015 g
0.9013 g
0.9015 g
0.9010 g
0.8993 g
0.8994 g
0.8992 g
0.9006 g
0.8989 g
0.8986 g
0.8980 g
0.8963 g
0.8964 g
0.8980 g
0.8958 g

LCS

0.5155 g
0.4097 g

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11139	1	Ra226	grams	12/2/2011	TSMITH

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS				1.00E+00	1.0000E+00	1.0000E+00				
02	BLANK	MBL				1.00E+00	1.0000E+00	1.0000E+00				
03	IB1/2-1	DUP				1.00E+00	9.9980E-01	9.9980E-01				
04	IB1/2-1	DO				1.00E+00	1.0208E+00	1.0208E+00				
05	IB1/2-2	TRG				1.00E+00	1.0079E+00	1.0079E+00				
06	IB1/2-3	TRG				1.00E+00	1.0205E+00	1.0205E+00				
07	IB1/2-4	TRG		1	2.00	5.00E-01	1.0122E+00	5.0610E-01				
08	IB1/2-5	TRG				1.00E+00	1.0345E+00	1.0345E+00				
09	IB1/2-6	TRG				1.00E+00	9.9980E-01	9.9980E-01				
10	IB1/2-7	TRG				1.00E+00	1.0155E+00	1.0155E+00				
11	IB1/2-4A	TRG		1	2.00	5.00E-01	1.0291E+00	5.1455E-01				
12	IB1/2-4B	TRG				1.00E+00	1.0465E+00	1.0465E+00				
13	IB1/2-4C	TRG				1.00E+00	1.0068E+00	1.0068E+00				
14	IB1/2-4D	TRG				1.00E+00	9.9940E-01	9.9940E-01				
15	IB1/2-4E	TRG				1.00E+00	1.0205E+00	1.0205E+00				
16	IB3-1	TRG				1.00E+00	1.0214E+00	1.0214E+00				
17	IB3-2	TRG				1.00E+00	1.0093E+00	1.0093E+00				
18	IB3-3	TRG				1.00E+00	1.0014E+00	1.0014E+00				
19	IB3-4	TRG				1.00E+00	1.0001E+00	1.0001E+00				
20	IB3-5	TRG				1.00E+00	1.0042E+00	1.0042E+00				

Comments	

Technician: [illegible] Date: 11/30/11

EBERLINE SERVICES	Internal Work Order	11-11139
	Fraction	> 07 <
Dilution Worksheet	Analysis Code	Ra226
	Run Number	1
	Analyst	TSMITH

Dilution Number	...	Amount Taken	Units	...	Diluted To	Units	Ratio
1	I took	**15**	ml	from the original sample and diluted it to	**30**	ml	0.5000
2	I took		ml	from the 1st dilution and diluted it to		ml	
3	I took		ml	from the 2nd dilution and diluted it to		ml	
4	I took		ml	from the 3rd dilution and diluted it to		ml	
5	I took		ml	from the 4th dilution and diluted it to		ml	

Dilutions Taken	1

Dilution Ratio	**0.5**
Dilution Factor	**2**

Diluted by: [illegible] Date: 11-30-11

EBERLINE SERVICES	Internal Work Order	11-11139
	Fraction	> 11 <
Dilution Worksheet	Analysis Code	**Ra226**
	Run Number	**1**
	Analyst	**TSMITH**

Dilution Number	...	Amount Taken	Units	...	Diluted To	Units	Ratio
1	I took	**15**	ml	from the original sample and diluted it to	**30**	ml	0.5000
2	I took		ml	from the 1st dilution and diluted it to		ml	
3	I took		ml	from the 2nd dilution and diluted it to		ml	
4	I took		ml	from the 3rd dilution and diluted it to		ml	
5	I took		ml	from the 4th dilution and diluted it to		ml	

Dilutions Taken	1

Dilution Ratio	**0.5**
Dilution Factor	**2**

Diluted by: [illegible] Date: 11-30-11

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11139	1	Ra226			TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS		0.0237	0.0300	**0.0063**	
02	BLANK	MBL		0.0232	0.0293	**0.0061**	
03	DUP	DUP		0.0237	0.0300	**0.0063**	
04	IB1/2-1	DO		0.0236	0.0297	**0.0061**	
05	IB1/2-2	TRG		0.0235	0.0296	**0.0061**	
06	IB1/2-3	TRG		0.0233	0.0303	**0.0070**	
07	IB1/2-4	TRG		0.0236	0.0293	**0.0057**	
08	IB1/2-5	TRG		0.0236	0.0298	**0.0062**	
09	IB1/2-6	TRG		0.0235	0.0300	**0.0065**	
10	IB1/2-7	TRG		0.0234	0.0294	**0.0060**	
11	IB1/2-4A	TRG		0.0237	0.0291	**0.0054**	
12	IB1/2-4B	TRG		0.0238	0.0309	**0.0071**	
13	IB1/2-4C	TRG		0.0236	0.0295	**0.0059**	
14	IB1/2-4D	TRG		0.0239	0.0294	**0.0055**	
15	IB1/2-4E	TRG		0.0238	0.0298	**0.0060**	
16	IB3-1	TRG		0.0227	0.0309	**0.0082**	
17	IB3-2	TRG		0.0230	0.0305	**0.0075**	
18	IB3-3	TRG		0.0231	0.0311	**0.0080**	
19	IB3-4	TRG		0.0230	0.0307	**0.0077**	
20	IB3-5	TRG		0.0230	0.0298	**0.0068**	

Technician: [signature] Date: 11/30/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11139	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	IB1/2-1	13.4800	253.0700	177.7300	239.5900	164.2500	31.45%	68.55%			
05	IB1/2-2	13.5100	257.3100	182.8000	243.8000	169.2900	30.56%	69.44%			
06	IB1/2-3	13.4700	232.9400	179.7000	219.4700	166.2300	24.26%	75.74%			
07	IB1/2-4	13.5000	192.6800	146.9300	179.1800	133.4300	25.53%	74.47%			
08	IB1/2-5	13.4300	259.1000	185.6800	245.6700	172.2500	29.89%	70.11%			
09	IB1/2-6	13.4800	249.6600	190.1300	236.1800	176.6500	25.21%	74.79%			
10	IB1/2-7	13.4200	207.9200	148.6500	194.5000	135.2300	30.47%	69.53%			
11	IB1/2-4A	13.5200	206.8700	156.5900	193.3500	143.0700	26.00%	74.00%			
12	IB1/2-4B	13.5200	209.6700	155.5400	196.1500	142.0200	27.60%	72.40%			
13	IB1/2-4C	13.4100	208.3500	159.5700	194.9400	146.1600	25.02%	74.98%			
14	IB1/2-4D	13.4500	168.3400	129.2400	154.8900	115.7900	25.24%	74.76%			
15	IB1/2-4E	13.6300	207.2400	159.0500	193.6100	145.4200	24.89%	75.11%			
16	IB3-1	13.7400	272.2200	234.9100	258.4800	221.1700	14.43%	85.57%			
17	IB3-2	13.6900	285.1000	205.9500	271.4100	192.2600	29.16%	70.84%			
18	IB3-3	13.4900	223.8000	181.1200	210.3100	167.6300	20.29%	79.71%			
19	IB3-4	13.3200	283.8400	247.9700	270.5200	234.6500	13.26%	86.74%			
20	IB3-5	13.4300	247.0500	195.7800	233.6200	182.3500	21.95%	78.05%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

Analysis: Ra226 Page No. 7855

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011098.cnf
Batch Identification: 1111139A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_033
Chamber Serial Number: 06027396A
Detector Serial Number: 91132
Env. Background: System Bkgd 10011
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.270E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/1/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:39 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1992 +/- 0.0032 on 8/30/2011 7:34:55 PM
Effective Efficiency: 0.1992 +/- 0.0032

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: 0.0068
Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

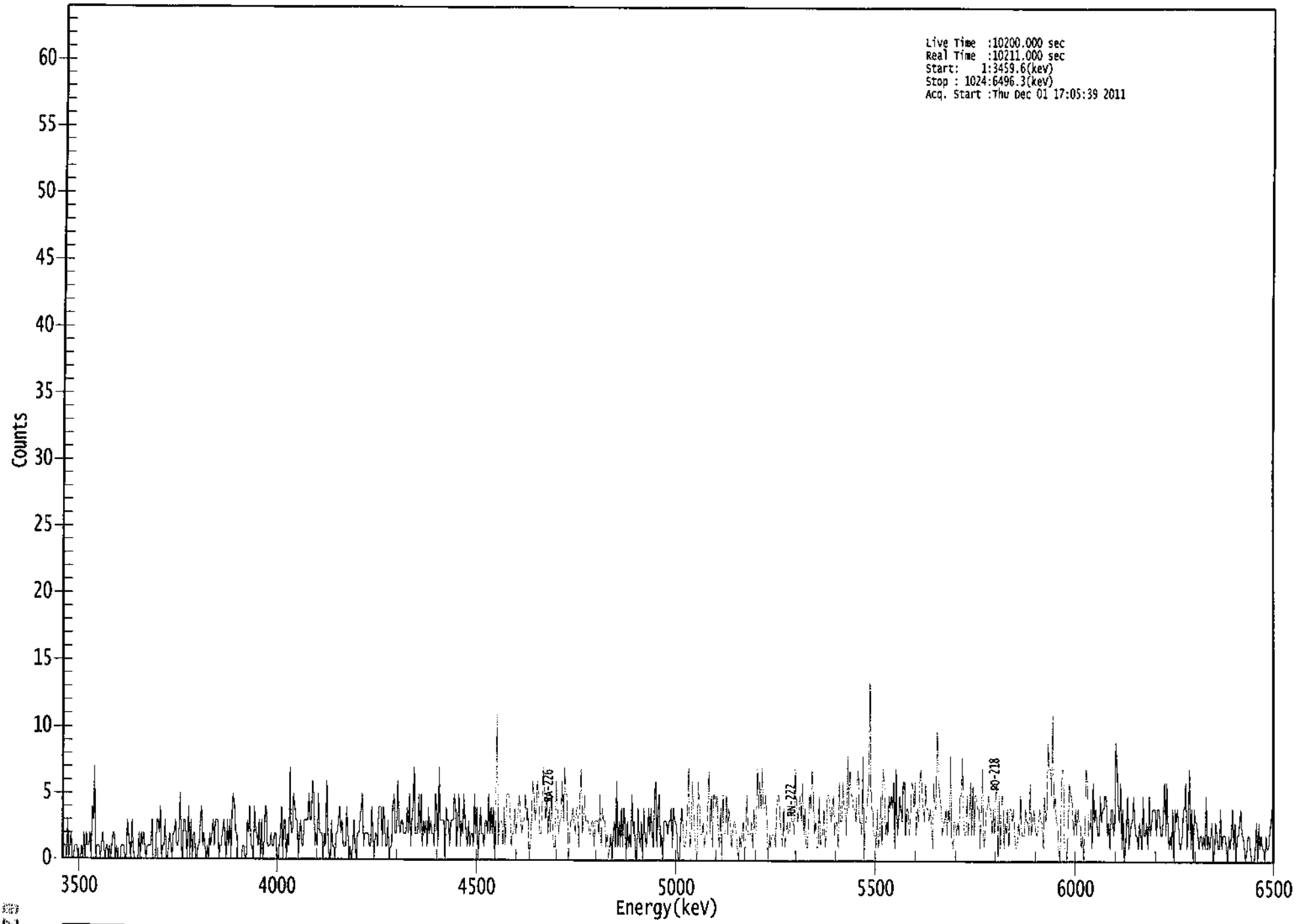
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.802	561.32	8.28	0.68	0.00E+000	5.1
RN-222	5.292	560.66	8.28	0.34	0.00E+000	4.7
RA-226	4.684	314.83	11.05	0.17	0.00E+000	3.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.975	6003.00*	1.70E+001 +/- 1.50E+000	1.70E-001 +/- 5.35E-003
RN-222	0.975	5490.00*	1.69E+001 +/- 1.50E+000	1.45E-001 +/- 4.53E-003
RA-226	0.993	4785.00*	9.51E+000 +/- 1.09E+000	1.26E-001 +/- 3.95E-003

AG
12/2/11

0000011098.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	2	1	1	0	3	0	1	2
9:	0	0	1	1	1	0	0	0
17:	1	0	2	0	2	1	1	2
25:	0	4	3	7	0	1	1	1
33:	0	1	2	1	0	1	1	0
41:	1	0	1	2	2	0	1	0
49:	0	0	1	1	1	0	0	3
57:	2	1	0	3	1	0	0	0
65:	0	2	0	2	1	2	1	0
73:	1	1	1	1	3	0	0	0
81:	3	3	2	4	0	1	1	3
89:	0	0	1	2	1	0	2	2
97:	3	1	1	2	5	1	0	3
105:	3	2	0	4	0	3	0	2
113:	2	0	0	1	1	3	4	1
121:	2	1	0	1	0	2	1	2
129:	3	1	3	3	3	0	1	1
137:	2	3	2	0	3	1	3	0
145:	4	5	4	2	2	0	0	0
153:	0	1	1	0	0	3	2	4
161:	1	1	0	4	2	2	1	3
169:	0	3	0	1	4	4	1	1
177:	1	2	1	1	2	2	0	0
185:	1	2	4	0	3	3	0	2
193:	1	7	2	2	5	4	3	3
201:	0	2	3	1	1	3	3	3
209:	3	5	3	3	6	5	1	2
217:	1	5	2	2	2	0	2	1
225:	6	2	0	0	3	1	1	0
233:	2	2	3	4	2	3	1	1
241:	1	4	2	0	1	0	1	3
249:	1	0	2	2	3	4	5	1
257:	2	2	2	2	1	1	4	2
265:	0	2	2	1	4	4	4	1
273:	4	3	1	1	3	0	1	1
281:	4	5	2	2	6	3	2	3
289:	3	2	2	2	4	2	5	1
297:	3	4	7	2	2	2	5	2
305:	5	1	3	2	3	1	4	2
313:	3	2	2	1	5	4	1	7
321:	3	3	3	3	0	4	3	3
329:	1	3	3	3	5	4	1	3
337:	5	1	3	2	5	3	2	1
345:	3	1	2	2	1	5	2	4
353:	0	2	4	2	2	1	3	3
361:	2	5	2	4	2	4	0	3

369:	11	1	3	3	3	1	4	1

Sample Title: 01

Channel								
377:	5	5	5	4	1	2	2	4
385:	2	3	4	5	3	2	3	3
393:	5	3	4	0	1	3	6	5
401:	3	4	6	5	2	2	4	7
409:	5	3	5	2	4	2	5	2
417:	1	1	6	4	2	3	3	6
425:	3	7	5	5	0	1	3	3
433:	4	3	2	4	4	1	5	7
441:	2	3	5	3	3	3	2	2
449:	3	3	1	3	3	3	2	5
457:	1	4	3	3	1	2	0	1
465:	2	0	2	3	1	6	1	3
473:	1	4	1	4	3	0	3	1
481:	2	1	5	2	3	0	0	4
489:	2	1	3	0	4	2	1	2
497:	4	2	4	2	1	5	6	1
505:	4	5	1	2	0	3	3	3
513:	2	3	3	4	1	4	3	3
521:	2	0	0	2	4	3	1	1
529:	2	4	7	1	2	6	4	2
537:	1	0	6	4	2	2	3	1
545:	2	2	4	7	2	5	1	5
553:	5	4	5	2	1	4	0	5
561:	2	2	5	2	4	3	1	2
569:	3	3	2	1	0	2	1	2
577:	3	0	2	5	2	2	2	3
585:	1	4	2	2	7	4	6	4
593:	7	4	4	5	3	0	2	1
601:	2	2	2	1	4	5	5	3
609:	2	1	4	1	2	3	2	2
617:	4	3	3	2	7	4	3	4
625:	5	3	6	2	4	1	1	3
633:	5	4	7	5	2	3	1	1
641:	5	1	2	2	4	1	2	5
649:	5	4	3	4	5	2	3	3
657:	1	6	3	3	6	4	4	2
665:	8	4	7	5	5	4	4	3
673:	6	7	3	3	2	8	0	3
681:	3	5	6	14	4	4	2	2
689:	1	4	1	2	5	1	7	6
697:	2	3	2	5	4	5	4	6
705:	1	7	2	3	5	4	3	6
713:	6	2	4	4	2	3	6	6
721:	4	6	2	4	3	6	7	5
729:	4	3	6	4	4	3	4	3
737:	1	6	4	4	10	6	5	4
745:	2	3	3	4	2	4	3	8
753:	1	1	3	3	2	3	2	5
761:	5	8	3	2	2	5	2	3
769:	6	2	6	2	5	5	4	4
777:	1	4	7	1	2	4	4	5
785:	4	4	2	4	2	5	6	0
793:	5	1	5	5	1	3	2	4

801:	1	4	4	3	4	2	1	1

Sample Title: 01

Channel								
809:	3	2	5	2	2	2	4	3
817:	3	2	6	2	3	4	3	2
825:	2	3	4	3	3	1	5	3
833:	4	9	7	7	5	11	4	5
841:	3	3	1	0	4	7	7	1
849:	1	0	3	6	5	5	3	2
857:	4	2	4	3	3	1	2	0
865:	3	7	6	2	2	4	1	6
873:	3	4	3	2	2	5	3	4
881:	4	5	5	2	3	1	4	4
889:	2	3	9	7	4	3	6	1
897:	4	0	1	3	5	1	2	3
905:	3	5	3	2	2	1	3	2
913:	1	5	2	2	3	1	5	2
921:	3	4	4	4	2	4	4	3
929:	2	2	4	6	2	6	2	1
937:	2	1	4	0	4	3	4	3
945:	1	1	2	4	4	6	1	3
953:	7	1	4	0	4	3	3	2
961:	1	2	2	1	2	1	5	1
969:	2	1	2	3	0	1	3	2
977:	1	1	4	1	2	2	2	1
985:	0	2	1	2	4	1	3	0
993:	2	2	3	4	2	2	1	0
1001:	1	2	2	1	0	0	0	1
1009:	3	0	3	1	2	1	1	0
1017:	2	1	1	2	3	4	1	2

Apex-Alpha™

12/2/11

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011039.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_034
Chamber Serial Number: 06027396B
Detector Serial Number: 91136
Env. Background: System Bkgd 10012
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.200E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/1/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:41 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1866 +/- 0.0030 on 8/30/2011 7:34:54 PM
Effective Efficiency: 0.1866 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.713	0.15	1397.8	0.85	0.00E+000	3.0
RN-222	5.488	0.66	305.43	0.34	0.00E+000	3.0
RA-226	4.616	1.66	169.38	0.34	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.948	6003.00*	4.69E-003 +/- 6.55E-002	1.87E-001 +/- 5.87E-003
RN-222	1.000	5490.00*	2.06E-002 +/- 6.30E-002	1.49E-001 +/- 4.69E-003
RA-226	0.982	4785.00*	5.18E-002 +/- 8.78E-002	1.49E-001 +/- 4.69E-003

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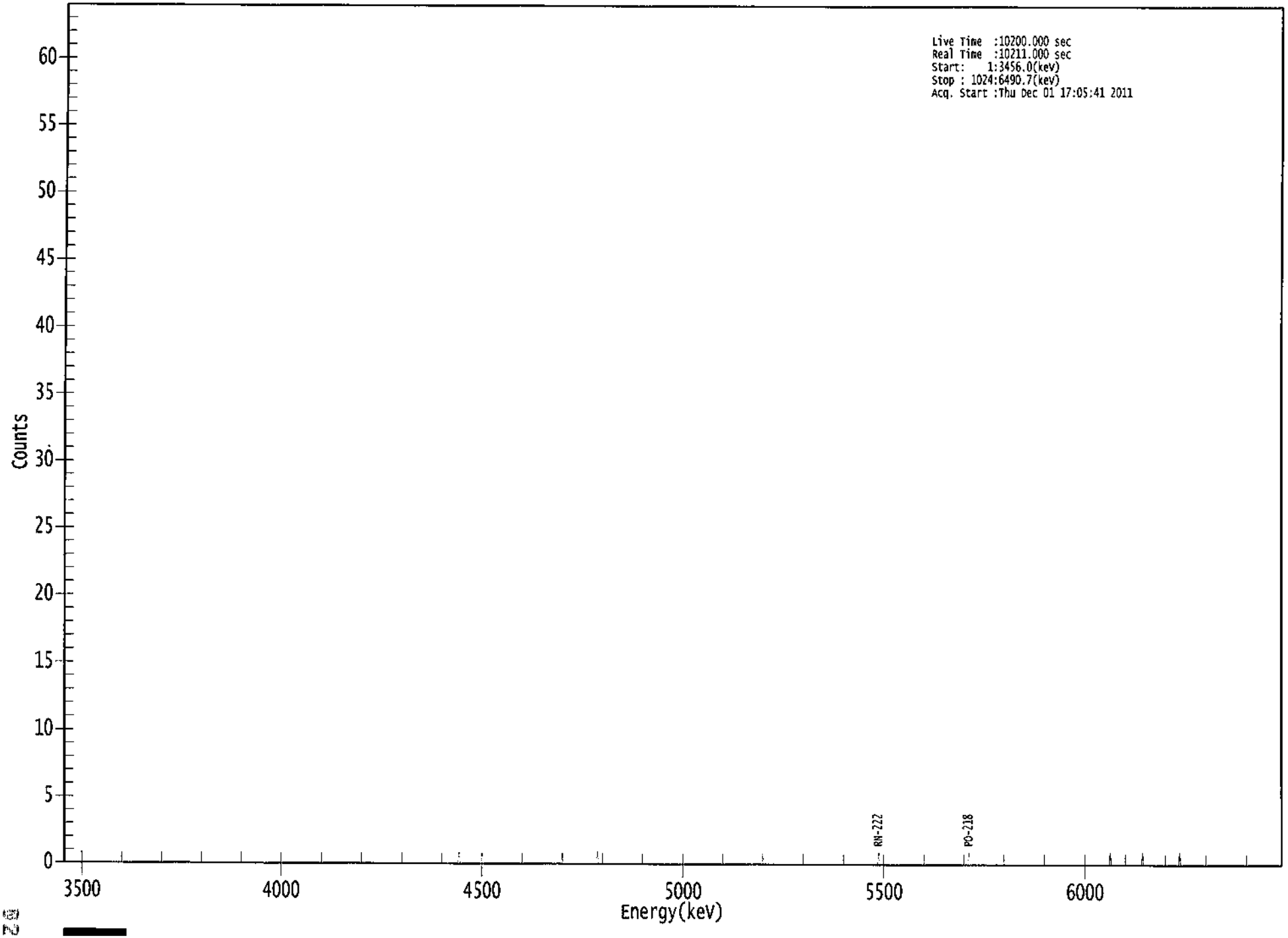
12/2/11

0000011039.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	1	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	1	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	1	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	1	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

1-28-14

Sample Description: IB1/2-1-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011038.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_035
Chamber Serial Number: 04026477A
Detector Serial Number: 58771
Env. Background: System Bkgd 10013
Reagent Blank: <not performed>

Sample Size: 9.998E-001 +/- 0.000E+000 gram
Generic Mult. Factor: 2.270E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:43 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9756 +/- 0.0000
Counting Efficiency: 0.1761 +/- 0.0028 on 8/30/2011 7:34:52 PM
Effective Efficiency: 0.1718 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

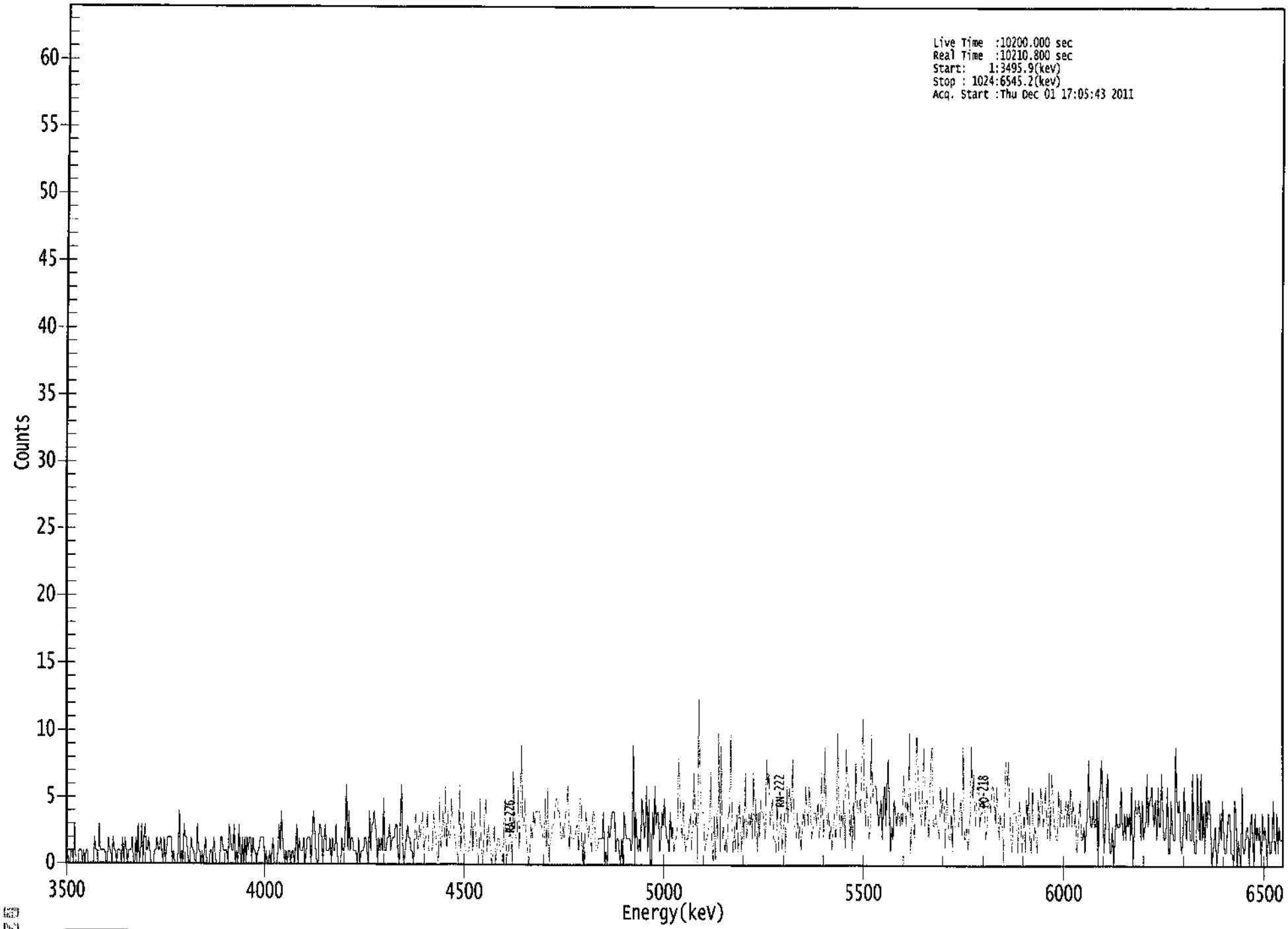
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.801	624.81	7.85	1.19	0.00E+000	4.1
RN-222	5.290	645.98	7.72	1.02	0.00E+000	5.0
RA-226	4.613	387.47	9.98	1.53	0.00E+000	4.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	2.19E+001 +/- 1.85E+000	2.31E-001 +/- 7.27E-003
RN-222	0.975	5490.00*	2.26E+001 +/- 1.89E+000	2.21E-001 +/- 6.96E-003
RA-226	0.981	4785.00*	1.36E+001 +/- 1.42E+000	2.49E-001 +/- 7.84E-003

AG
12/2/11

0000011038.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	1	1	0	0	1	1	0	3
9:	0	0	0	1	1	1	0	1
17:	0	1	1	0	0	0	0	0
25:	2	1	1	0	3	1	1	1
33:	1	1	0	0	2	1	1	0
41:	2	1	1	0	1	1	1	0
49:	2	0	2	1	0	1	1	1
57:	2	0	0	2	0	3	0	1
65:	3	0	2	3	1	1	2	1
73:	0	0	0	1	1	2	1	1
81:	2	1	0	2	0	1	2	2
89:	2	2	0	1	0	0	0	1
97:	4	0	1	0	3	2	2	1
105:	0	0	2	1	1	0	0	3
113:	1	1	0	1	0	1	2	0
121:	0	0	1	1	0	2	1	0
129:	0	0	0	2	2	1	1	1
137:	1	0	3	2	1	1	3	0
145:	1	0	3	1	0	2	0	2
153:	0	2	1	2	2	0	2	1
161:	1	0	1	1	2	2	2	2
169:	0	1	0	0	1	0	1	2
177:	0	0	0	1	3	1	4	2
185:	1	0	1	0	1	1	0	1
193:	1	0	1	3	0	2	1	1
201:	1	2	0	1	2	2	2	0
209:	2	4	3	1	0	0	3	3
217:	2	0	2	3	1	1	1	2
225:	0	2	1	1	3	1	0	0
233:	0	2	1	1	3	6	1	4
241:	1	2	2	1	1	1	0	2
249:	0	1	1	1	2	2	1	0
257:	4	1	3	3	4	3	2	0
265:	2	1	2	1	5	1	1	2
273:	2	3	1	2	2	2	3	3
281:	1	0	3	6	1	0	1	2
289:	3	2	2	1	1	0	2	4
297:	2	1	3	2	3	4	1	2
305:	2	4	1	1	1	1	4	3
313:	2	1	0	5	1	2	4	2
321:	6	1	4	2	2	5	3	3
329:	2	1	1	0	6	1	3	4
337:	2	1	1	1	1	2	4	1
345:	4	3	2	1	0	5	2	0
353:	1	4	5	1	3	2	1	0
361:	1	3	0	1	2	2	1	1

369:	0	3	5	0	1	1	3	2

Sample Title: 03

Channel								
377:	0	7	3	2	2	6	1	4
385:	9	3	3	5	2	1	0	1
393:	3	2	4	3	4	4	4	4
401:	3	3	2	2	5	1	6	0
409:	2	2	3	3	4	5	5	4
417:	4	2	2	3	2	4	4	6
425:	1	3	2	2	2	2	3	3
433:	1	5	5	0	2	0	4	3
441:	2	3	2	1	4	4	2	1
449:	1	2	2	2	2	4	0	1
457:	0	3	2	3	4	4	4	1
465:	2	2	1	0	2	0	4	3
473:	2	2	2	2	1	2	9	0
481:	4	2	1	2	1	5	4	2
489:	3	6	1	5	0	0	4	2
497:	6	3	4	4	1	2	4	3
505:	5	3	2	2	1	4	2	3
513:	1	2	2	3	8	6	3	2
521:	5	2	1	2	2	3	4	1
529:	3	7	3	4	0	13	7	4
537:	4	4	1	2	2	3	3	7
545:	2	0	4	0	4	2	10	1
553:	9	2	3	1	2	1	4	4
561:	10	3	1	3	1	4	1	5
569:	3	1	4	2	7	2	3	4
577:	3	4	2	7	2	5	1	4
585:	2	5	4	4	3	2	8	6
593:	7	3	4	5	2	2	1	5
601:	1	3	4	1	3	4	1	6
609:	3	6	5	4	8	3	3	2
617:	4	2	3	1	3	4	3	6
625:	4	3	6	4	2	3	4	4
633:	3	5	2	3	7	4	2	9
641:	4	3	4	2	3	1	3	4
649:	2	4	10	4	2	4	3	5
657:	1	9	6	6	2	4	1	5
665:	2	8	4	4	5	4	8	11
673:	5	3	6	4	2	3	10	5
681:	6	6	6	4	3	4	5	2
689:	5	6	3	6	8	4	1	3
697:	2	5	4	3	4	4	3	4
705:	3	7	5	3	5	4	10	1
713:	4	4	2	6	10	7	5	4
721:	3	6	9	3	5	5	2	5
729:	8	9	3	3	4	3	3	2
737:	6	4	5	5	1	6	4	2
745:	2	4	1	6	3	3	3	3
753:	4	5	2	9	2	2	3	1
761:	3	4	9	5	7	3	4	6
769:	6	3	4	4	5	4	2	3
777:	5	5	4	6	6	5	3	6
785:	4	2	4	3	3	0	7	8
793:	6	8	4	2	1	4	4	4

801:	3	1	5	4	1	2	4	1

Sample Title: 03

Channel								
809:	5	3	6	2	1	6	2	3
817:	2	1	5	3	6	5	3	4
825:	6	3	2	7	2	7	6	3
833:	3	2	2	6	3	5	3	3
841:	4	5	3	5	3	6	3	5
849:	3	4	1	2	4	5	2	2
857:	3	1	3	4	8	4	3	3
865:	5	3	3	5	0	5	6	8
873:	5	1	3	5	7	3	1	1
881:	3	0	2	4	3	3	3	6
889:	3	2	4	2	4	3	4	2
897:	6	0	2	5	4	4	5	4
905:	2	5	2	3	3	7	3	5
913:	5	6	4	3	5	2	6	3
921:	3	7	4	2	2	3	6	1
929:	1	5	3	2	2	9	5	4
937:	5	2	1	2	6	4	2	4
945:	4	2	2	7	2	1	1	7
953:	3	2	7	2	4	1	5	3
961:	5	5	3	0	1	2	3	0
969:	1	2	4	2	5	2	1	1
977:	3	4	4	1	1	0	5	4
985:	0	2	1	0	6	1	1	2
993:	3	3	0	3	4	2	0	4
1001:	2	3	2	3	0	4	2	3
1009:	2	0	4	1	1	2	5	2
1017:	1	4	1	3	2	2	2	0

Apex-Alpha™

12/2/11

Sample Description: IB1/2-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011031.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_036
Chamber Serial Number: 04026477B
Detector Serial Number: 84167
Env. Background: System Bkgd 10014
Reagent Blank: <not performed>

Sample Size: 1.021E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.200E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:44 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.8954 +/- 0.0000
Counting Efficiency: 0.1917 +/- 0.0031 on 8/30/2011 7:34:51 PM
Effective Efficiency: 0.1716 +/- 0.0027

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.808	548.83	8.37	0.17	0.00E+000	5.3
RN-222	5.283	584.32	8.11	0.68	0.00E+000	4.4
RA-226	4.614	375.83	10.11	0.17	0.00E+000	3.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	1.83E+001 +/- 1.63E+000	1.39E-001 +/- 4.36E-003
RN-222	0.973	5490.00*	1.95E+001 +/- 1.69E+000	1.88E-001 +/- 5.89E-003
RA-226	0.981	4785.00*	1.25E+001 +/- 1.32E+000	1.39E-001 +/- 4.36E-003

AG
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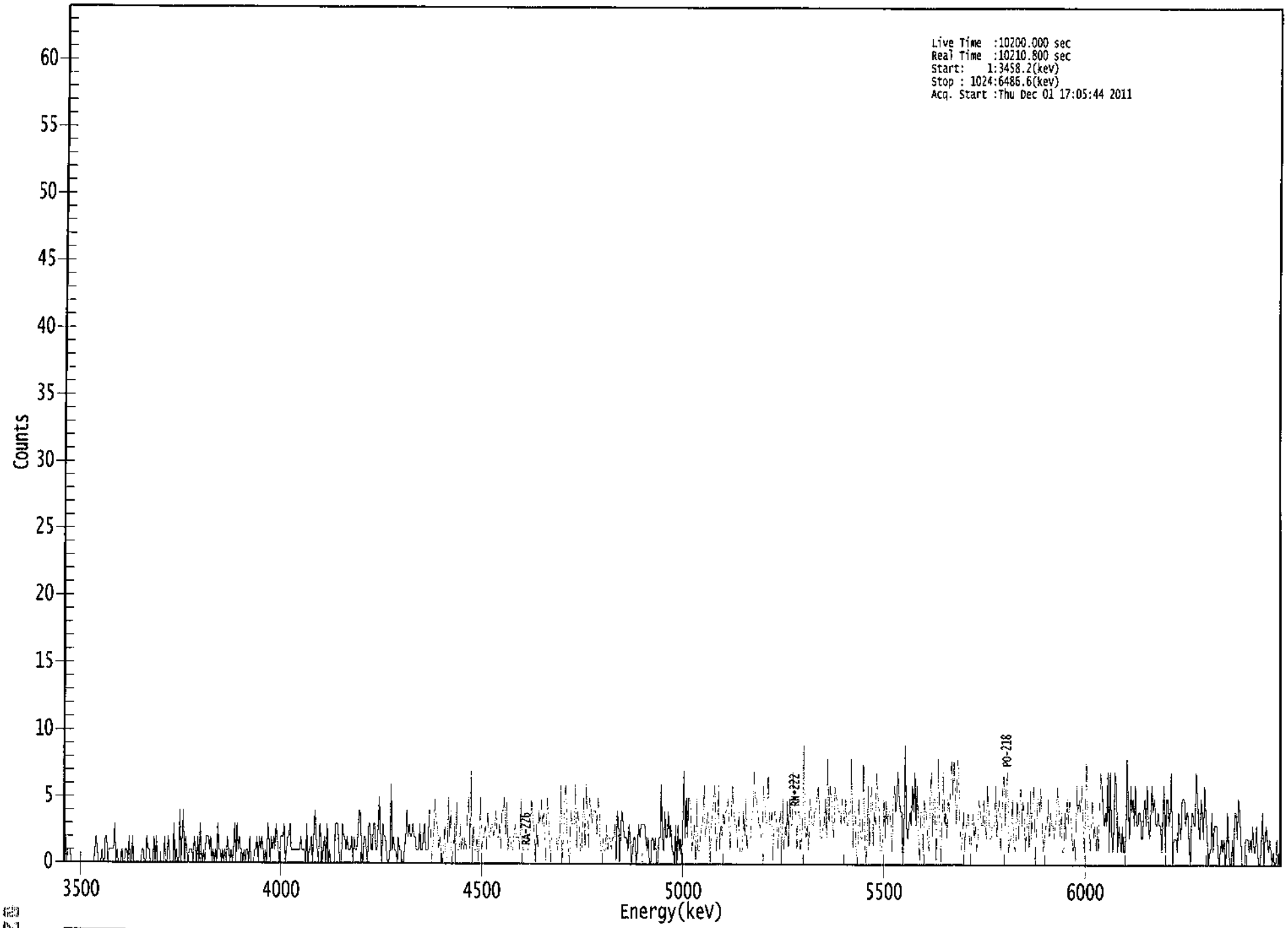
0000011031.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	2	0	1	1	1	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	1	2	1	0	0	0
33:	1	0	0	2	2	0	1	1
41:	1	1	1	3	0	1	0	0
49:	0	1	0	0	1	1	0	2
57:	0	0	2	0	0	0	0	0
65:	0	0	1	1	0	0	2	1
73:	1	0	0	0	2	0	2	0
81:	0	0	0	0	0	2	0	0
89:	2	1	0	0	0	3	0	1
97:	0	0	4	0	2	4	0	2
105:	1	0	1	1	1	0	2	1
113:	0	2	0	3	1	0	1	0
121:	2	2	2	1	2	0	1	0
129:	1	0	3	1	1	0	1	0
137:	1	0	2	1	0	1	0	1
145:	3	0	3	1	2	1	1	0
153:	1	0	1	1	0	2	0	0
161:	0	1	1	2	0	2	1	2
169:	1	0	1	0	3	2	0	2
177:	1	2	1	3	2	1	0	2
185:	2	2	3	0	1	2	2	3
193:	1	1	1	1	1	1	1	1
201:	2	1	1	1	0	3	0	1
209:	1	2	0	2	4	2	1	0
217:	3	2	0	1	2	0	3	0
225:	1	0	0	0	0	3	3	3
233:	1	0	0	3	2	2	1	2
241:	1	1	1	2	0	2	1	1
249:	2	4	4	1	0	2	2	1
257:	0	3	3	1	1	3	3	1
265:	1	3	5	2	0	3	2	2
273:	1	0	0	1	6	1	2	1
281:	1	0	2	1	1	0	0	1
289:	2	4	2	3	2	2	3	2
297:	2	1	1	1	3	1	1	2
305:	3	1	1	1	4	4	0	1
313:	3	5	3	3	1	2	1	0
321:	1	3	0	0	5	2	4	0
329:	1	3	0	5	1	1	3	1
337:	2	1	2	1	4	5	1	7
345:	0	3	1	1	2	0	2	5
353:	1	2	2	3	1	4	2	2
361:	3	3	2	3	4	2	2	3

369:	1	4	4	5	2	5	1	2

Sample Title: 04

Channel								
377:	2	1	1	2	3	2	2	2
385:	1	5	2	1	1	1	1	1
393:	2	3	5	3	3	0	3	1
401:	4	3	5	3	4	2	0	5
409:	4	2	0	2	2	2	2	2
417:	1	2	2	6	0	2	5	6
425:	2	1	0	4	3	3	3	6
433:	1	4	3	1	1	3	5	1
441:	6	4	1	5	4	3	4	4
449:	4	2	5	4	1	1	2	1
457:	1	3	1	2	2	1	2	2
465:	3	0	4	3	0	3	4	3
473:	2	2	2	1	3	2	0	1
481:	2	2	0	1	3	2	3	3
489:	3	3	2	1	2	0	0	2
497:	2	1	2	0	0	2	2	6
505:	2	1	4	2	2	4	2	3
513:	1	1	0	3	0	3	1	2
521:	0	3	7	2	5	2	5	5
529:	4	1	2	3	0	5	1	1
537:	2	3	3	6	2	3	4	3
545:	0	3	4	5	6	1	2	6
553:	1	3	2	4	3	4	4	5
561:	3	1	4	6	4	3	3	1
569:	4	1	1	1	4	2	5	1
577:	2	2	2	4	4	7	5	5
585:	4	3	3	2	2	6	5	3
593:	3	7	3	3	4	0	4	4
601:	3	1	3	4	0	5	1	3
609:	2	5	1	5	3	3	7	4
617:	4	1	4	4	1	2	3	9
625:	3	2	3	1	5	4	3	3
633:	4	4	5	6	4	2	2	3
641:	3	5	2	8	3	6	5	3
649:	2	6	5	5	4	4	3	5
657:	4	3	5	3	3	4	4	8
665:	1	4	4	1	0	5	3	2
673:	2	8	2	0	2	6	1	5
681:	6	1	4	3	7	5	4	1
689:	1	2	5	2	5	3	4	4
697:	3	1	5	6	4	5	7	5
705:	4	4	0	3	9	3	2	3
713:	4	3	6	4	7	3	6	3
721:	0	4	4	1	5	4	4	2
729:	1	5	7	2	5	5	0	4
737:	8	3	0	3	7	3	4	2
745:	5	4	6	8	5	8	5	3
753:	8	7	3	1	2	4	1	3
761:	3	4	2	0	3	4	2	3
769:	1	2	5	4	3	3	5	3
777:	2	6	4	2	2	3	3	3
785:	6	2	4	5	1	3	6	7
793:	3	6	7	1	2	2	5	2

801:	1	2	5	2	4	6	3	5

Sample Title: 04

Channel								
809:	3	1	3	5	1	6	2	5
817:	6	0	2	5	5	4	6	3
825:	1	2	3	3	5	2	4	3
833:	3	2	3	4	6	4	2	4
841:	1	1	4	2	5	3	5	4
849:	2	1	2	0	6	4	5	4
857:	6	4	1	4	8	3	3	1
865:	3	5	2	3	1	3	1	4
873:	7	6	4	3	4	3	7	1
881:	7	3	1	3	7	6	1	3
889:	2	1	3	1	1	3	8	4
897:	2	6	4	5	3	6	3	3
905:	4	4	2	2	4	5	3	6
913:	3	2	4	6	4	5	3	3
921:	4	3	3	1	4	6	1	5
929:	5	3	4	7	0	2	2	2
937:	1	4	3	2	5	5	5	3
945:	4	4	1	0	4	4	3	3
953:	7	5	3	2	5	4	2	6
961:	4	2	0	1	1	4	1	3
969:	3	3	1	0	1	2	1	2
977:	0	1	4	1	0	0	2	0
985:	4	4	2	5	4	2	0	0
993:	0	2	2	2	1	2	1	3
1001:	1	1	3	1	0	0	2	4
1009:	0	2	3	2	1	2	1	0
1017:	1	0	0	2	0	1	1	2

Apex-Alpha™

12/2/11

Sample Description: IB1/2-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011022.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_037
Chamber Serial Number: 04026478A
Detector Serial Number: 91133
Env. Background: System Bkgd 10015
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.200E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:46 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.8767 +/- 0.0000
Counting Efficiency: 0.1806 +/- 0.0029 on 8/30/2011 7:34:50 PM
Effective Efficiency: 0.1583 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.808	522.15	8.59	0.85	0.00E+000	11.3
RN-222	5.300	542.83	8.41	0.17	0.00E+000	5.1
RA-226	4.615	312.83	11.09	0.17	0.00E+000	4.1

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	1.91E+001 +/- 1.74E+000	2.19E-001 +/- 6.88E-003
RN-222	0.977	5490.00*	1.98E+001 +/- 1.78E+000	1.53E-001 +/- 4.80E-003
RA-226	0.982	4785.00*	1.14E+001 +/- 1.32E+000	1.52E-001 +/- 4.79E-003

AG
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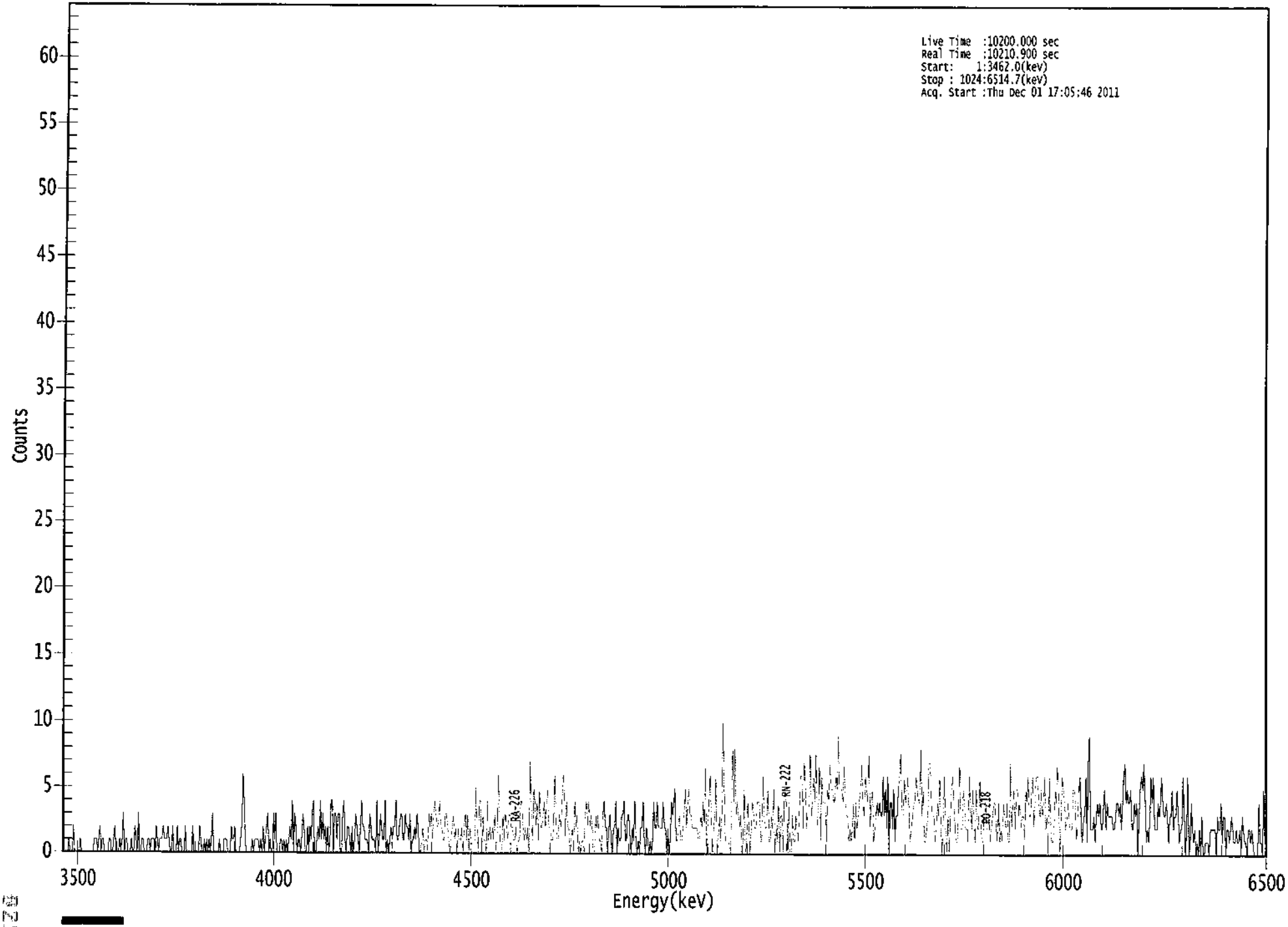
0000011022.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	1	0	0	0	0	1	0	0
9:	0	2	0	0	0	0	0	1
17:	0	0	0	0	0	0	0	0
25:	0	0	0	1	1	1	0	1
33:	2	0	1	1	0	0	0	0
41:	1	1	0	0	1	2	0	0
49:	0	1	0	1	3	0	1	1
57:	0	0	0	1	0	0	2	1
65:	0	3	0	0	1	1	0	0
73:	0	1	1	0	1	1	1	0
81:	2	1	0	1	1	1	2	1
89:	1	1	2	1	0	0	2	0
97:	0	0	2	0	1	1	0	0
105:	0	2	0	0	0	0	0	2
113:	0	0	0	0	0	2	1	0
121:	0	1	0	1	0	1	0	1
129:	3	0	0	0	0	0	1	0
137:	0	0	1	1	1	0	0	0
145:	2	1	1	2	0	0	0	0
153:	1	2	6	4	1	0	0	0
161:	0	0	1	0	1	1	1	1
169:	0	1	0	2	0	1	2	3
177:	0	1	0	0	3	1	3	0
185:	0	0	1	1	0	1	0	1
193:	0	1	2	1	4	0	3	2
201:	0	1	1	0	1	3	2	0
209:	0	2	0	2	1	3	4	0
217:	0	1	2	1	4	1	3	1
225:	2	0	2	0	1	4	4	0
233:	3	3	1	3	3	0	0	3
241:	4	1	0	2	2	1	0	2
249:	0	1	3	2	1	0	2	4
257:	2	2	1	1	1	0	3	2
265:	1	1	1	0	4	0	1	3
273:	2	1	1	4	0	1	0	1
281:	2	1	2	2	4	1	1	2
289:	3	3	1	1	3	2	2	1
297:	3	0	1	1	2	1	3	2
305:	0	0	1	2	0	1	1	0
313:	3	2	3	1	3	4	3	2
321:	2	4	2	2	1	1	3	3
329:	2	1	0	1	2	3	1	2
337:	0	2	1	1	2	0	2	3
345:	1	3	0	2	1	1	1	1
353:	5	2	0	4	4	0	3	1
361:	1	0	4	1	2	1	2	1

369:	3	0	1	6	3	0	0	3

Sample Title: 05

Channel								
377:	1	3	2	1	3	3	2	2
385:	1	1	2	0	1	1	4	4
393:	2	1	2	1	2	0	7	3
401:	1	5	4	2	4	1	5	2
409:	2	3	4	2	4	5	2	2
417:	1	1	2	6	3	1	1	3
425:	2	4	6	5	1	4	2	2
433:	0	1	2	0	4	2	3	0
441:	1	0	1	1	0	3	4	2
449:	4	2	3	2	0	0	3	2
457:	3	1	1	0	3	4	2	2
465:	0	2	3	1	0	2	2	4
473:	0	2	1	1	3	3	4	1
481:	1	3	3	1	0	2	1	4
489:	1	0	1	0	2	2	4	1
497:	0	2	1	0	1	0	1	4
505:	2	2	4	2	2	2	2	4
513:	2	2	0	2	0	1	4	3
521:	4	5	1	1	2	3	1	1
529:	2	3	5	2	4	5	3	3
537:	2	2	2	2	2	1	1	3
545:	2	4	2	7	0	2	4	6
553:	3	0	2	3	6	0	1	3
561:	1	3	10	5	1	1	1	1
569:	0	2	8	4	8	3	4	3
577:	2	3	0	1	5	0	1	4
585:	2	0	2	4	3	2	2	4
593:	4	4	1	1	6	3	2	2
601:	5	1	1	3	2	5	0	2
609:	1	4	0	3	3	0	5	4
617:	4	0	4	0	0	3	1	1
625:	3	2	1	4	6	6	2	7
633:	5	2	3	3	8	3	4	6
641:	4	8	2	3	7	1	6	4
649:	4	4	1	5	4	7	5	5
657:	4	4	6	5	9	5	5	5
665:	4	7	4	3	3	1	2	1
673:	2	4	1	4	2	3	4	5
681:	7	4	3	6	5	4	8	2
689:	4	5	1	2	3	4	3	4
697:	3	3	6	3	5	2	6	0
705:	4	4	2	5	1	3	3	5
713:	6	8	3	3	6	4	5	6
721:	3	1	2	3	4	4	6	5
729:	4	4	8	3	5	1	1	2
737:	3	7	7	4	3	3	1	2
745:	4	3	6	2	0	3	6	2
753:	0	3	0	3	5	6	4	2
761:	1	1	4	7	2	2	5	4
769:	2	2	1	6	4	2	5	3
777:	1	5	2	2	6	2	1	1
785:	4	4	2	2	3	1	2	3
793:	4	4	2	1	4	1	2	1

801:	4	3	2	4	1	1	7	2

Sample Title: 05

Channel								
809:	4	5	2	5	5	3	4	2
817:	3	3	1	5	4	6	3	3
825:	5	6	2	5	6	6	4	3
833:	5	3	4	6	2	3	0	6
841:	3	1	1	2	5	4	7	4
849:	0	3	6	5	4	2	3	4
857:	2	2	2	5	5	4	1	3
865:	5	6	2	1	3	3	6	1
873:	7	9	2	2	2	3	1	3
881:	4	3	4	2	2	4	5	2
889:	4	3	3	3	3	2	2	3
897:	4	4	3	4	2	4	6	7
905:	4	5	4	4	5	2	2	4
913:	3	4	0	3	5	6	5	7
921:	4	1	2	1	3	6	4	6
929:	2	2	2	4	3	4	6	4
937:	3	3	4	3	1	3	3	5
945:	2	3	3	5	3	1	2	2
953:	6	3	0	2	6	0	1	4
961:	2	1	2	0	1	0	2	0
969:	3	0	0	1	1	1	0	2
977:	2	2	2	2	0	3	2	2
985:	4	1	3	3	0	2	2	1
993:	2	3	2	1	1	2	1	1
1001:	2	0	3	2	1	1	0	2
1009:	2	1	2	1	0	0	0	0
1017:	4	1	1	0	5	1	4	3

Apex-Alpha™

12/2/11

Sample Description: IB1/2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011023.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_038
Chamber Serial Number: 04026478B
Detector Serial Number: 91134
Env. Background: System Bkgd 10016
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.500E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:48 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9262 +/- 0.0000
Counting Efficiency: 0.1591 +/- 0.0026 on 8/30/2011 7:34:48 PM
Effective Efficiency: 0.1473 +/- 0.0024

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

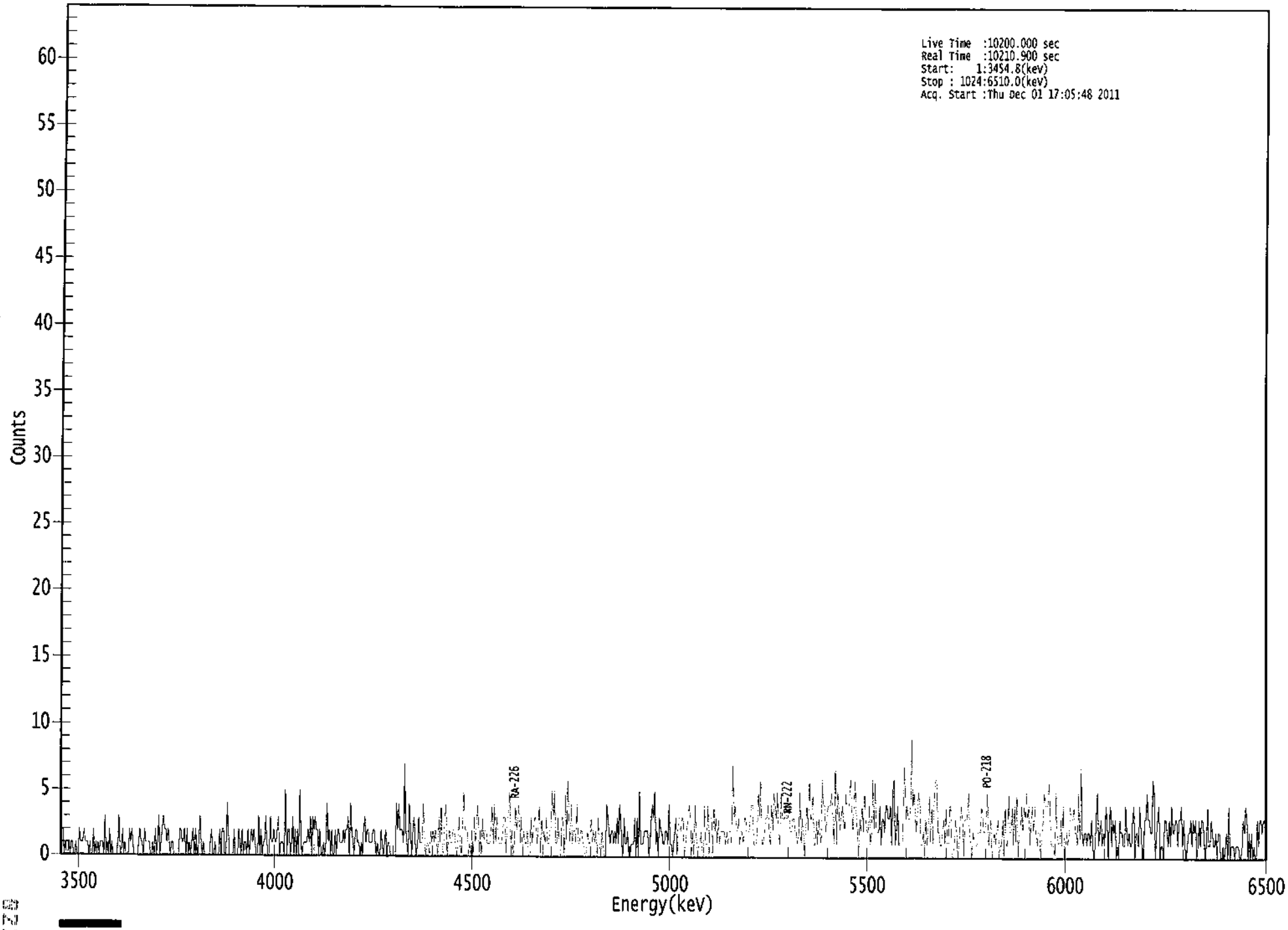
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.806	384.66	10.00	0.34	0.00E+000	5.4
RN-222	5.301	454.83	9.19	0.17	0.00E+000	4.4
RA-226	4.610	269.32	11.96	0.68	0.00E+000	4.8

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.975	6003.00*	1.70E+001 +/- 1.78E+000	2.11E-001 +/- 6.67E-003
RN-222	0.977	5490.00*	2.01E+001 +/- 1.95E+000	1.84E-001 +/- 5.83E-003
RA-226	0.981	4785.00*	1.19E+001 +/- 1.47E+000	2.49E-001 +/- 7.87E-003

AG
12/2/11

0000011023.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	1	2	2	0	1	0	0	1
9:	0	1	1	0	0	1	0	0
17:	2	1	1	1	2	1	1	1
25:	0	1	0	0	2	0	1	0
33:	1	0	1	1	1	0	3	0
41:	1	0	2	0	1	0	0	0
49:	0	1	3	0	0	2	0	1
57:	0	0	0	2	1	2	1	0
65:	0	0	0	1	2	1	1	0
73:	2	1	1	1	1	0	0	1
81:	0	2	0	1	3	0	1	2
89:	3	2	2	1	2	1	0	1
97:	1	0	0	0	0	0	2	2
105:	1	1	2	0	2	0	1	0
113:	1	2	0	2	1	0	1	3
121:	1	0	1	0	0	0	0	0
129:	1	2	0	0	1	0	0	0
137:	2	0	2	2	0	0	4	2
145:	0	0	0	0	2	0	0	0
153:	2	1	0	2	0	1	1	0
161:	2	0	1	2	1	2	1	0
169:	0	3	0	2	0	1	1	3
177:	1	0	0	3	1	1	2	1
185:	1	2	3	0	1	1	1	0
193:	5	0	2	2	0	1	3	0
201:	2	0	2	0	5	1	0	1
209:	1	1	1	2	1	3	0	3
217:	2	3	2	2	0	2	0	0
225:	1	0	1	4	1	2	0	2
233:	0	0	2	0	2	2	1	1
241:	1	2	1	2	2	3	0	4
249:	2	1	0	2	2	1	1	0
257:	1	0	2	3	1	2	2	1
265:	1	1	2	2	1	0	1	0
273:	0	2	1	0	1	2	0	1
281:	1	0	0	0	0	0	4	2
289:	4	2	2	2	1	7	2	1
297:	0	4	2	0	2	3	1	0
305:	1	3	1	1	1	4	1	0
313:	1	1	0	2	1	2	1	2
321:	1	0	3	1	4	0	0	3
329:	4	0	1	2	1	1	2	2
337:	1	0	1	3	1	0	3	5
345:	2	2	2	0	1	0	2	0
353:	3	1	3	4	0	2	0	3
361:	1	2	2	1	1	1	2	4

369:	1	4	1	3	2	1	1	1

Sample Title: 06

Channel								
377:	2	3	3	0	3	3	5	1
385:	2	0	1	4	2	3	4	1
393:	3	0	2	1	1	2	0	0
401:	3	1	2	3	3	1	2	4
409:	0	3	0	2	1	3	1	1
417:	2	2	5	3	5	1	1	3
425:	0	0	3	3	0	5	1	6
433:	3	1	4	1	2	2	1	4
441:	1	1	2	2	1	1	0	0
449:	2	1	1	3	1	2	1	2
457:	0	3	1	0	2	1	0	0
465:	4	3	2	1	2	2	1	2
473:	1	3	1	4	3	1	0	3
481:	1	1	2	0	0	1	1	1
489:	3	0	3	0	5	1	1	1
497:	2	2	2	2	0	1	3	4
505:	3	5	1	2	0	3	2	2
513:	1	1	2	2	1	4	1	1
521:	0	1	2	3	0	3	3	2
529:	3	3	0	1	2	3	4	3
537:	0	2	0	4	2	0	1	1
545:	2	0	0	4	1	1	4	1
553:	3	3	0	4	2	3	1	3
561:	1	2	2	2	2	1	2	1
569:	2	2	1	7	3	4	2	2
577:	3	1	2	2	1	3	3	2
585:	2	2	3	4	4	1	1	1
593:	2	5	3	6	1	1	2	3
601:	3	4	2	1	4	2	5	4
609:	3	5	2	1	5	3	3	3
617:	4	3	3	4	2	2	3	3
625:	2	2	1	2	5	1	3	2
633:	0	2	4	2	6	3	3	5
641:	1	1	3	1	3	2	1	6
649:	4	4	2	3	4	4	4	5
657:	3	1	7	1	5	4	2	3
665:	4	3	2	5	4	4	4	6
673:	4	2	4	6	3	2	0	3
681:	2	4	2	5	3	2	2	4
689:	1	2	6	2	6	2	2	2
697:	4	1	3	3	2	4	4	3
705:	3	4	1	5	6	1	2	4
713:	1	1	1	1	5	7	3	4
721:	3	3	4	9	4	5	3	2
729:	4	5	4	1	1	2	0	3
737:	1	2	5	1	4	1	4	6
745:	6	2	2	1	1	2	3	1
753:	4	1	1	4	4	0	0	1
761:	3	2	0	1	3	4	3	0
769:	3	3	3	5	2	1	0	2
777:	1	1	1	2	2	2	4	3
785:	2	2	3	5	1	2	3	0
793:	1	2	1	2	3	0	1	1

801:	3	0	4	1	1	5	2	2

Sample Title: 06

Channel								
809:	4	1	4	1	5	0	2	2
817:	4	2	4	3	5	3	4	1
825:	3	4	2	4	2	1	2	2
833:	0	2	3	5	4	4	4	6
841:	3	1	1	1	0	5	2	1
849:	1	3	1	4	0	1	2	1
857:	2	4	3	3	4	2	2	1
865:	5	1	7	2	1	2	2	1
873:	2	2	1	3	1	0	1	3
881:	5	1	2	3	1	2	1	4
889:	3	0	3	4	1	3	2	3
897:	0	1	0	3	2	2	1	1
905:	4	2	1	2	1	1	3	4
913:	0	2	2	1	4	2	0	1
921:	3	3	5	3	3	2	2	6
929:	5	0	2	3	4	0	1	1
937:	0	3	3	2	1	3	1	4
945:	2	2	3	3	1	3	3	4
953:	1	3	1	0	1	2	2	3
961:	1	3	2	3	0	1	3	1
969:	3	3	2	0	1	4	1	1
977:	3	2	1	1	2	0	2	2
985:	0	0	1	0	1	2	0	4
993:	0	1	1	1	0	1	1	1
1001:	0	0	1	3	2	4	3	0
1009:	2	0	2	0	1	0	0	3
1017:	1	3	3	2	3	3	1	0

Apex-Alpha™

Sample Description: IB1/2-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011037.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10017
Reagent Blank: <not performed>

Sample Size: 5.061E-001 +/- 0.000E+000 gram
Generic Mult. Factor: 2.040E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:49 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9604 +/- 0.0000
Counting Efficiency: 0.1847 +/- 0.0030 on 8/30/2011 7:34:47 PM
Effective Efficiency: 0.1773 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.809	255.49	12.28	0.51	0.00E+000	3.5
RN-222	5.288	269.49	11.95	0.51	0.00E+000	4.0
RA-226	4.621	133.66	16.98	0.34	0.00E+000	5.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	1.54E+001 +/- 1.95E+000	3.16E-001 +/- 9.94E-003
RN-222	0.974	5490.00*	1.62E+001 +/- 2.01E+000	3.16E-001 +/- 9.94E-003
RA-226	0.983	4785.00*	8.05E+000 +/- 1.39E+000	2.88E-001 +/- 9.05E-003

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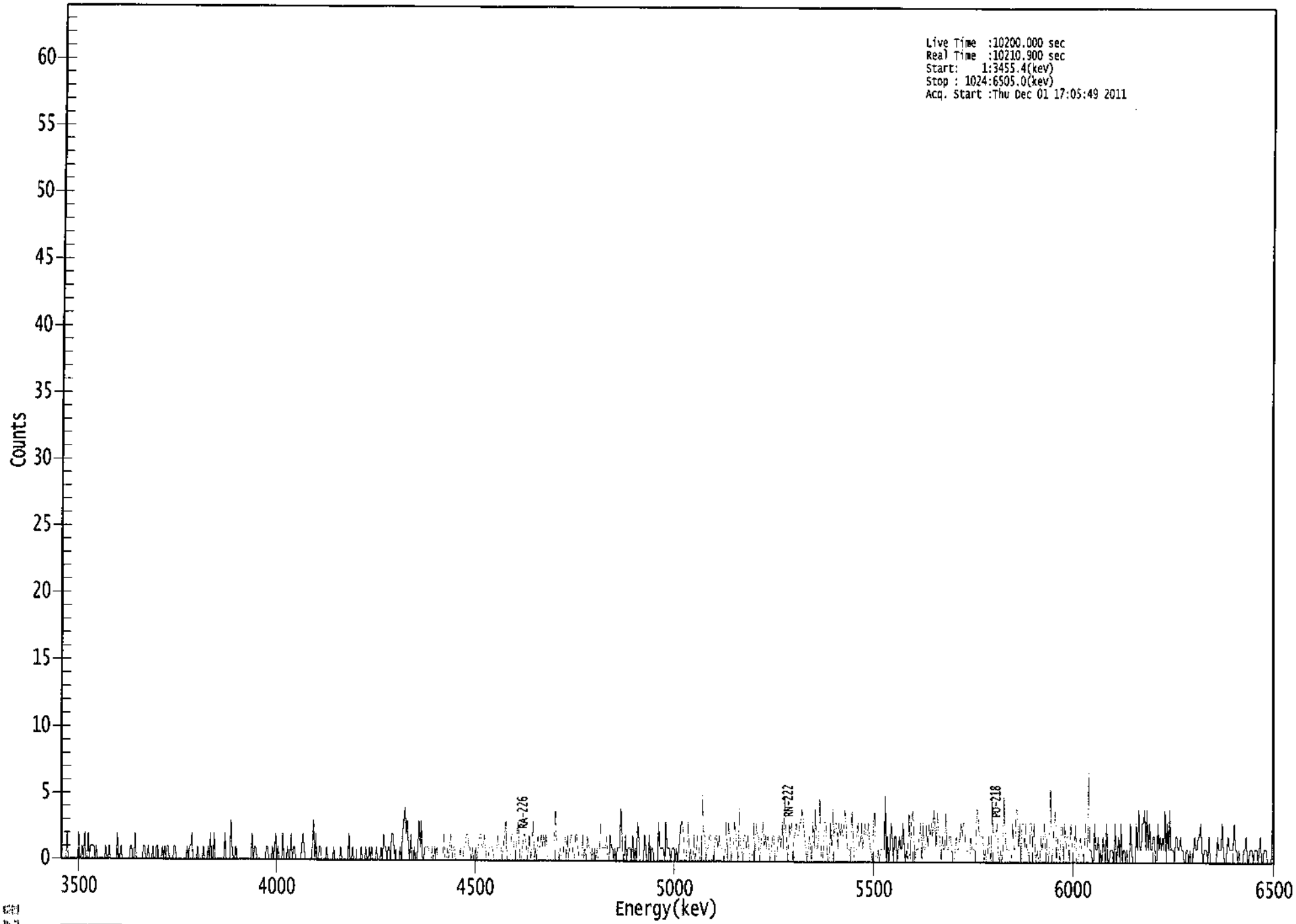
12/2/11

0000011037.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	0	0	0	0	2	0	0
9:	0	0	0	0	0	0	0	2
17:	0	0	1	0	2	0	0	2
25:	0	1	1	1	1	0	1	0
33:	0	0	0	0	0	0	1	0
41:	0	1	0	0	0	0	0	0
49:	2	0	0	1	0	0	0	0
57:	0	0	0	1	1	0	0	2
65:	0	0	0	0	0	0	1	1
73:	0	0	1	0	0	0	1	0
81:	0	1	1	0	0	0	1	0
89:	1	0	1	1	0	0	0	0
97:	1	1	0	0	0	0	0	0
105:	0	0	0	1	0	1	1	2
113:	0	0	0	0	1	0	0	0
121:	0	1	0	0	0	1	0	2
129:	0	0	2	0	0	0	0	0
137:	0	0	0	2	0	0	0	0
145:	3	1	0	0	1	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	2	0	1	1	0	0
169:	0	0	0	0	0	0	1	1
177:	0	0	0	1	0	1	2	0
185:	1	0	0	0	2	0	0	0
193:	1	0	0	2	0	1	1	0
201:	0	0	0	0	1	2	1	0
209:	0	0	0	0	0	1	3	0
217:	2	0	0	1	1	0	0	0
225:	0	1	0	0	0	0	0	1
233:	0	0	0	0	0	1	0	0
241:	0	0	0	0	2	0	0	1
249:	0	0	0	0	0	0	1	0
257:	0	0	1	0	0	1	0	1
265:	0	0	0	1	0	0	0	1
273:	0	2	1	1	0	1	1	0
281:	2	2	1	0	0	0	0	1
289:	0	2	3	4	2	3	1	0
297:	2	0	0	1	0	0	1	3
305:	1	3	0	0	1	1	1	1
313:	0	0	1	0	1	0	1	0
321:	0	0	0	0	2	0	0	1
329:	0	1	2	0	1	1	0	0
337:	0	0	1	0	0	1	1	2
345:	2	1	1	0	1	0	0	1
353:	0	1	2	2	1	1	2	1
361:	0	0	1	1	1	1	0	0

369:	0	2	1	1	1	0	1	2

Sample Title: 07

Channel								
377:	3	0	0	0	0	2	2	1
385:	1	1	3	2	0	0	1	2
393:	2	1	0	1	2	0	1	3
401:	0	1	0	2	1	1	2	1
409:	2	1	2	1	0	0	0	0
417:	0	2	4	1	1	0	1	0
425:	0	2	2	0	2	0	1	2
433:	2	0	0	2	2	1	0	0
441:	0	2	0	1	0	2	1	1
449:	0	1	0	1	0	1	0	0
457:	3	1	1	1	1	2	0	0
465:	2	1	1	0	1	0	1	1
473:	1	4	2	0	0	2	0	1
481:	1	1	0	2	0	1	0	3
489:	2	0	0	0	0	2	1	0
497:	0	2	0	1	1	0	0	0
505:	0	3	1	1	1	1	0	3
513:	1	1	1	0	1	1	1	0
521:	1	0	1	2	3	3	2	0
529:	0	1	3	0	1	0	0	2
537:	0	1	2	1	0	0	5	2
545:	2	0	1	1	2	2	0	0
553:	1	2	2	1	2	1	1	1
561:	0	1	3	0	3	2	0	1
569:	1	3	2	1	0	4	1	1
577:	0	2	2	1	2	1	0	0
585:	1	3	0	3	2	2	0	1
593:	2	3	1	2	1	2	1	0
601:	1	2	2	0	0	1	2	2
609:	1	3	1	5	3	1	0	3
617:	2	3	0	2	2	3	2	2
625:	3	3	4	3	2	1	0	1
633:	2	1	0	3	1	4	1	1
641:	2	5	0	0	1	3	3	1
649:	0	0	3	1	4	2	3	3
657:	1	3	2	3	2	2	4	3
665:	1	1	1	0	4	2	0	0
673:	2	3	1	1	3	1	2	3
681:	2	2	3	1	1	0	3	4
689:	0	0	1	0	1	1	1	1
697:	5	0	2	0	1	3	2	0
705:	2	2	0	1	2	1	1	3
713:	1	0	1	0	4	0	3	4
721:	3	0	1	1	1	2	3	0
729:	3	1	1	3	1	3	2	3
737:	2	4	3	1	4	2	2	0
745:	2	1	1	4	1	1	2	2
753:	1	0	0	1	2	1	1	2
761:	3	2	3	3	1	1	0	0
769:	2	1	1	1	0	4	4	2
777:	2	2	2	0	1	0	0	2
785:	1	0	5	2	2	2	3	1
793:	0	1	0	1	5	2	1	1

801:	1	0	0	3	1	1	4	4

Sample Title: 07

Channel								
809:	1	3	0	3	3	1	3	1
817:	1	0	3	3	1	3	1	0
825:	1	0	0	2	1	2	3	0
833:	2	0	1	6	0	1	3	4
841:	0	2	1	0	3	3	0	3
849:	1	2	2	0	3	2	0	1
857:	3	0	0	1	2	1	1	0
865:	3	2	1	7	1	1	0	0
873:	3	1	1	2	0	1	0	2
881:	1	0	3	0	0	1	1	1
889:	0	3	0	1	2	0	3	0
897:	1	1	0	1	0	0	3	1
905:	0	0	0	3	1	4	1	1
913:	3	3	4	1	4	1	3	1
921:	1	2	2	0	0	3	1	2
929:	1	2	1	4	0	3	1	4
937:	1	1	1	0	2	2	1	1
945:	2	1	1	0	0	1	1	0
953:	1	0	0	1	2	1	1	2
961:	2	3	1	0	1	1	1	0
969:	2	0	0	0	0	0	0	2
977:	1	1	1	3	1	0	0	1
985:	2	1	1	1	1	3	1	1
993:	0	1	0	0	0	1	1	2
1001:	0	0	1	1	1	0	1	1
1009:	1	0	1	2	0	0	1	1
1017:	1	0	0	0	0	3	1	0

Apex-Alpha™

Sample Description: IB1/2-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011026.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10018
Reagent Blank: <not performed>

Sample Size: 1.035E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.230E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:51 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.8995 +/- 0.0000
Counting Efficiency: 0.1914 +/- 0.0031 on 8/30/2011 7:34:46 PM
Effective Efficiency: 0.1721 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

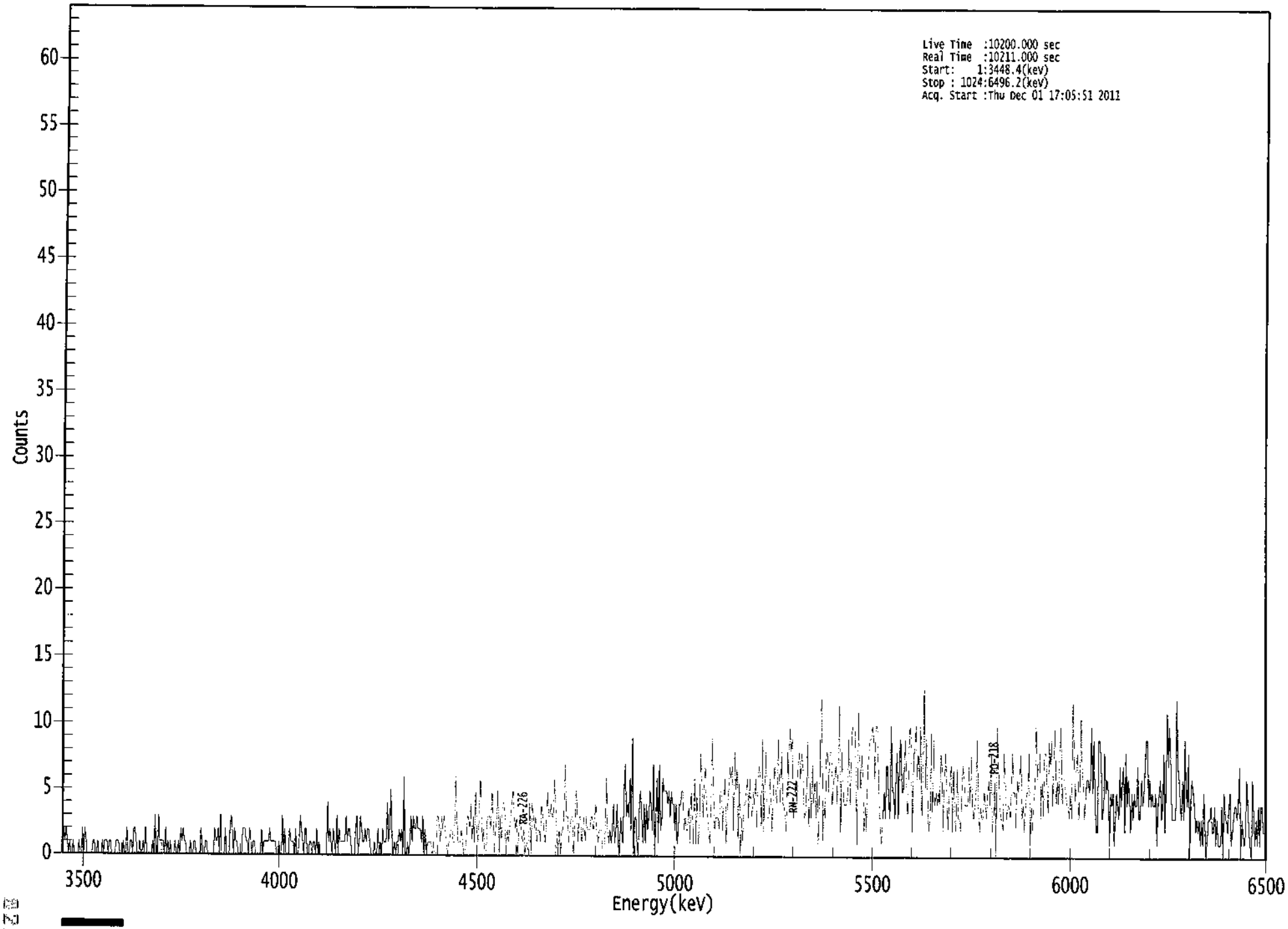
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.810	838.32	6.77	0.68	0.00E+000	5.2
RN-222	5.301	881.49	6.60	0.51	0.00E+000	6.7
RA-226	4.620	337.66	10.67	0.34	0.00E+000	6.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.78E+001 +/- 2.08E+000	1.87E-001 +/- 5.87E-003
RN-222	0.977	5490.00*	2.93E+001 +/- 2.14E+000	1.74E-001 +/- 5.46E-003
RA-226	0.983	4785.00*	1.12E+001 +/- 1.25E+000	1.59E-001 +/- 4.97E-003

AG
12/2/11

0000011026.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	1	2	1	2	1	0	1	0
9:	0	1	0	0	0	0	1	0
17:	0	2	0	2	1	0	0	0
25:	0	0	1	1	0	0	1	0
33:	0	0	1	0	1	1	1	0
41:	1	1	0	0	0	0	1	1
49:	1	0	0	0	1	0	0	2
57:	0	0	1	1	0	2	2	1
65:	0	0	1	0	0	1	0	2
73:	0	0	0	0	0	1	0	3
81:	0	0	3	1	1	1	1	0
89:	2	0	1	0	1	0	0	0
97:	1	0	0	1	0	2	1	2
105:	1	1	0	0	0	1	0	0
113:	1	1	0	0	0	0	2	1
121:	0	0	1	1	0	0	0	0
129:	0	0	2	1	1	2	0	3
137:	0	0	0	2	0	0	0	2
145:	3	2	0	2	1	1	0	0
153:	0	0	2	2	2	1	1	0
161:	2	1	0	1	1	0	0	0
169:	0	0	2	0	1	1	1	1
177:	1	2	1	1	1	1	1	0
185:	0	1	0	0	3	0	2	0
193:	0	0	2	1	1	1	0	2
201:	0	0	1	3	2	1	0	2
209:	2	0	0	1	1	0	1	1
217:	0	2	0	1	0	0	0	0
225:	0	0	4	1	2	1	0	2
233:	1	0	3	0	2	1	1	1
241:	1	1	3	1	2	2	1	0
249:	0	0	2	3	0	1	3	2
257:	1	1	2	1	2	2	1	0
265:	0	0	1	0	0	2	0	1
273:	0	2	1	1	1	4	1	2
281:	5	1	0	1	0	1	1	2
289:	1	2	0	6	0	0	1	0
297:	1	3	1	3	2	2	3	2
305:	2	2	1	3	0	2	0	1
313:	1	1	1	0	1	0	0	3
321:	3	2	1	3	2	3	2	1
329:	0	1	1	2	2	1	1	6
337:	3	1	1	1	2	1	0	0
345:	1	3	3	2	4	1	3	1
353:	5	2	1	3	6	3	1	2
361:	0	0	3	3	3	2	5	3

369:	0	2	3	5	0	3	1	4

Sample Title: 08

Channel								
377:	4	3	0	2	1	2	3	4
385:	5	3	2	3	0	2	3	2
393:	1	2	0	1	1	0	4	0
401:	4	3	2	3	1	2	2	1
409:	4	3	2	1	2	5	3	3
417:	4	3	3	6	4	2	0	2
425:	0	2	2	4	7	3	3	1
433:	2	3	3	0	2	5	4	1
441:	3	3	1	2	3	1	3	2
449:	2	2	3	3	2	3	4	2
457:	1	2	2	2	0	0	2	6
465:	2	1	2	1	2	4	1	2
473:	4	1	0	3	2	1	5	7
481:	3	4	3	6	2	9	0	3
489:	3	1	0	4	5	3	1	4
497:	1	4	2	3	5	4	2	7
505:	0	3	6	1	7	2	3	6
513:	5	5	5	4	5	3	5	4
521:	4	2	4	1	2	4	4	5
529:	5	2	3	2	2	4	1	5
537:	3	1	6	1	5	1	2	8
545:	6	3	5	7	4	3	2	1
553:	5	9	5	2	3	3	3	2
561:	5	5	2	5	6	1	4	5
569:	7	6	7	2	8	5	7	1
577:	6	0	3	1	4	4	5	6
585:	3	6	4	3	5	4	6	2
593:	6	7	6	2	9	2	6	8
601:	3	3	6	4	2	5	7	5
609:	4	9	6	4	8	4	4	3
617:	2	8	6	10	8	9	3	4
625:	6	4	7	8	6	8	7	3
633:	3	5	9	2	6	3	7	4
641:	6	3	6	1	4	11	12	1
649:	4	3	8	8	5	8	8	4
657:	6	6	7	4	7	12	1	8
665:	6	4	4	4	5	9	4	7
673:	10	10	10	6	1	11	8	5
681:	8	6	2	4	2	7	8	9
689:	9	10	9	6	10	10	7	4
697:	2	1	3	5	3	7	7	4
705:	3	10	5	5	3	6	8	3
713:	8	9	5	5	7	9	5	3
721:	8	10	9	2	8	8	10	6
729:	8	6	10	3	6	13	5	9
737:	4	2	3	10	3	9	4	5
745:	4	5	4	8	7	2	5	8
753:	6	2	4	6	7	2	7	3
761:	2	7	3	3	2	5	7	6
769:	4	4	4	7	4	8	4	3
777:	4	5	9	4	2	4	3	3
785:	5	4	3	5	6	4	8	2
793:	3	6	0	10	7	5	3	3

801:	2	8	5	3	4	4	3	5

Sample Title: 08

Channel								
809:	8	5	5	2	6	5	6	8
817:	3	4	2	4	5	5	8	1
825:	4	2	4	6	10	6	8	8
833:	3	6	3	8	8	6	3	9
841:	7	9	4	8	10	4	6	4
849:	8	10	4	6	6	5	4	4
857:	3	5	3	12	8	4	7	8
865:	3	5	11	7	5	3	5	6
873:	6	5	6	10	5	9	4	2
881:	2	9	9	7	3	4	8	5
889:	6	5	1	5	4	5	1	3
897:	5	4	3	7	4	6	7	2
905:	8	4	6	5	2	5	3	5
913:	4	4	7	3	3	6	4	5
921:	7	9	9	4	6	4	5	4
929:	4	5	1	4	5	6	3	4
937:	8	2	6	11	7	10	7	3
945:	3	3	3	12	7	6	4	3
953:	6	3	9	5	4	8	0	5
961:	6	5	4	2	3	2	3	1
969:	3	1	5	2	0	2	3	3
977:	4	2	2	4	1	3	1	1
985:	1	4	0	5	3	3	2	4
993:	5	1	2	3	4	4	3	4
1001:	7	0	3	2	1	2	6	4
1009:	2	1	0	6	3	1	3	1
1017:	4	1	4	4	2	2	2	2

Apex-Alpha™

C 12/2/11

Sample Description: IB1/2-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011032.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 10019
Reagent Blank: <not performed>

Sample Size: 9.998E-001 +/- 0.000E+000 gram
Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:53 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.8589 +/- 0.0000
Counting Efficiency: 0.1774 +/- 0.0028 on 8/30/2011 7:34:44 PM
Effective Efficiency: 0.1524 +/- 0.0024

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.807	566.81	8.24	1.19	0.00E+000	7.2
RN-222	5.301	530.98	8.52	1.02	0.00E+000	4.6
RA-226	4.634	254.96	12.33	2.04	0.00E+000	5.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.31E+001 +/- 2.04E+000	2.68E-001 +/- 8.44E-003
RN-222	0.977	5490.00*	2.16E+001 +/- 1.96E+000	2.57E-001 +/- 8.08E-003
RA-226	0.986	4785.00*	1.04E+001 +/- 1.32E+000	3.17E-001 +/- 9.98E-003

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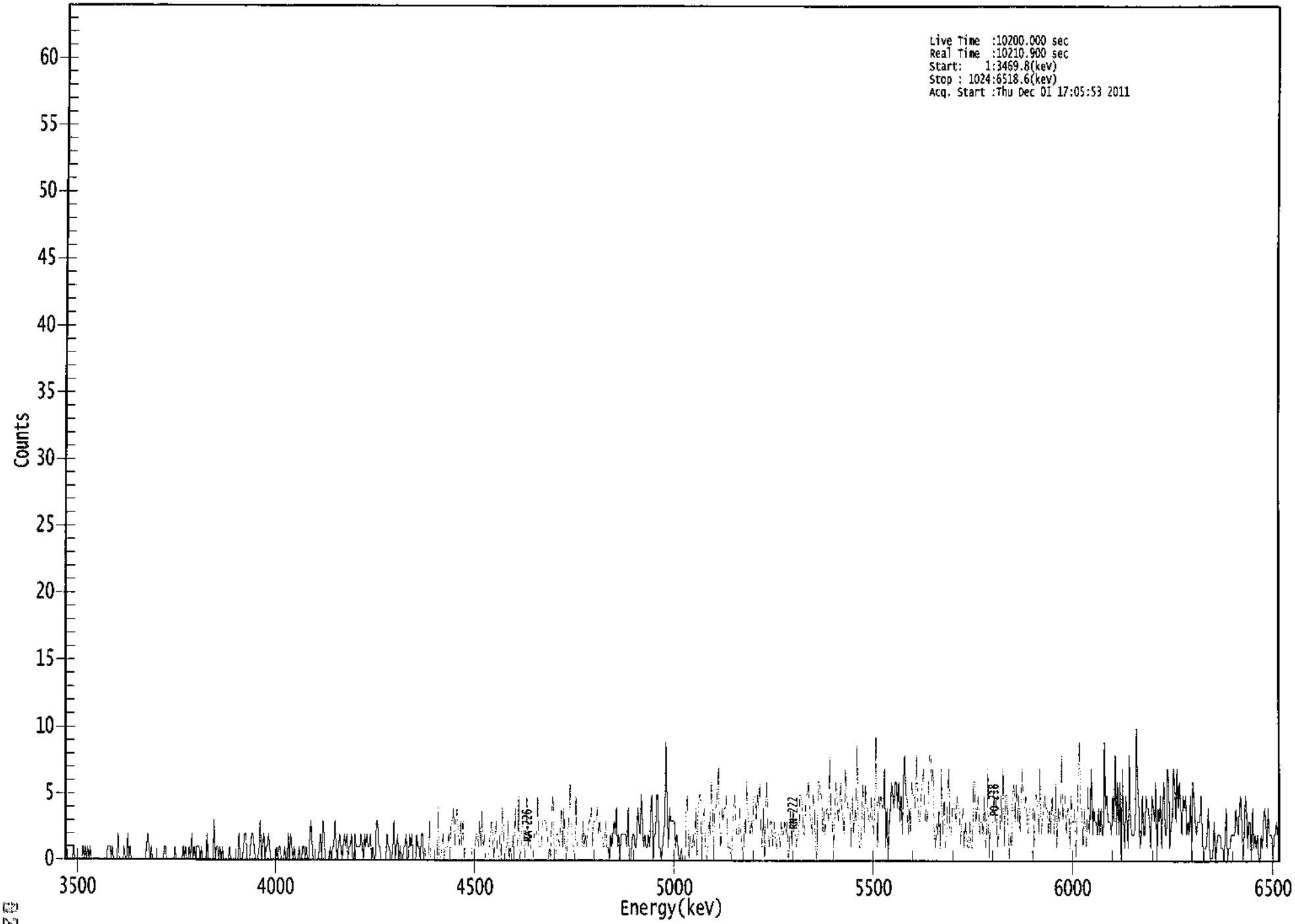
12/2/11

0000011032.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 09

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	1	0	0	0	0	0	1
9:	0	0	0	0	0	0	0	1
17:	0	1	0	1	0	1	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	1	1	1	0
41:	1	0	0	0	0	2	0	0
49:	0	0	1	0	0	2	0	1
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	1	2	1
73:	0	1	0	0	0	0	0	0
81:	0	0	0	0	1	1	0	0
89:	0	0	0	0	0	1	0	0
97:	0	0	0	0	1	0	1	0
105:	0	1	0	2	0	1	0	1
113:	1	1	0	1	0	0	0	0
121:	2	0	0	0	0	0	3	0
129:	1	1	0	1	0	1	0	0
137:	0	0	0	1	0	0	0	0
145:	0	0	0	2	0	0	0	1
153:	2	2	0	0	0	1	2	2
161:	1	0	0	0	1	3	0	1
169:	2	0	1	1	2	1	0	0
177:	0	0	0	1	0	1	1	0
185:	0	0	1	0	0	2	0	2
193:	1	0	1	0	0	0	1	0
201:	0	1	1	0	1	0	0	2
209:	3	1	0	0	0	0	0	1
217:	2	0	3	2	0	0	0	0
225:	1	0	1	1	3	1	0	1
233:	2	1	0	1	2	1	2	0
241:	1	1	2	0	0	2	1	1
249:	1	1	2	1	0	2	1	2
257:	1	1	2	0	1	0	0	3
265:	3	1	1	0	0	0	0	0
273:	2	1	1	0	0	1	3	0
281:	1	2	0	1	0	0	1	1
289:	2	0	0	2	1	2	0	0
297:	0	2	1	1	0	2	2	0
305:	1	0	0	0	3	0	0	0
313:	0	0	0	4	0	0	1	2
321:	0	1	1	1	2	0	3	3
329:	4	1	3	4	2	1	3	1
337:	3	0	1	1	1	1	1	1
345:	0	0	1	2	2	1	3	1
353:	4	1	2	0	0	0	1	2
361:	3	2	0	2	3	0	0	2

369:	0	4	3	0	1	1	3	0

Sample Title: 09

Channel								
377:	1	0	2	0	4	2	1	5
385:	0	1	3	3	0	2	5	1
393:	2	1	0	0	2	2	2	5
401:	1	1	1	3	3	3	3	2
409:	0	1	0	4	5	0	0	2
417:	2	1	2	4	1	4	1	0
425:	2	3	6	2	2	1	0	5
433:	1	1	1	1	1	3	1	2
441:	1	2	3	3	4	1	3	3
449:	3	4	2	3	2	2	1	1
457:	3	1	1	0	2	1	2	3
465:	2	4	1	2	0	2	2	2
473:	2	2	1	4	0	0	1	2
481:	2	1	1	4	3	2	5	3
489:	1	2	1	1	2	1	4	5
497:	0	2	2	5	5	1	1	0
505:	1	2	3	9	4	1	4	3
513:	3	3	3	1	2	1	0	0
521:	1	0	0	0	4	5	0	2
529:	1	1	2	1	4	0	4	5
537:	5	0	3	4	1	0	1	3
545:	2	6	4	0	4	4	5	7
553:	3	1	4	3	4	4	5	1
561:	1	1	0	2	4	5	2	2
569:	2	4	2	1	0	3	2	6
577:	3	3	2	3	2	5	5	3
585:	5	4	6	2	1	4	0	4
593:	6	2	1	3	3	1	3	2
601:	1	2	2	1	3	2	2	3
609:	2	3	0	1	4	1	4	2
617:	2	1	2	2	5	5	4	2
625:	2	5	5	6	4	3	2	5
633:	4	1	0	6	6	5	5	2
641:	4	2	4	4	3	8	3	3
649:	1	3	6	5	3	4	6	4
657:	3	2	7	5	4	4	4	1
665:	5	2	4	3	9	3	1	1
673:	4	6	2	6	4	4	3	3
681:	5	3	2	5	10	1	5	4
689:	5	4	4	7	1	4	0	3
697:	4	6	5	4	6	6	4	6
705:	3	5	2	6	8	5	5	2
713:	4	2	6	5	5	4	8	5
721:	3	3	5	6	7	3	4	3
729:	4	8	8	6	7	2	1	3
737:	2	4	1	7	2	5	1	2
745:	5	7	2	2	4	4	4	3
753:	5	4	4	1	3	4	1	3
761:	2	1	1	3	1	1	6	6
769:	3	4	5	2	3	3	2	5
777:	1	2	7	0	3	3	3	6
785:	3	5	1	2	2	5	3	7
793:	1	5	5	3	0	2	1	5

801:	6	3	6	3	5	2	5	7

Sample Title: 09

Channel								
809:	4	4	5	3	2	4	4	4
817:	4	1	5	5	4	2	7	2
825:	3	4	5	4	4	2	4	2
833:	5	3	2	6	1	4	3	4
841:	8	3	4	5	2	4	4	1
849:	5	3	3	4	0	3	6	9
857:	4	4	1	4	2	1	6	2
865:	4	7	2	4	3	3	2	4
873:	2	4	2	2	9	4	5	3
881:	3	3	2	5	3	8	2	6
889:	2	6	0	7	3	1	5	3
897:	1	8	3	2	2	2	3	10
905:	6	4	1	2	5	2	2	5
913:	4	4	3	1	5	4	3	6
921:	0	4	3	5	1	4	6	2
929:	2	7	6	1	3	3	7	6
937:	3	7	4	6	4	2	5	4
945:	5	2	3	2	5	0	6	5
953:	3	2	3	3	3	5	2	0
961:	1	1	2	4	1	0	0	1
969:	3	0	1	2	2	2	1	1
977:	0	2	4	0	1	1	2	2
985:	2	2	4	3	2	4	5	3
993:	0	2	5	4	1	3	3	0
1001:	4	1	2	1	2	0	0	2
1009:	1	3	4	3	1	4	2	2
1017:	2	0	2	2	3	2	3	2

Apex-Alpha™

12244

Sample Description: IB1/2-7
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011025.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 10020
Reagent Blank: <not performed>

Sample Size: 1.015E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.160E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:55 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9135 +/- 0.0000
Counting Efficiency: 0.1900 +/- 0.0030 on 8/30/2011 7:35:05 PM
Effective Efficiency: 0.1736 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

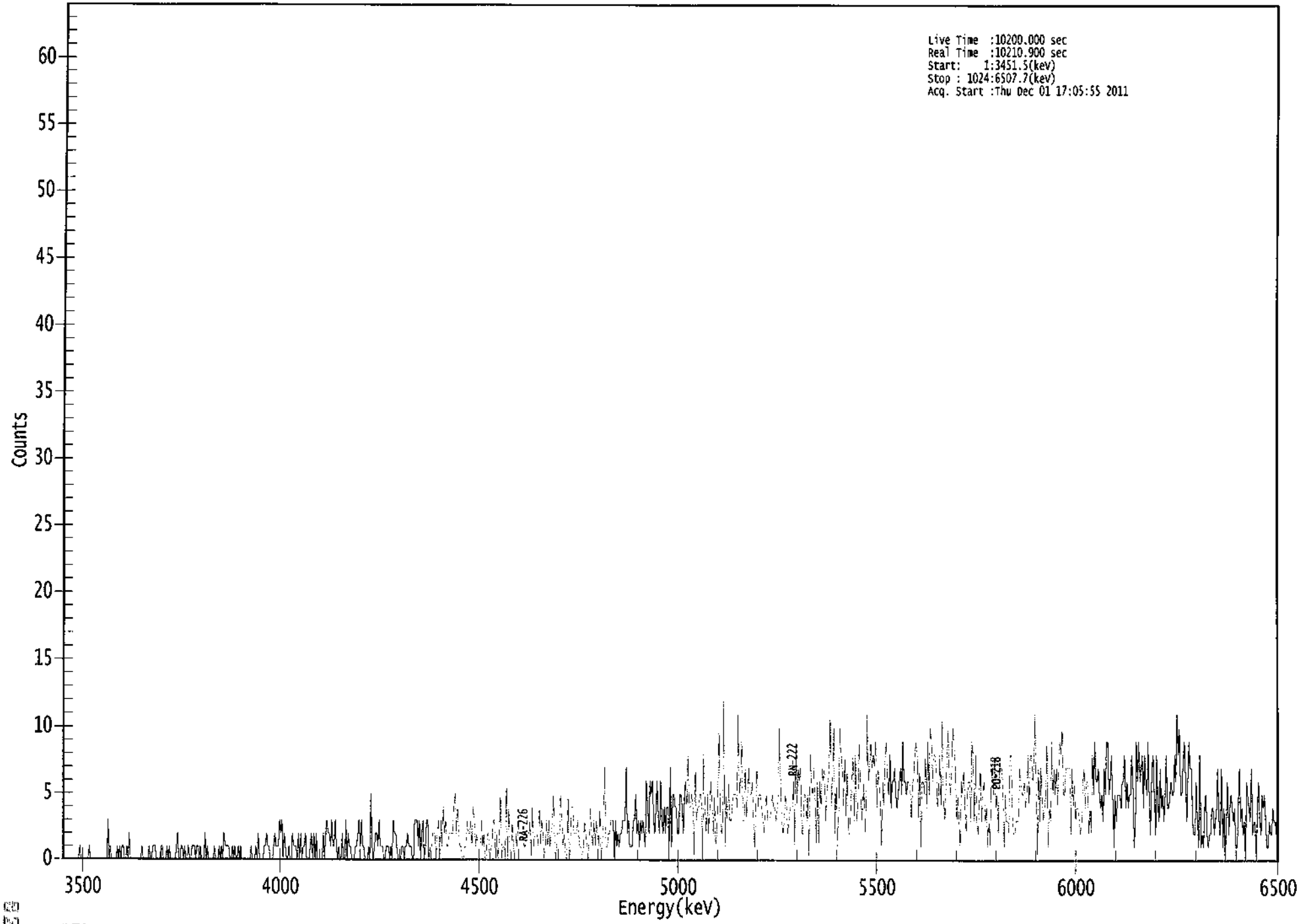
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.804	834.13	6.80	1.87	0.00E+000	5.1
RN-222	5.291	832.32	6.80	0.68	0.00E+000	3.6
RA-226	4.615	287.32	11.58	0.68	0.00E+000	4.4

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.975	6003.00*	2.71E+001 +/- 2.03E+000	2.46E-001 +/- 7.71E-003
RN-222	0.975	5490.00*	2.70E+001 +/- 2.02E+000	1.83E-001 +/- 5.74E-003
RA-226	0.982	4785.00*	9.33E+000 +/- 1.12E+000	1.83E-001 +/- 5.74E-003

AG
12/2/11

0000011025.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	1	0
17:	0	0	0	0	0	0	1	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	3	0
41:	1	0	0	0	0	0	1	0
49:	1	0	1	1	0	0	1	0
57:	2	0	0	0	0	0	0	0
65:	0	0	0	1	0	0	0	0
73:	0	1	0	0	1	1	1	0
81:	0	0	0	1	1	0	0	0
89:	1	0	1	0	0	0	0	0
97:	1	2	0	0	1	1	0	1
105:	0	0	1	0	0	1	1	1
113:	0	1	1	0	1	0	0	0
121:	2	0	1	0	0	0	0	0
129:	1	0	0	0	1	0	1	0
137:	2	1	1	1	1	0	0	1
145:	0	1	0	0	1	0	1	0
153:	0	0	0	0	0	0	0	1
161:	0	0	0	1	0	2	0	0
169:	0	0	1	1	2	1	1	0
177:	0	0	1	2	1	1	1	3
185:	2	3	0	2	1	0	0	1
193:	0	0	2	1	1	1	0	2
201:	0	2	0	1	1	2	0	0
209:	0	1	2	0	2	0	2	0
217:	0	0	0	0	2	0	2	3
225:	2	2	1	3	1	1	3	1
233:	0	1	0	0	2	0	0	3
241:	0	2	1	1	0	0	0	1
249:	1	2	3	1	3	1	1	0
257:	0	0	1	0	5	1	0	1
265:	2	2	1	3	1	1	1	0
273:	0	1	1	1	0	1	0	3
281:	2	2	1	0	0	0	1	1
289:	0	1	1	2	1	1	1	0
297:	0	3	3	3	1	3	0	2
305:	3	0	1	3	3	0	1	0
313:	2	2	2	0	2	3	0	3
321:	1	4	2	3	1	1	2	2
329:	2	2	4	5	2	4	2	1
337:	1	0	0	1	1	3	2	2
345:	3	1	4	3	1	2	1	1
353:	1	3	1	2	0	0	2	2
361:	0	1	1	3	3	0	2	0

369:	2	5	0	1	1	0	6	0

Sample Title: 10

Channel								
377:	4	1	0	3	1	0	2	1
385:	3	2	2	2	2	1	1	2
393:	2	2	3	0	4	1	2	2
401:	2	1	4	1	3	2	0	1
409:	3	1	3	1	2	3	5	1
417:	0	2	2	2	5	3	1	2
425:	0	0	5	0	1	4	4	2
433:	2	2	3	2	1	1	0	1
441:	3	2	1	0	2	4	2	1
449:	3	1	3	2	1	4	0	1
457:	3	7	1	1	2	2	3	3
465:	3	0	3	1	2	1	2	2
473:	3	3	3	7	2	3	1	1
481:	1	3	3	5	2	3	1	3
489:	2	3	2	1	6	4	2	6
497:	5	6	3	2	4	6	3	2
505:	6	3	2	4	2	4	4	0
513:	7	1	5	5	4	4	2	2
521:	5	5	4	2	5	6	4	8
529:	4	4	5	4	0	7	3	4
537:	4	5	5	0	8	4	2	5
545:	2	4	6	4	2	5	1	2
553:	5	10	3	2	3	12	1	5
561:	3	6	3	3	4	5	5	5
569:	4	11	5	6	9	3	3	7
577:	3	5	7	5	5	6	3	1
585:	4	7	4	5	5	4	3	2
593:	4	5	3	3	3	4	5	4
601:	4	3	4	5	10	5	3	2
609:	3	5	4	2	3	4	4	4
617:	6	1	9	4	7	6	7	2
625:	2	5	5	3	5	0	8	6
633:	5	7	5	1	6	1	6	4
641:	7	6	7	3	5	6	7	11
649:	4	6	10	2	6	1	4	10
657:	8	7	4	8	3	7	2	2
665:	4	6	8	3	8	3	4	9
673:	7	3	4	6	2	4	11	6
681:	7	9	7	8	7	9	4	7
689:	6	4	1	6	4	8	9	6
697:	5	8	4	6	6	7	5	4
705:	5	6	7	5	9	6	6	5
713:	6	6	6	3	6	6	8	9
721:	8	3	7	1	6	6	5	8
729:	4	9	5	10	9	6	8	8
737:	7	4	5	8	4	11	5	3
745:	5	8	10	6	5	7	10	9
753:	7	3	5	3	1	6	5	7
761:	4	2	5	6	6	3	9	8
769:	3	8	3	2	5	7	3	5
777:	6	3	4	1	3	1	6	7
785:	5	8	4	5	2	7	7	7
793:	5	1	5	3	3	2	8	8

801:	3	2	2	3	3	3	7	6

Sample Title: 10

Channel								
809:	5	5	6	4	5	8	4	8
817:	8	6	7	11	6	0	7	3
825:	7	5	3	4	5	9	1	4
833:	3	9	5	7	5	7	4	7
841:	9	8	10	5	5	7	7	7
849:	7	2	7	4	6	3	4	4
857:	3	2	3	6	7	4	6	6
865:	2	4	2	8	5	9	6	6
873:	7	5	4	5	3	7	5	9
881:	9	5	6	8	5	1	5	3
889:	5	5	5	4	6	6	8	4
897:	6	4	5	5	8	6	1	3
905:	9	6	9	6	7	8	4	8
913:	6	5	9	4	2	7	8	5
921:	2	8	4	3	7	4	5	3
929:	5	8	4	4	5	6	5	5
937:	8	6	11	8	10	5	5	7
945:	9	7	3	6	9	7	7	3
953:	2	2	6	3	1	8	1	2
961:	1	4	5	2	1	2	2	4
969:	4	2	3	4	7	2	2	7
977:	1	4	0	3	6	2	4	5
985:	4	3	4	1	1	4	7	3
993:	4	2	3	0	6	5	4	3
1001:	7	2	3	3	0	4	6	3
1009:	2	5	4	5	3	1	1	3
1017:	2	2	4	3	3	2	7	4

Apex-Alpha™

12/2/11

Sample Description: IB1/2-4A
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011030.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 10021
Reagent Blank: <not performed>

Sample Size: 5.146E-001 +/- 0.000E+000 gram
Generic Mult. Factor: 1.910E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:56 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9054 +/- 0.0000
Counting Efficiency: 0.2025 +/- 0.0032 on 8/30/2011 7:35:03 PM
Effective Efficiency: 0.1834 +/- 0.0029

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.800	271.49	11.91	0.51	0.00E+000	5.2
RN-222	5.284	277.15	11.79	0.85	0.00E+000	4.0
RA-226	4.595	181.83	14.54	0.17	0.00E+000	4.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	1.46E+001 +/- 1.79E+000	2.81E-001 +/- 8.81E-003
RN-222	0.973	5490.00*	1.49E+001 +/- 1.82E+000	3.21E-001 +/- 1.01E-002
RA-226	0.977	4785.00*	9.75E+000 +/- 1.45E+000	2.24E-001 +/- 7.00E-003

AG
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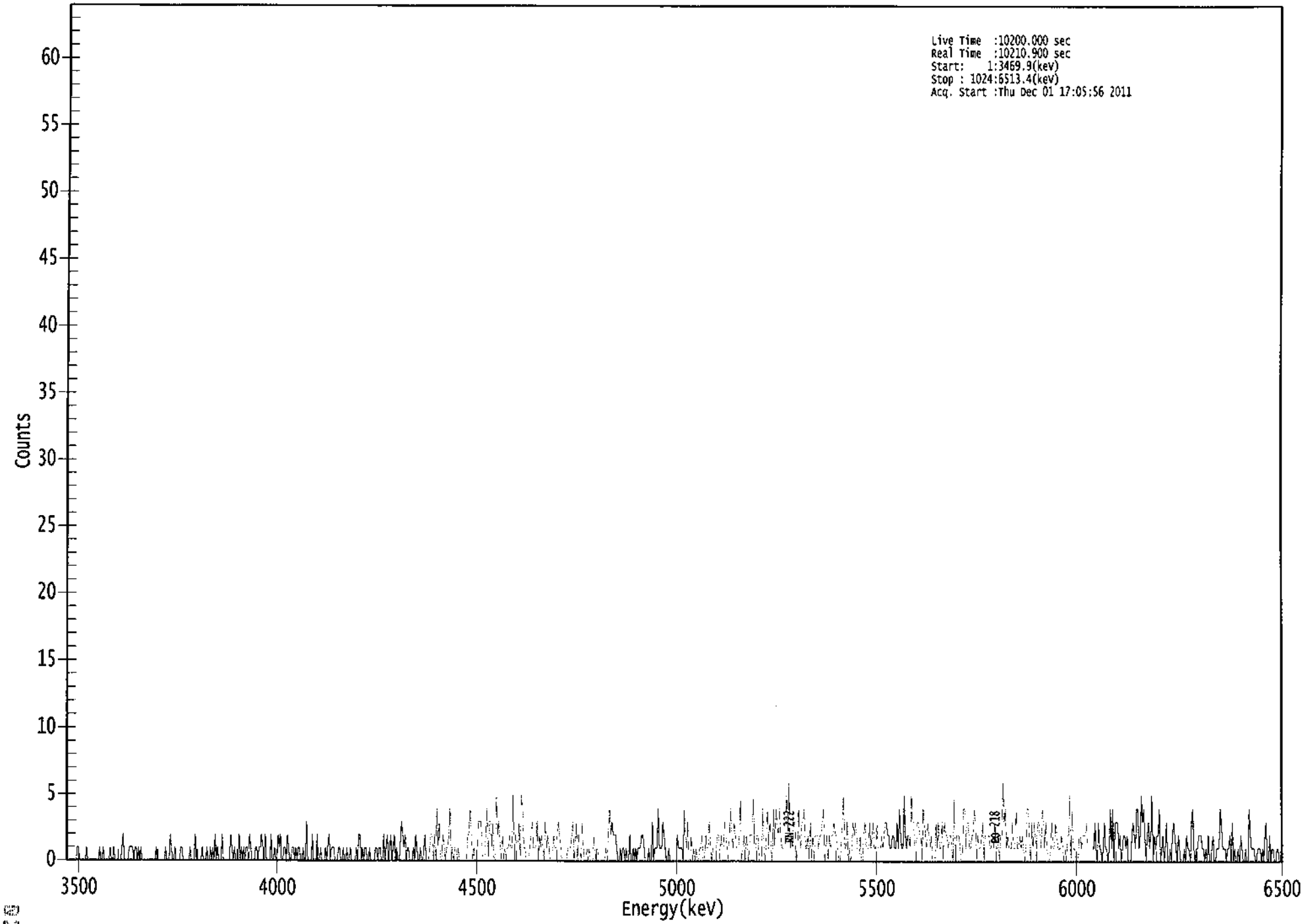
0000011030.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	1	1	0	0	0	0	0
17:	0	1	0	0	0	0	0	0
25:	0	0	0	0	1	0	0	1
33:	0	0	0	0	0	1	0	0
41:	1	0	0	0	0	0	0	1
49:	2	0	0	0	0	1	1	1
57:	1	0	1	1	0	1	0	1
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	1	0	0	0
81:	0	0	0	0	1	0	0	0
89:	2	1	0	0	1	0	0	0
97:	0	1	1	0	0	0	0	0
105:	0	1	0	0	0	2	0	0
113:	0	0	0	1	0	0	0	1
121:	0	0	1	0	1	0	2	0
129:	1	0	0	0	2	0	0	0
137:	0	0	0	2	1	0	1	0
145:	0	0	2	0	1	0	1	0
153:	1	1	0	2	1	0	0	0
161:	1	1	0	1	1	2	1	0
169:	2	0	0	0	0	2	0	0
177:	1	0	0	2	1	2	0	0
185:	1	1	0	2	1	0	0	1
193:	1	0	1	0	1	1	0	0
201:	1	0	0	3	0	0	0	0
209:	2	0	0	0	2	0	0	1
217:	0	0	0	1	0	1	2	0
225:	1	1	1	0	0	0	1	1
233:	0	0	1	0	0	1	0	0
241:	1	0	0	0	0	1	0	2
249:	2	0	1	0	1	1	0	0
257:	1	0	0	0	0	1	1	0
265:	1	1	0	0	2	0	1	2
273:	0	1	2	0	1	2	0	1
281:	0	0	1	3	2	1	2	0
289:	1	1	0	0	0	1	0	2
297:	1	0	0	1	0	0	1	2
305:	0	0	0	1	2	2	0	2
313:	0	4	1	3	0	0	2	1
321:	0	1	1	2	4	0	1	0
329:	1	1	0	1	0	0	0	0
337:	0	0	0	2	2	4	2	0
345:	1	0	0	1	3	3	3	1
353:	0	0	2	4	0	3	3	1
361:	3	0	0	5	2	3	1	0

369:	2	0	1	0	1	1	2	1

Sample Title: 11

Channel								
377:	1	5	0	2	1	1	3	0
385:	5	4	1	1	0	0	0	1
393:	2	3	1	1	1	3	0	2
401:	1	2	1	0	3	1	2	1
409:	0	0	0	2	1	1	2	3
417:	2	1	0	0	0	0	0	1
425:	1	1	2	3	0	1	3	0
433:	2	1	0	3	1	0	0	1
441:	0	1	0	0	0	2	0	1
449:	1	0	0	0	0	0	0	1
457:	0	2	4	2	3	2	2	2
465:	1	0	0	1	0	1	1	0
473:	1	0	0	2	0	0	1	0
481:	1	0	1	1	1	2	2	1
489:	0	0	0	1	0	0	3	0
497:	1	1	1	4	1	1	1	3
505:	2	1	0	0	1	0	0	0
513:	0	0	0	2	1	1	1	1
521:	0	4	2	1	3	0	0	2
529:	0	1	0	1	0	0	1	1
537:	2	0	0	2	1	1	3	1
545:	0	1	1	1	1	2	2	0
553:	2	1	1	3	2	1	0	2
561:	4	2	1	3	2	1	1	1
569:	5	0	1	2	0	2	1	0
577:	2	2	2	5	1	1	2	2
585:	0	0	0	4	1	0	2	4
593:	1	3	1	0	4	1	4	3
601:	2	4	2	1	1	1	1	5
609:	2	6	1	2	1	3	3	0
617:	0	4	2	1	3	3	4	1
625:	1	2	0	3	0	2	0	2
633:	2	2	1	2	2	3	4	0
641:	1	2	0	2	1	2	2	3
649:	2	2	1	0	0	1	3	5
657:	1	1	3	0	1	0	1	3
665:	2	3	2	0	0	2	0	0
673:	2	3	1	1	1	3	1	2
681:	3	1	1	3	1	1	1	2
689:	1	2	3	3	2	2	1	1
697:	2	2	1	1	3	1	4	2
705:	1	1	5	2	1	2	2	1
713:	5	3	3	1	1	3	3	2
721:	2	0	4	3	2	1	3	2
729:	1	2	0	0	0	3	1	3
737:	1	1	3	0	3	2	2	1
745:	2	2	1	0	5	0	2	2
753:	2	1	0	0	4	4	1	3
761:	3	1	1	2	2	4	3	0
769:	2	1	1	2	3	0	2	2
777:	2	2	1	1	2	1	3	1
785:	1	2	0	2	2	6	3	4
793:	1	2	1	1	1	3	1	1

801:	4	1	1	2	1	2	1	0

Sample Title: 11

Channel								
809:	1	4	4	2	0	3	1	3
817:	2	1	3	3	2	1	4	3
825:	1	3	1	0	0	1	3	1
833:	1	3	2	1	1	1	2	1
841:	0	1	0	2	2	5	0	4
849:	1	1	0	0	0	2	2	1
857:	2	2	2	3	1	1	1	1
865:	1	1	3	1	0	3	1	1
873:	0	1	3	1	1	0	1	4
881:	1	4	0	3	3	3	1	2
889:	0	1	2	2	1	2	0	0
897:	0	2	3	2	1	4	4	1
905:	2	5	3	4	2	0	2	3
913:	1	2	5	0	2	1	2	2
921:	4	0	1	2	0	1	3	0
929:	0	1	0	2	3	2	1	0
937:	2	1	0	0	0	1	0	2
945:	1	1	0	3	4	1	0	1
953:	1	2	2	2	1	1	0	1
961:	0	2	0	0	1	2	0	0
969:	1	1	1	4	3	1	1	1
977:	0	1	1	2	0	3	0	1
985:	0	0	1	0	2	1	0	0
993:	1	0	0	4	2	1	1	1
1001:	0	0	1	1	1	0	1	0
1009:	2	3	0	0	2	0	1	1
1017:	0	0	1	1	0	0	2	0

Apex-Alpha™

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Sample Description: IB1/2-4B
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011035.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 10022
Reagent Blank: <not performed>

Sample Size: 1.046E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.530E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:05:58 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.7976 +/- 0.0000
Counting Efficiency: 0.1937 +/- 0.0031 on 8/30/2011 7:35:02 PM
Effective Efficiency: 0.1545 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.812	397.49	9.84	0.51	0.00E+000	4.1
RN-222	5.286	441.98	9.34	1.02	0.00E+000	3.7
RA-226	4.611	332.66	10.75	0.34	0.00E+000	3.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	1.65E+001 +/- 1.70E+000	2.18E-001 +/- 6.83E-003
RN-222	0.974	5490.00*	1.83E+001 +/- 1.81E+000	2.61E-001 +/- 8.20E-003
RA-226	0.981	4785.00*	1.38E+001 +/- 1.55E+000	1.98E-001 +/- 6.22E-003

AG
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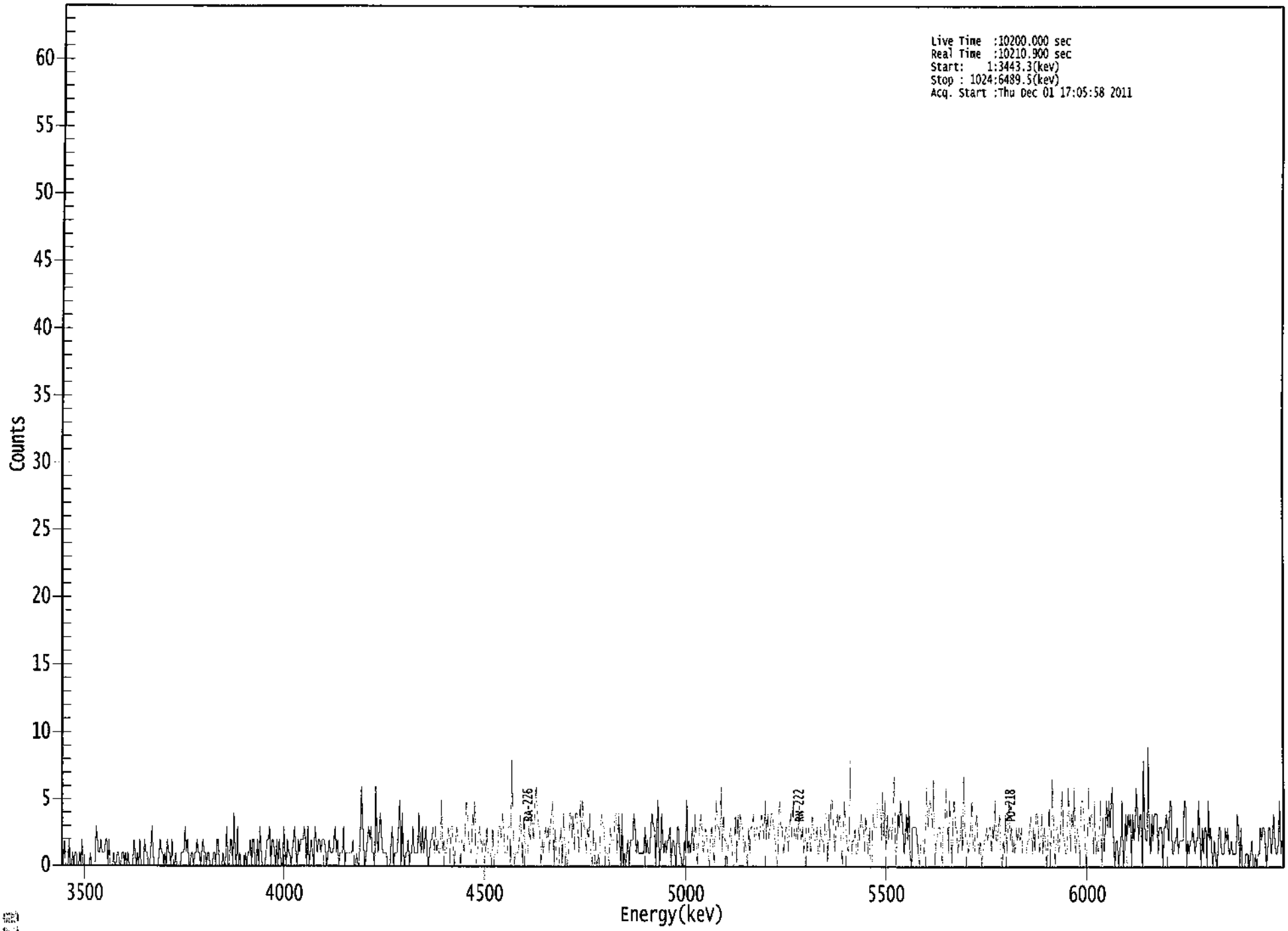
0000011035.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 12

Elapsed Live time: 10200
Elapsed Real Time: 10211

Channel								
1:	1	0	2	0	0	0	2	0
9:	0	1	0	1	1	0	0	1
17:	0	2	0	0	0	0	0	0
25:	1	0	0	0	0	3	2	1
33:	1	2	1	1	1	2	2	0
41:	2	0	0	0	1	0	0	1
49:	1	0	0	1	1	0	1	0
57:	1	0	0	0	0	2	1	0
65:	1	0	2	0	0	0	2	1
73:	1	0	0	1	3	1	0	0
81:	0	0	1	2	1	1	0	1
89:	0	2	1	1	0	2	0	0
97:	1	0	0	0	0	1	1	1
105:	3	1	2	0	0	1	1	0
113:	1	1	2	1	1	0	1	2
121:	1	1	0	1	1	0	0	0
129:	1	1	0	2	2	0	0	0
137:	1	0	0	3	0	0	2	2
145:	0	4	1	0	3	0	1	0
153:	0	0	0	1	0	1	1	2
161:	0	2	2	0	0	2	0	3
169:	1	0	0	0	1	2	2	3
177:	0	2	2	1	0	2	0	2
185:	1	0	0	3	1	0	2	1
193:	1	0	1	2	3	1	0	2
201:	1	2	2	2	3	2	0	3
209:	0	1	2	1	0	3	2	1
217:	2	2	1	2	2	2	1	0
225:	1	2	1	1	1	2	3	1
233:	2	0	1	1	1	3	0	1
241:	1	1	1	1	1	2	0	0
249:	1	0	0	3	6	3	1	0
257:	1	2	3	2	3	1	1	0
265:	6	2	1	3	4	2	1	1
273:	1	1	0	0	0	2	3	0
281:	1	1	1	3	5	0	4	1
289:	0	1	1	2	0	1	1	3
297:	1	1	1	1	4	2	1	3
305:	1	2	3	1	0	1	2	2
313:	3	1	3	1	2	1	1	5
321:	1	2	1	1	2	3	0	3
329:	3	1	0	2	3	2	2	0
337:	2	2	1	3	5	4	2	1
345:	1	4	3	5	0	1	2	3
353:	2	1	2	2	1	3	1	1
361:	1	0	3	0	1	1	1	3

369:	3	2	4	3	1	1	1	3

Sample Title: 12

Channel								
377:	3	0	8	3	0	1	1	1
385:	2	4	2	0	4	1	1	1
393:	3	2	4	3	2	5	6	4
401:	3	3	0	2	1	2	3	2
409:	3	1	3	4	5	0	3	1
417:	0	0	2	3	0	4	2	1
425:	0	1	4	4	2	4	1	4
433:	4	3	1	5	2	5	3	3
441:	1	3	2	4	1	0	3	0
449:	2	0	1	0	3	4	3	3
457:	1	1	1	0	3	2	2	2
465:	4	4	1	4	2	0	4	0
473:	1	0	1	2	0	2	2	2
481:	4	3	1	2	1	1	1	1
489:	1	3	1	2	1	1	3	4
497:	3	3	0	3	5	0	1	4
505:	2	1	2	1	2	2	3	0
513:	2	2	1	0	3	3	1	1
521:	0	0	2	1	5	1	2	1
529:	2	3	1	4	2	0	2	3
537:	4	3	1	2	3	2	1	0
545:	2	3	2	0	3	5	3	3
553:	2	6	1	4	2	2	0	2
561:	2	3	2	0	0	4	0	4
569:	2	4	3	3	1	2	1	0
577:	3	1	3	3	4	2	2	3
585:	3	2	3	4	3	2	5	2
593:	4	2	3	4	4	3	2	1
601:	0	4	5	3	3	1	2	3
609:	3	1	3	4	2	5	2	2
617:	3	2	4	3	2	3	1	2
625:	3	1	3	2	1	4	3	2
633:	2	3	1	1	3	2	2	1
641:	4	4	0	4	2	5	5	3
649:	1	3	4	3	4	3	0	2
657:	5	3	2	1	2	8	1	2
665:	2	3	1	1	3	2	4	3
673:	3	1	4	2	1	3	0	0
681:	4	3	3	3	5	5	5	2
689:	6	2	5	1	4	2	3	3
697:	2	5	7	0	2	4	3	5
705:	4	3	1	2	4	2	5	1
713:	0	3	3	3	3	2	1	0
721:	2	2	2	1	3	6	3	4
729:	5	4	3	7	0	2	2	3
737:	3	2	0	3	3	6	4	1
745:	5	3	0	4	5	3	3	1
753:	2	2	4	1	7	3	2	2
761:	1	2	3	5	1	1	3	4
769:	2	1	2	0	1	2	2	3
777:	2	3	3	1	3	2	5	2
785:	2	3	4	1	0	2	1	4
793:	1	3	5	2	3	1	2	1

801:	3	2	3	2	3	1	1	1

Sample Title: 12

Channel								
809:	1	2	2	3	4	1	3	1
817:	4	4	3	1	2	4	1	3
825:	2	0	1	5	0	3	7	2
833:	0	3	3	1	2	4	6	2
841:	2	1	1	6	4	1	4	3
849:	6	1	2	3	2	0	5	5
857:	4	2	0	2	6	3	4	4
865:	1	5	1	2	1	3	5	0
873:	4	1	3	5	3	5	3	5
881:	6	2	0	2	2	0	1	2
889:	5	0	1	4	2	4	3	4
897:	0	4	2	3	6	4	2	4
905:	4	0	8	3	2	2	9	2
913:	1	4	2	4	4	4	1	3
921:	3	3	0	3	3	4	3	2
929:	5	5	1	1	2	2	3	1
937:	2	2	2	2	5	5	0	2
945:	1	2	2	3	2	1	2	2
953:	5	2	0	3	1	3	3	0
961:	5	2	3	1	0	2	1	0
969:	1	3	3	1	1	1	3	2
977:	3	1	1	2	1	1	1	1
985:	4	3	0	3	0	0	0	1
993:	1	1	0	1	2	0	0	1
1001:	0	1	1	3	2	3	3	2
1009:	0	1	3	3	1	2	4	2
1017:	1	1	2	5	1	2	1	1

Apex-Alpha™

12/2/11

Sample Description: IB1/2-4C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011020.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 10023
Reagent Blank: <not performed>

Sample Size: 1.007E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.120E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:00 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8146 +/- 0.0000
Counting Efficiency: 0.1901 +/- 0.0030 on 8/30/2011 7:35:01 PM
Effective Efficiency: 0.1549 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

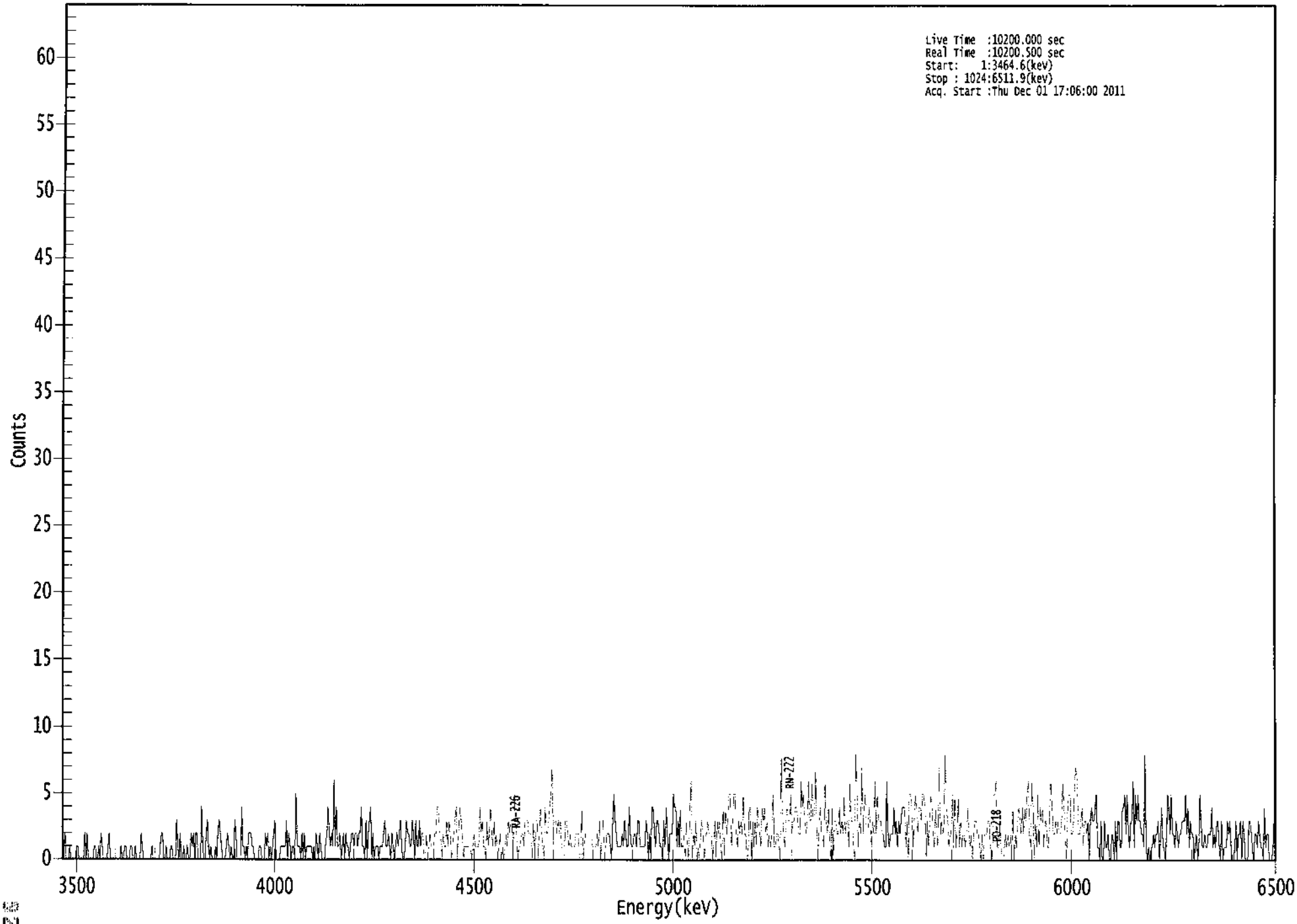
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.814	418.15	9.60	0.85	0.00E+000	5.4
RN-222	5.297	451.00	9.24	0.00	0.00E+000	4.5
RA-226	4.609	273.00	11.88	0.00	0.00E+000	9.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.978	6003.00*	1.51E+001 +/- 1.52E+000	2.16E-001 +/- 6.77E-003
RN-222	0.976	5490.00*	1.63E+001 +/- 1.59E+000	2.16E-001 +/- 6.79E-003
RA-226	0.980	4785.00*	9.83E+000 +/- 1.21E+000	2.16E-001 +/- 6.78E-003

AG
12/2/11

0000011020.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 13

Elapsed Live time: 10200
Elapsed Real Time: 10201

Channel								
1:	0	0	2	0	0	0	1	0
9:	0	0	0	0	1	1	0	0
17:	0	0	0	2	0	2	0	0
25:	0	0	0	1	1	0	0	1
33:	0	2	1	0	0	0	0	1
41:	2	0	0	0	0	0	0	0
49:	0	0	1	0	0	1	1	0
57:	0	0	1	1	0	0	1	0
65:	0	0	0	2	1	0	0	0
73:	0	0	0	0	1	0	0	0
81:	0	0	0	1	2	2	0	0
89:	1	0	0	0	1	1	0	0
97:	0	3	1	0	2	0	0	1
105:	0	0	1	0	0	2	1	2
113:	0	2	2	0	0	0	4	1
121:	0	0	2	3	1	0	1	0
129:	0	0	1	0	2	3	2	1
137:	0	0	0	1	2	1	0	1
145:	0	0	3	2	0	0	0	0
153:	4	1	1	0	1	0	2	2
161:	2	1	1	0	0	0	0	1
169:	1	0	0	0	2	1	2	0
177:	1	0	1	2	3	0	0	0
185:	0	1	1	1	1	1	3	0
193:	2	1	0	1	1	0	5	1
201:	1	1	0	2	0	2	0	1
209:	1	1	1	1	0	1	0	2
217:	1	0	2	1	0	0	0	1
225:	2	4	2	1	2	1	6	1
233:	4	1	1	2	0	1	2	0
241:	2	1	1	0	1	2	2	1
249:	2	2	1	2	2	4	1	1
257:	0	3	0	2	3	4	0	2
265:	0	1	1	1	0	1	1	1
273:	2	3	1	1	2	1	0	2
281:	1	0	1	2	1	2	3	1
289:	0	0	1	3	2	2	1	1
297:	3	2	0	3	1	1	3	1
305:	2	2	0	0	2	0	1	2
313:	1	1	1	2	2	4	4	2
321:	2	0	2	1	1	3	1	3
329:	2	0	1	2	3	4	0	2
337:	4	3	2	0	1	1	1	1
345:	1	1	0	1	2	1	1	1
353:	1	4	2	3	1	1	0	3
361:	1	2	4	2	1	3	1	2

369:	0	1	2	0	1	0	1	2

Sample Title: 13

Channel								
377:	1	3	2	3	3	0	5	3
385:	2	0	1	1	2	2	1	3
393:	3	3	2	2	2	0	3	0
401:	3	3	0	2	4	2	1	0
409:	4	2	2	3	4	5	7	1
417:	3	3	2	3	2	3	1	0
425:	0	3	3	2	1	2	1	1
433:	1	1	2	2	2	0	0	4
441:	0	1	2	2	2	2	2	2
449:	1	1	1	1	2	1	3	0
457:	2	3	0	1	2	2	2	1
465:	0	3	5	3	2	1	1	1
473:	1	2	1	3	2	1	1	4
481:	2	1	1	2	2	1	3	3
489:	1	1	1	1	1	3	2	0
497:	2	0	4	4	2	1	3	3
505:	2	1	1	0	3	1	4	2
513:	0	2	2	2	5	4	4	1
521:	3	1	4	1	1	2	0	3
529:	1	0	4	6	0	2	1	3
537:	0	1	0	2	3	2	0	2
545:	2	3	2	2	2	0	1	3
553:	0	3	2	3	1	0	4	0
561:	4	2	3	5	5	1	3	5
569:	5	2	1	3	2	3	2	5
577:	2	2	0	0	4	4	0	3
585:	1	3	1	4	3	2	1	4
593:	3	4	2	3	1	2	1	2
601:	5	1	1	2	2	1	0	8
609:	4	2	1	3	4	3	3	5
617:	2	3	3	4	4	3	2	2
625:	6	4	5	3	2	3	6	3
633:	3	6	3	3	7	2	0	3
641:	4	2	2	1	6	3	2	4
649:	1	0	4	0	3	3	2	2
657:	4	2	3	2	5	2	3	3
665:	1	6	3	3	1	0	8	5
673:	1	3	2	7	2	4	5	2
681:	2	4	3	1	3	2	6	2
689:	5	3	3	3	2	2	1	1
697:	6	2	1	2	2	2	4	2
705:	3	1	3	2	3	4	4	4
713:	1	3	0	5	5	4	1	3
721:	5	4	2	4	4	3	5	5
729:	4	0	3	1	3	5	4	2
737:	1	4	2	1	7	2	3	2
745:	3	8	4	3	1	2	2	5
753:	1	5	1	2	5	1	3	1
761:	2	2	1	2	4	2	1	2
769:	0	2	3	3	2	2	1	0
777:	2	0	2	2	2	3	3	1
785:	0	1	5	5	6	1	1	3
793:	1	0	0	1	2	1	2	1

801:	2	0	4	0	2	1	3	4

Sample Title: 13

Channel								
809:	3	2	4	2	4	3	5	6
817:	2	1	6	4	0	3	1	5
825:	1	4	3	4	1	3	3	1
833:	1	4	6	4	2	2	3	2
841:	3	2	2	3	6	4	2	0
849:	4	5	5	2	2	3	6	7
857:	6	2	2	3	4	1	3	3
865:	2	3	0	3	4	3	3	4
873:	5	1	1	0	3	0	0	3
881:	1	1	2	0	0	2	2	0
889:	3	0	3	3	1	1	4	4
897:	5	2	5	2	1	3	3	6
905:	1	5	3	5	3	3	2	2
913:	1	8	1	0	1	0	1	1
921:	2	1	2	2	3	0	2	4
929:	1	1	0	2	5	4	2	5
937:	2	2	1	3	2	1	2	2
945:	3	3	3	5	2	4	1	3
953:	2	2	0	1	2	0	1	5
961:	3	1	1	2	1	1	2	2
969:	2	4	1	2	1	3	3	1
977:	0	3	0	1	1	1	3	2
985:	3	1	0	0	1	3	0	2
993:	2	3	0	3	2	0	0	0
1001:	3	3	2	1	0	2	2	1
1009:	3	2	1	1	0	4	1	2
1017:	2	0	0	0	1	3	3	3

Apex-Alpha™

12/2/14

Sample Description: IB1/2-4D
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011021.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 14
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 10024
Reagent Blank: <not performed>

Sample Size: 9.994E-001 +/- 0.000E+000 gram
Generic Mult. Factor: 1.950E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:02 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8533 +/- 0.0000
Counting Efficiency: 0.1773 +/- 0.0035 on 10/23/2011 12:17:07 PM
Effective Efficiency: 0.1513 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.825	391.32	9.92	0.68	0.00E+000	4.6
RN-222	5.292	375.00	10.13	0.00	0.00E+000	4.0
RA-226	4.596	252.83	12.33	0.17	0.00E+000	9.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.980	6003.00*	1.34E+001 +/- 1.42E+000	1.93E-001 +/- 7.45E-003
RN-222	0.975	5490.00*	1.28E+001 +/- 1.39E+000	2.05E-001 +/- 7.92E-003
RA-226	0.977	4785.00*	8.64E+000 +/- 1.12E+000	1.43E-001 +/- 5.51E-003

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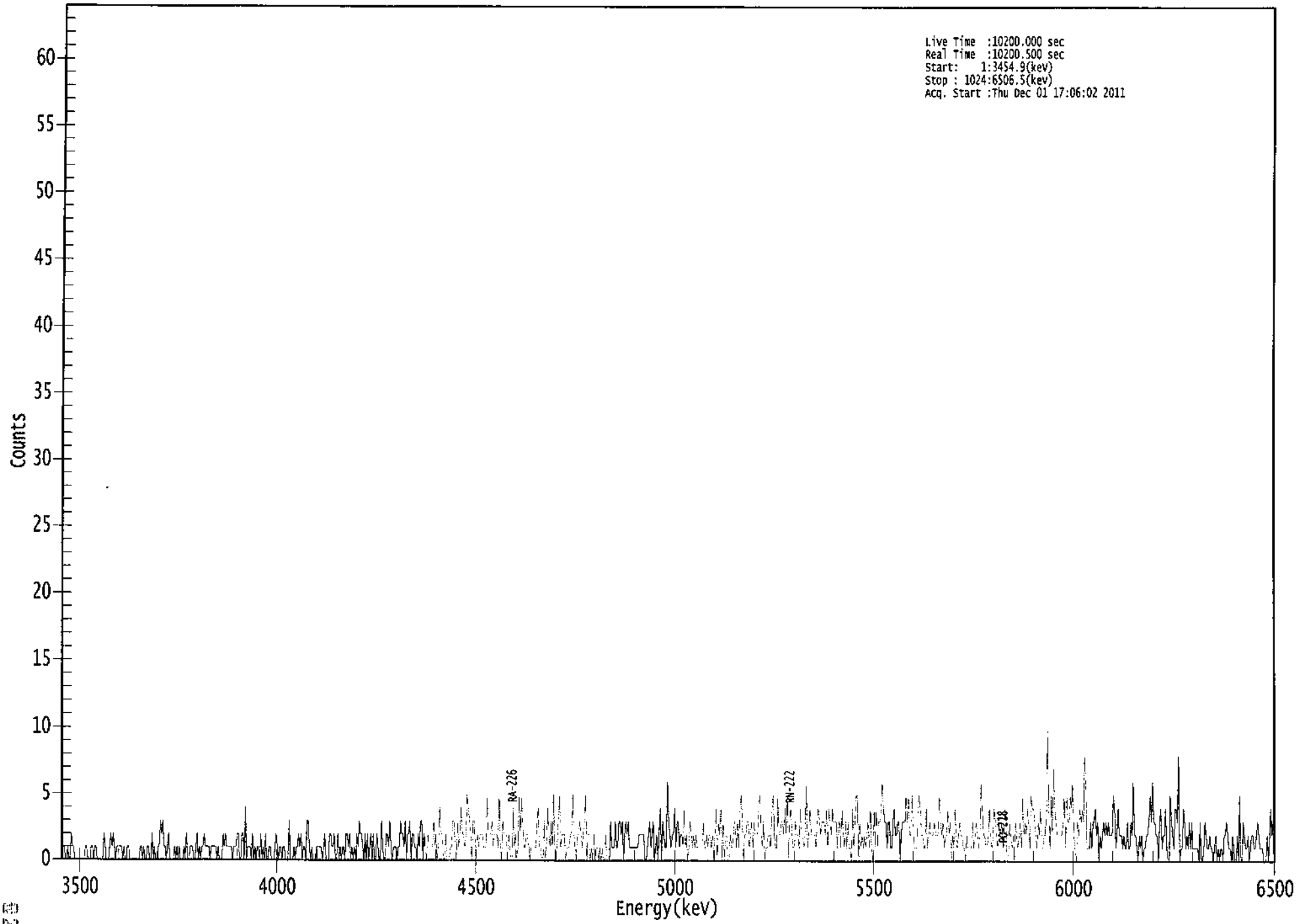
12/2/11

0000011021.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 14

Elapsed Live time: 10200
Elapsed Real Time: 10201

Channel								
1:	0	1	1	0	0	1	0	0
9:	2	1	1	0	0	0	0	0
17:	0	0	0	0	1	1	0	0
25:	0	1	1	0	1	1	0	0
33:	0	0	0	0	2	1	0	0
41:	0	1	2	1	2	1	0	1
49:	1	1	1	1	0	1	0	0
57:	1	1	0	0	0	0	0	0
65:	0	0	0	1	1	0	1	0
73:	0	1	1	0	0	2	0	1
81:	0	0	1	1	3	2	3	1
89:	1	0	1	2	0	0	0	0
97:	1	0	1	0	1	0	0	0
105:	1	0	2	0	0	1	1	1
113:	0	0	1	2	0	1	0	1
121:	1	2	1	1	1	1	0	1
129:	1	1	1	1	0	1	0	0
137:	0	2	1	2	1	1	1	1
145:	1	0	1	1	1	2	2	0
153:	0	2	2	0	4	0	1	1
161:	1	0	2	0	1	0	1	1
169:	0	2	0	1	0	2	0	0
177:	1	1	0	0	0	1	2	1
185:	0	1	1	0	1	1	0	0
193:	0	3	0	0	0	1	0	1
201:	1	2	1	2	0	1	1	0
209:	3	3	1	0	1	0	0	0
217:	1	1	1	1	1	0	1	2
225:	0	0	0	2	2	1	1	2
233:	0	0	2	0	1	0	1	1
241:	0	2	2	1	2	0	1	0
249:	1	0	2	1	3	2	2	1
257:	0	2	0	2	0	1	2	0
265:	2	0	0	2	1	0	0	3
273:	1	0	0	2	2	1	3	1
281:	0	1	1	1	0	1	1	3
289:	2	2	1	3	0	2	2	3
297:	0	2	2	1	1	0	2	1
305:	3	3	0	2	1	0	2	1
313:	1	1	1	3	1	2	0	1
321:	4	2	2	0	0	2	0	0
329:	0	1	1	3	3	1	0	3
337:	1	2	4	2	2	1	2	5
345:	4	3	2	0	3	3	1	1
353:	2	1	2	2	2	1	1	1
361:	5	2	2	2	3	1	2	2

369:	2	1	5	1	0	3	2	2

Sample Title: 14

Channel								
377:	2	0	2	1	0	0	4	1
385:	2	0	1	5	2	5	3	1
393:	1	2	2	1	0	1	1	1
401:	1	1	3	4	1	1	0	0
409:	3	0	1	4	2	1	3	1
417:	5	1	0	1	3	5	1	2
425:	2	2	0	1	1	1	2	2
433:	5	2	1	0	2	2	3	2
441:	1	2	3	5	0	2	2	0
449:	1	0	2	0	1	1	0	1
457:	0	1	0	0	2	0	0	0
465:	3	1	1	1	3	1	1	3
473:	3	2	3	0	2	3	2	3
481:	1	1	1	1	1	1	1	1
489:	2	2	2	2	2	0	0	1
497:	2	3	1	2	3	0	1	2
505:	0	2	4	0	3	2	1	1
513:	6	3	2	1	2	2	4	1
521:	3	3	1	2	2	1	4	1
529:	2	0	1	3	2	1	2	1
537:	2	1	1	1	1	1	3	1
545:	1	2	1	2	2	1	2	0
553:	2	4	0	3	2	4	0	3
561:	0	2	2	0	0	2	1	1
569:	3	3	1	3	1	4	5	3
577:	0	2	2	3	3	1	2	3
585:	1	3	2	2	2	4	5	2
593:	1	3	0	1	1	2	2	1
601:	4	5	2	1	1	5	2	2
609:	3	3	2	4	2	5	0	3
617:	4	2	1	1	3	2	2	1
625:	4	2	2	1	2	6	1	2
633:	4	2	2	2	2	1	3	4
641:	3	2	3	3	3	2	4	1
649:	4	3	2	4	3	3	3	1
657:	3	3	1	4	2	1	3	1
665:	3	1	1	0	4	1	3	5
673:	5	0	3	1	2	1	2	1
681:	2	3	1	4	1	0	4	1
689:	4	1	3	3	4	6	4	3
697:	3	1	3	3	1	1	3	4
705:	2	2	3	3	0	2	3	3
713:	3	5	3	5	2	2	5	3
721:	1	1	1	4	5	4	2	2
729:	1	1	4	1	2	3	2	2
737:	2	3	2	2	2	5	3	2
745:	3	1	2	2	4	2	3	0
753:	2	1	4	2	1	2	3	2
761:	2	1	1	0	2	1	1	1
769:	1	3	1	2	3	2	1	2
777:	6	4	2	2	1	1	2	4
785:	2	1	2	4	3	2	1	3
793:	2	3	2	1	4	3	0	0

801:	3	2	1	2	0	3	2	1

Sample Title: 14

Channel								
809:	2	3	1	5	2	3	2	4
817:	3	1	5	4	4	3	2	1
825:	3	2	4	1	1	2	2	4
833:	10	3	1	5	2	7	4	3
841:	2	2	2	2	2	3	5	1
849:	5	3	3	5	4	6	2	1
857:	0	3	2	4	3	4	3	8
865:	6	1	1	1	3	1	3	3
873:	4	2	3	0	2	1	2	3
881:	2	3	2	3	2	2	2	5
889:	4	1	2	4	2	2	2	1
897:	2	1	1	3	1	1	3	2
905:	6	2	2	1	0	2	1	2
913:	0	1	1	2	2	3	5	3
921:	6	3	3	2	2	0	3	4
929:	1	2	2	4	1	0	0	5
937:	3	2	1	4	4	3	8	0
945:	1	1	4	3	1	2	1	3
953:	1	3	1	1	1	1	1	0
961:	3	0	0	1	3	2	1	1
969:	2	1	1	0	1	2	0	1
977:	0	1	1	0	2	2	3	2
985:	1	1	0	2	1	0	0	2
993:	0	5	0	0	3	2	1	1
1001:	2	0	1	2	2	1	1	2
1009:	3	2	1	1	1	0	0	0
1017:	2	0	2	4	2	3	2	1

Apex-Alpha™

12/2/11

Sample Description: IB1/2-4E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011029.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 15
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 10025
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.160E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:04 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9004 +/- 0.0000
Counting Efficiency: 0.1714 +/- 0.0028 on 8/30/2011 7:34:58 PM
Effective Efficiency: 0.1543 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.799	345.66	10.55	0.34	0.00E+000	4.6
RN-222	5.291	397.83	9.83	0.17	0.00E+000	3.5
RA-226	4.620	246.00	12.52	0.00	0.00E+000	4.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	1.26E+001 +/- 1.38E+000	1.74E-001 +/- 5.49E-003
RN-222	0.975	5490.00*	1.45E+001 +/- 1.49E+000	1.52E-001 +/- 4.80E-003
RA-226	0.983	4785.00*	8.94E+000 +/- 1.15E+000	2.18E-001 +/- 6.88E-003

AG
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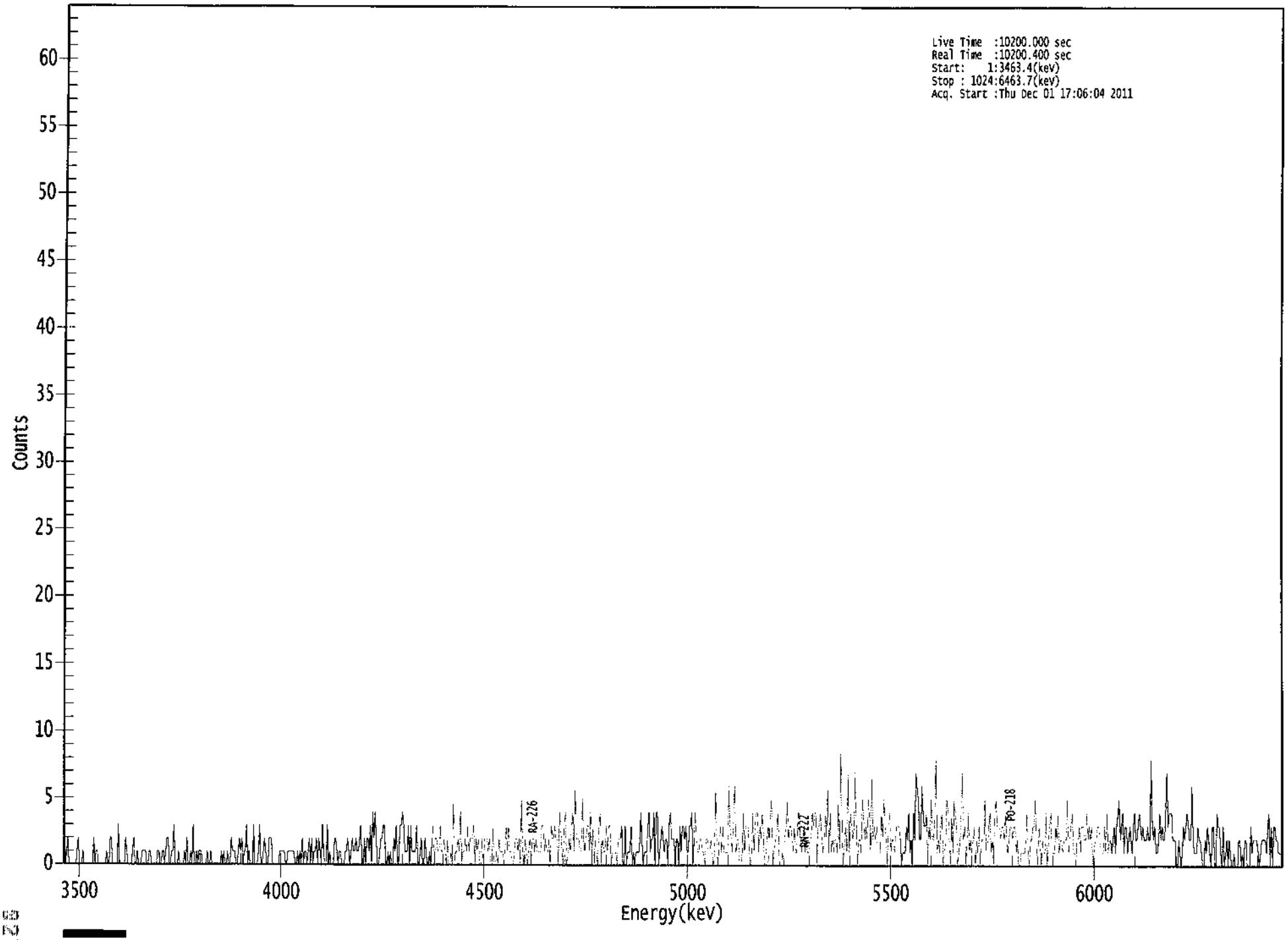
0000011029.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 15

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	1	2	0	0	0	0
9:	0	0	0	1	2	0	0	0
17:	1	0	0	0	0	0	0	0
25:	0	2	0	1	1	0	0	0
33:	0	0	0	0	1	0	0	2
41:	2	0	0	0	0	0	3	0
49:	0	0	0	0	2	1	0	0
57:	0	0	1	2	0	0	1	0
65:	0	0	1	1	1	1	0	0
73:	1	1	0	0	0	0	0	1
81:	1	0	0	1	1	0	1	2
89:	2	0	0	1	1	3	0	0
97:	0	1	0	0	0	0	1	0
105:	2	0	0	1	0	3	0	0
113:	1	0	1	1	1	0	0	0
121:	0	1	0	0	1	0	0	0
129:	0	0	0	0	0	1	0	1
137:	0	0	1	0	0	2	1	1
145:	1	0	0	1	2	1	2	0
153:	1	1	3	0	1	0	0	0
161:	3	0	0	0	1	3	0	0
169:	1	2	1	0	0	2	2	2
177:	0	0	0	0	0	0	1	1
185:	1	1	1	0	0	1	1	1
193:	1	1	1	0	0	1	0	1
201:	0	2	0	1	1	0	1	2
209:	0	2	0	1	1	2	0	2
217:	1	0	3	1	0	0	3	0
225:	1	0	0	0	2	2	1	0
233:	1	1	0	0	0	1	1	2
241:	1	0	1	2	1	1	2	1
249:	1	2	3	0	0	2	0	2
257:	2	1	3	0	4	2	4	2
265:	0	0	1	2	2	3	3	0
273:	0	1	0	1	0	0	2	1
281:	3	0	0	3	3	4	3	1
289:	1	1	3	0	3	1	1	1
297:	1	3	0	0	1	2	0	0
305:	2	1	0	0	1	0	2	3
313:	0	2	2	1	1	3	1	1
321:	2	1	0	2	0	0	1	0
329:	5	0	1	1	2	1	4	0
337:	1	1	2	1	3	1	2	2
345:	2	3	0	2	1	2	0	0
353:	2	0	2	2	2	1	2	0
361:	0	3	0	0	1	0	2	1

369:	1	1	0	1	3	1	3	1

Sample Title: 15

Channel								
377:	1	0	0	1	2	2	1	2
385:	0	5	1	0	2	1	0	1
393:	2	0	2	2	1	2	1	1
401:	1	1	3	3	1	2	1	1
409:	2	0	3	2	2	3	2	2
417:	0	4	3	1	0	3	4	0
425:	1	2	1	3	4	1	6	2
433:	2	2	1	1	5	2	1	2
441:	3	3	1	4	0	3	0	2
449:	1	0	3	4	0	2	1	1
457:	3	1	3	3	0	1	1	1
465:	1	0	2	2	2	3	0	0
473:	3	0	1	1	1	3	0	1
481:	0	1	1	1	1	4	2	0
489:	1	1	1	3	4	1	2	2
497:	4	0	4	4	0	1	2	3
505:	2	1	2	2	0	3	4	2
513:	2	2	0	2	2	0	3	1
521:	3	3	2	3	1	1	3	3
529:	4	0	2	4	2	1	1	2
537:	2	1	1	0	2	2	1	1
545:	2	1	0	1	6	1	0	2
553:	3	1	3	1	1	1	1	6
561:	3	2	1	4	6	1	2	2
569:	0	0	1	4	1	3	3	3
577:	1	0	1	4	1	3	4	4
585:	1	3	2	4	2	0	0	2
593:	3	2	4	5	0	1	2	2
601:	4	1	0	0	1	0	2	3
609:	5	2	3	3	2	1	3	1
617:	1	4	4	2	1	2	3	1
625:	2	1	1	2	2	4	3	4
633:	4	0	3	3	4	2	1	2
641:	4	2	6	1	4	1	2	1
649:	2	2	1	5	1	9	2	0
657:	2	3	1	7	1	4	3	2
665:	3	7	3	0	2	2	1	5
673:	4	2	3	2	5	4	1	7
681:	2	3	2	3	1	1	1	4
689:	2	5	3	2	0	3	4	1
697:	2	2	1	2	3	3	3	2
705:	0	1	1	1	3	2	4	1
713:	2	0	4	2	7	6	5	2
721:	2	6	4	3	3	4	0	3
729:	2	5	2	2	4	8	1	2
737:	1	3	4	0	1	2	5	4
745:	2	0	4	1	5	4	3	0
753:	1	2	4	7	2	3	0	2
761:	4	1	2	1	2	3	0	2
769:	1	3	0	2	2	2	5	1
777:	1	3	4	1	2	0	4	5
785:	3	3	3	2	3	3	2	4
793:	2	1	2	3	3	2	3	3

801:	1	2	0	0	1	1	1	1

Sample Title: 15

Channel								
809:	2	4	1	0	2	2	3	3
817:	5	1	0	3	2	0	2	1
825:	1	4	0	2	3	4	1	1
833:	1	3	2	4	1	2	2	1
841:	2	2	2	5	1	2	3	4
849:	1	1	0	2	2	3	1	3
857:	3	2	2	4	2	3	2	3
865:	0	1	2	2	3	3	2	1
873:	1	1	3	1	4	1	2	2
881:	1	2	3	1	3	4	5	2
889:	3	4	1	3	3	1	2	3
897:	2	1	3	4	2	2	3	4
905:	3	2	3	2	2	2	3	2
913:	2	8	3	2	3	1	1	2
921:	4	2	3	2	2	4	7	3
929:	4	4	4	2	2	2	0	0
937:	2	1	0	1	3	2	3	4
945:	3	2	2	6	2	1	1	1
953:	3	2	2	1	0	0	2	1
961:	3	2	1	0	3	3	0	0
969:	4	3	3	1	0	3	0	1
977:	2	0	2	1	0	0	1	0
985:	0	0	2	2	0	1	0	2
993:	2	0	0	0	3	1	2	2
1001:	2	2	1	0	1	2	2	2
1009:	2	1	3	4	0	3	0	3
1017:	3	2	2	1	1	1	0	2

Apex-Alpha™

12/4/11

Sample Description: IB3-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011024.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 16
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 10026
Reagent Blank: <not performed>

Sample Size: 1.021E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.820E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:06 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9586 +/- 0.0000
Counting Efficiency: 0.1651 +/- 0.0027 on 8/30/2011 7:34:57 PM
Effective Efficiency: 0.1583 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.811	44.49	29.58	0.51	0.00E+000	2.9
RN-222	5.324	58.47	26.02	1.53	0.00E+000	5.9
RA-226	4.595	51.32	27.57	0.68	0.00E+000	3.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	2.06E+000 +/- 6.12E-001	2.43E-001 +/- 7.68E-003
RN-222	0.982	5490.00*	2.70E+000 +/- 7.09E-001	3.29E-001 +/- 1.04E-002
RA-226	0.977	4785.00*	2.37E+000 +/- 6.58E-001	2.61E-001 +/- 8.25E-003

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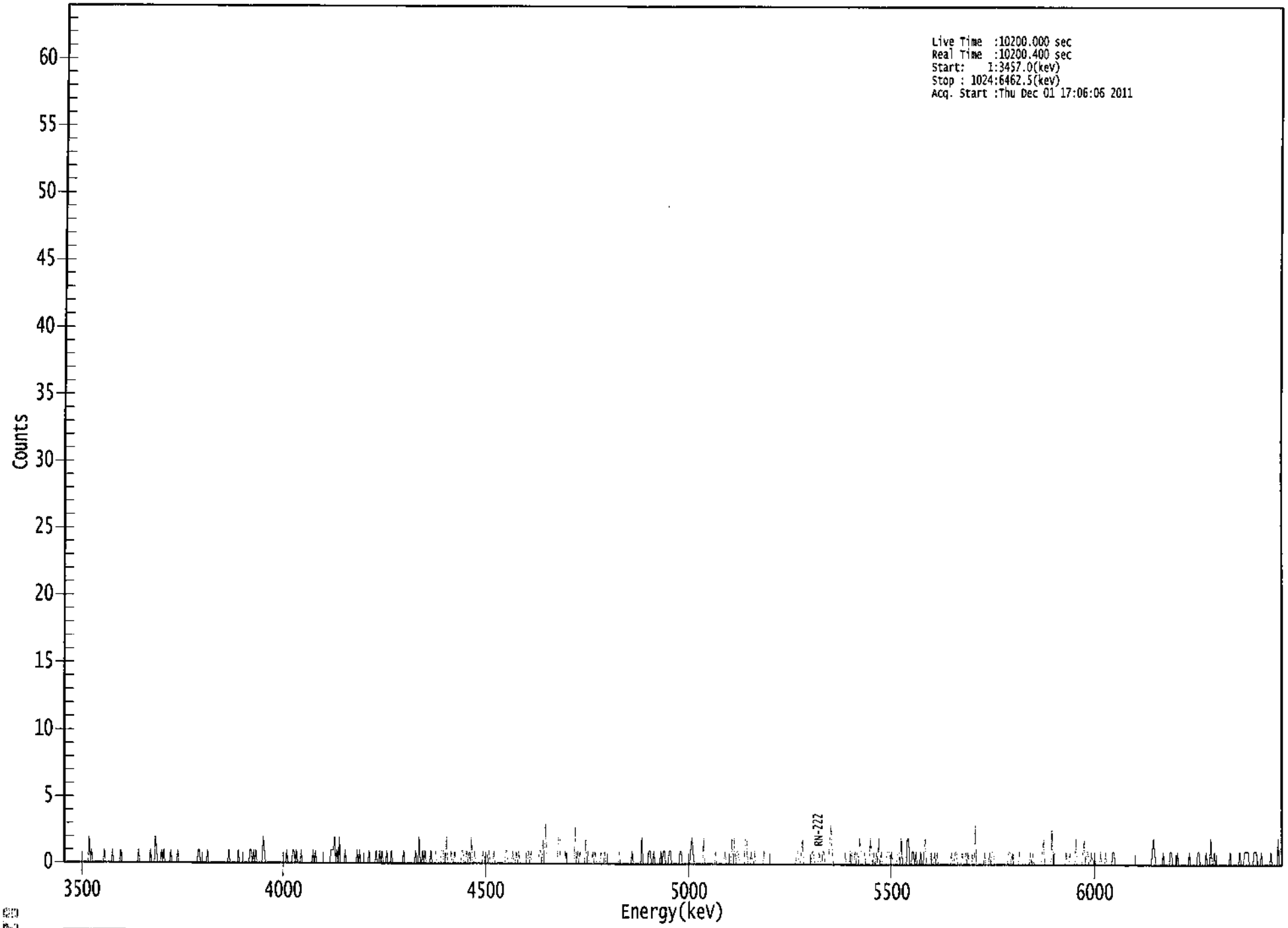
0000011024.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 16

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	2	0	1
25:	0	0	0	0	0	0	0	0
33:	0	0	1	0	0	0	0	0
41:	0	1	0	0	0	0	0	0
49:	1	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	1
65:	0	0	0	0	0	0	0	0
73:	0	1	0	0	0	2	1	0
81:	0	0	1	0	1	0	0	0
89:	0	0	1	0	0	0	0	0
97:	1	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	1	1	0	0	0	0	0
121:	0	1	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	1	0	0	0	0
145:	0	0	0	1	0	0	0	0
153:	0	0	0	0	0	1	1	0
161:	1	0	1	0	0	0	0	0
169:	2	1	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	0	1	1	0	1	0	0	0
201:	1	0	0	0	0	0	0	0
209:	0	0	1	0	1	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	1	1	1	2	0	1	0
233:	2	0	0	0	0	1	0	0
241:	0	0	0	0	0	0	0	1
249:	0	1	0	0	0	0	0	0
257:	0	1	0	0	0	0	0	1
265:	0	0	1	0	1	0	0	0
273:	1	0	0	0	1	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	0	0	0	0	0	0	0
297:	1	0	0	2	0	0	1	0
305:	1	0	0	0	0	1	0	0
313:	0	1	0	0	0	0	1	1
321:	0	0	2	0	0	0	1	0
329:	0	1	0	0	0	0	0	1
337:	1	0	0	1	0	1	0	2
345:	0	0	1	0	0	0	0	0
353:	0	1	0	1	1	0	1	0
361:	0	0	1	0	0	0	0	0

369:	0	0	0	0	1	1	0	0

Sample Title: 16

Channel								
377:	0	0	1	0	0	1	0	1
385:	0	0	0	0	0	0	0	1
393:	0	1	0	0	0	0	0	0
401:	1	1	0	2	0	3	1	0
409:	0	0	0	0	0	0	0	0
417:	2	2	0	0	0	0	1	0
425:	0	0	0	0	0	0	3	0
433:	1	0	1	0	0	0	0	2
441:	0	1	0	0	0	1	0	1
449:	0	0	0	0	1	0	0	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	2	0
489:	0	0	0	0	1	1	0	0
497:	1	0	0	0	0	0	1	0
505:	1	1	0	0	0	1	1	0
513:	0	0	0	0	0	0	1	1
521:	0	0	0	0	0	0	0	1
529:	2	1	0	0	0	0	0	0
537:	0	0	2	0	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	0	0	0	0	1	0	0	0
561:	0	0	2	0	2	0	1	1
569:	0	0	0	0	0	2	2	0
577:	0	0	1	0	0	1	0	0
585:	0	0	0	0	0	1	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	1	1	0	0	1	2	0	0
625:	0	0	0	0	0	1	1	0
633:	0	0	0	1	0	0	1	1
641:	0	0	0	0	2	3	1	0
649:	0	0	0	0	0	0	0	0
657:	0	1	0	0	0	1	1	0
665:	0	1	0	1	0	2	1	1
673:	1	1	0	0	0	0	2	1
681:	0	1	0	1	0	2	0	1
689:	0	0	0	0	1	1	1	0
697:	1	0	0	0	0	1	1	0
705:	2	0	0	0	0	2	2	0
713:	0	1	1	0	1	0	0	0
721:	1	0	0	1	2	0	0	0
729:	0	1	0	0	1	0	1	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	0	0	1	1	0
753:	0	0	0	1	0	0	1	0
761:	1	0	0	0	0	0	3	0
769:	0	0	0	0	0	0	1	0
777:	0	0	1	0	1	1	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	1	1	0	1	0	0

801:	0	0	0	1	0	0	0	0

Sample Title: 16

Channel								
809:	0	0	0	0	1	0	1	0
817:	0	0	0	0	0	0	1	2
825:	0	0	0	0	0	0	3	0
833:	1	0	0	0	0	0	0	0
841:	0	0	1	0	0	1	0	0
849:	0	0	2	0	0	0	0	0
857:	1	2	0	1	1	0	0	1
865:	0	0	1	0	0	0	0	1
873:	0	0	0	1	0	0	0	0
881:	0	1	1	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	1	2	1	0	0	0
921:	0	0	0	1	0	0	0	0
929:	0	1	1	0	0	0	0	1
937:	0	0	0	0	0	0	0	0
945:	0	1	0	0	0	0	0	0
953:	1	1	0	0	0	0	0	1
961:	0	0	0	2	0	0	1	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	1	0	0	0	0
985:	0	0	0	1	0	0	0	1
993:	1	1	1	0	0	0	0	1
1001:	1	1	0	0	0	1	0	0
1009:	0	0	0	0	0	1	0	0
1017:	0	0	0	2	0	0	0	0

Apex-Alpha™

12/2/11

Sample Description: IB3-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011034.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 17
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_003
Chamber Serial Number:
Detector Serial Number: 3
Env. Background: System Bkgd 9989
Reagent Blank: <not performed>

Sample Size: 1.009E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.640E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:40 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7613 +/- 0.0000
Counting Efficiency: 0.1856 +/- 0.0036 on 10/22/2011 3:36:30 PM
Effective Efficiency: 0.1413 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.807	560.37	8.34	6.63	0.00E+000	3.0
RN-222	5.289	529.77	8.55	3.23	0.00E+000	3.0
RA-226	4.608	256.30	12.29	1.70	0.00E+000	4.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.75E+001 +/- 2.52E+000	5.82E-001 +/- 2.22E-002
RN-222	0.975	5490.00*	2.60E+001 +/- 2.43E+000	4.47E-001 +/- 1.70E-002
RA-226	0.980	4785.00*	1.26E+001 +/- 1.62E+000	3.60E-001 +/- 1.37E-002

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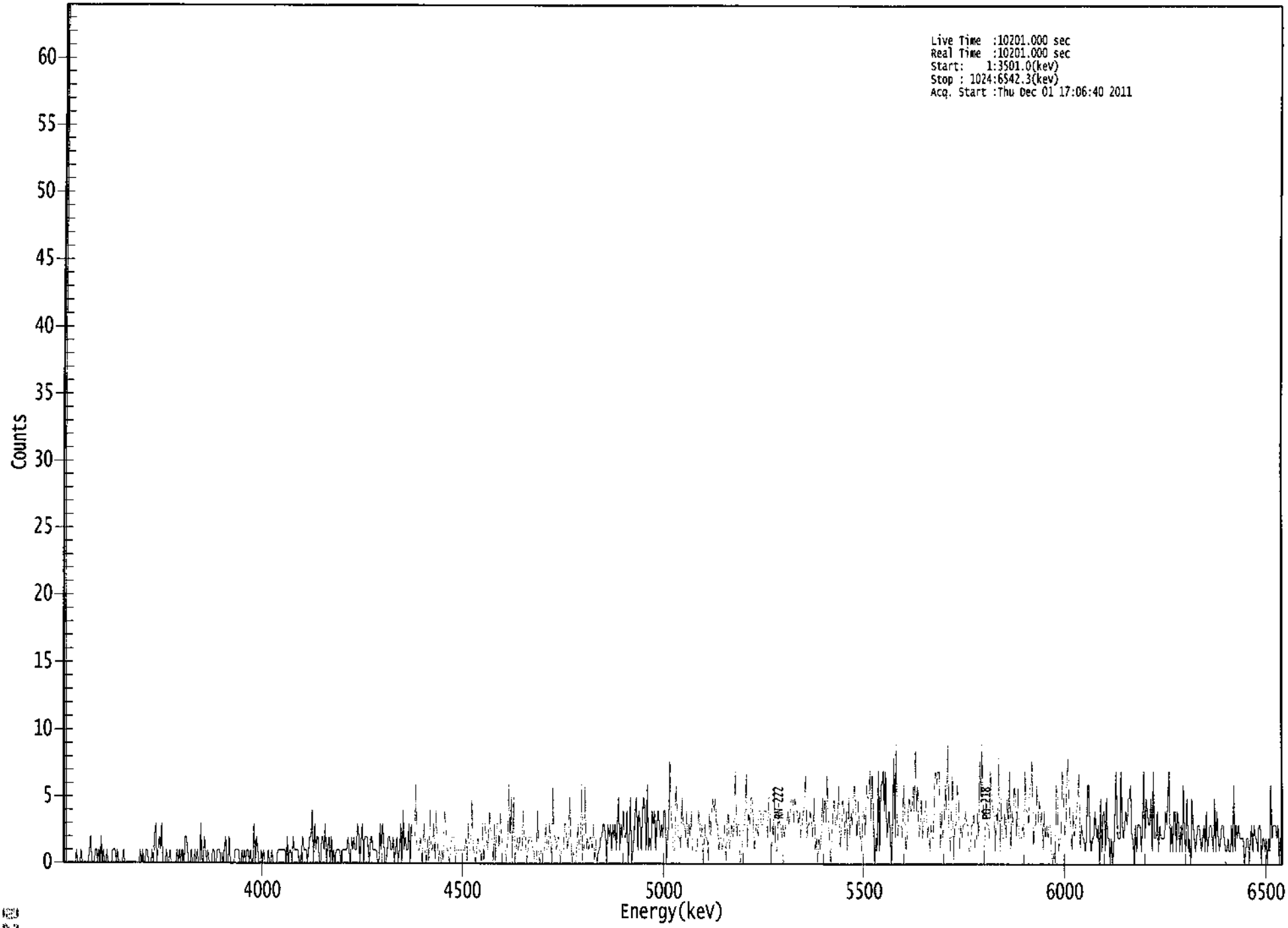
0000011034.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 17

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	1	0	0	0	1
17:	0	0	0	0	0	0	1	2
25:	0	0	0	1	1	0	1	0
33:	2	0	1	0	0	1	0	0
41:	0	0	1	1	1	0	1	0
49:	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	1	0	1	0	0	1	1
73:	0	0	0	1	0	2	3	0
81:	1	2	1	3	0	0	0	1
89:	0	0	1	0	0	0	0	0
97:	1	0	1	0	1	1	0	2
105:	2	1	0	0	1	0	0	1
113:	0	1	0	0	3	0	0	2
121:	1	0	1	0	0	0	1	1
129:	0	0	1	1	1	0	0	0
137:	1	2	0	0	2	0	0	0
145:	0	1	1	1	1	0	0	1
153:	0	1	0	1	1	0	1	0
161:	0	3	0	2	1	0	0	1
169:	0	1	0	0	0	1	0	0
177:	1	0	0	0	0	1	1	1
185:	1	1	1	1	0	2	0	1
193:	1	0	2	1	1	1	1	0
201:	0	1	2	1	1	1	0	1
209:	2	2	4	0	3	1	2	2
217:	0	0	2	2	1	3	0	1
225:	2	0	2	0	1	0	1	1
233:	1	1	0	1	1	1	1	1
241:	2	1	0	2	1	2	1	1
249:	3	2	0	2	3	0	2	2
257:	2	1	0	2	2	1	1	1
265:	1	0	0	3	1	3	2	0
273:	0	1	2	2	1	1	2	0
281:	1	2	0	1	3	0	4	1
289:	2	1	1	3	0	3	2	2
297:	2	6	1	1	1	2	0	1
305:	3	1	0	2	0	4	1	1
313:	3	0	4	2	0	1	0	1
321:	0	4	3	1	1	0	1	2
329:	2	2	0	1	1	1	1	1
337:	1	1	1	2	0	3	1	1
345:	5	1	1	0	1	2	1	1
353:	0	3	0	3	2	1	2	4
361:	2	2	0	3	0	3	3	1

369:	4	2	1	1	1	0	2	6

Sample Title: 17

Channel								
377:	2	5	0	5	0	1	2	1
385:	2	1	1	4	2	2	0	1
393:	2	2	2	1	1	0	0	4
401:	1	0	1	1	1	1	3	1
409:	1	3	2	0	6	2	2	1
417:	2	2	0	1	1	1	3	3
425:	1	2	5	2	0	1	0	0
433:	1	3	1	1	6	1	1	6
441:	1	2	1	2	2	1	3	0
449:	2	0	1	1	2	2	3	3
457:	2	0	3	2	3	1	3	2
465:	3	1	3	5	1	3	2	4
473:	2	2	4	0	2	5	0	1
481:	2	4	5	1	4	3	1	4
489:	5	4	1	6	1	2	1	4
497:	3	4	1	3	4	3	2	3
505:	2	4	4	0	2	3	8	4
513:	2	1	1	6	4	2	2	1
521:	5	3	3	2	4	1	3	2
529:	4	1	1	1	1	1	4	3
537:	2	3	0	3	2	2	0	4
545:	2	4	5	4	5	3	3	1
553:	2	2	1	2	3	0	3	4
561:	1	2	3	2	3	7	2	3
569:	3	0	1	2	3	3	7	1
577:	4	3	5	5	3	1	3	3
585:	2	4	4	3	3	4	4	4
593:	2	5	5	0	3	2	6	1
601:	1	4	3	3	2	3	2	3
609:	3	4	3	4	5	5	3	5
617:	4	4	3	4	2	3	4	4
625:	7	2	3	3	4	3	2	5
633:	1	2	0	2	1	2	5	3
641:	5	3	7	3	2	0	2	4
649:	5	3	3	4	6	1	3	5
657:	4	2	4	1	5	2	4	3
665:	5	6	4	2	5	3	2	1
673:	4	4	2	6	5	5	7	3
681:	7	3	0	2	1	7	1	6
689:	6	7	4	7	2	3	4	2
697:	0	4	8	2	9	2	3	3
705:	3	2	6	4	1	2	4	5
713:	4	4	6	4	9	4	6	2
721:	3	5	2	3	4	5	2	3
729:	1	3	2	2	6	7	6	7
737:	7	1	4	2	3	6	4	9
745:	3	1	3	7	0	3	3	6
753:	5	1	3	2	3	3	4	3
761:	3	1	1	3	3	4	1	1
769:	4	2	8	5	9	2	0	5
777:	3	3	2	7	5	4	4	1
785:	4	3	8	1	5	2	2	4
793:	2	5	3	7	1	4	3	6

801:	5	2	6	2	2	2	3	2

Sample Title: 17

Channel								
809:	7	4	4	3	6	6	8	1
817:	3	3	6	3	5	3	4	1
825:	4	2	3	2	3	3	1	0
833:	1	0	6	5	1	2	2	7
841:	6	2	3	7	8	4	3	1
849:	4	2	3	4	5	7	1	3
857:	2	2	1	2	6	6	2	1
865:	2	2	4	3	2	3	0	5
873:	1	4	4	1	5	2	2	0
881:	2	0	1	4	7	2	2	2
889:	7	3	2	3	4	3	5	5
897:	6	2	2	0	3	1	3	3
905:	3	1	3	7	2	5	4	3
913:	3	5	1	7	2	2	4	1
921:	3	2	2	2	2	4	3	5
929:	7	1	3	1	4	4	1	4
937:	3	1	3	1	6	2	1	5
945:	1	2	0	5	3	2	1	2
953:	3	3	2	1	2	3	1	4
961:	1	2	3	3	2	1	5	1
969:	4	2	1	2	3	3	2	1
977:	1	2	1	1	3	1	6	1
985:	3	2	3	2	2	2	2	0
993:	1	2	2	0	2	3	1	3
1001:	2	2	1	3	3	0	2	2
1009:	1	2	0	2	1	6	2	3
1017:	3	3	2	3	0	2	1	0

Apex-Alpha™

CR 12/2/11

Sample Description: IB3-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011028.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 18
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_010
Chamber Serial Number:
Detector Serial Number: 10
Env. Background: System Bkgd 9991
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:37 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8095 +/- 0.0000
Counting Efficiency: 0.1934 +/- 0.0035 on 10/29/2011 6:03:11 PM
Effective Efficiency: 0.1565 +/- 0.0029

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.806	336.92	10.75	4.08	0.00E+000	6.0
RN-222	5.312	335.30	10.74	1.70	0.00E+000	4.6
RA-226	4.626	169.15	15.11	0.85	0.00E+000	4.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	1.58E+001 +/- 1.79E+000	4.63E-001 +/- 1.66E-002
RN-222	0.980	5490.00*	1.57E+001 +/- 1.78E+000	3.44E-001 +/- 1.23E-002
RA-226	0.984	4785.00*	7.92E+000 +/- 1.23E+000	2.80E-001 +/- 1.00E-002

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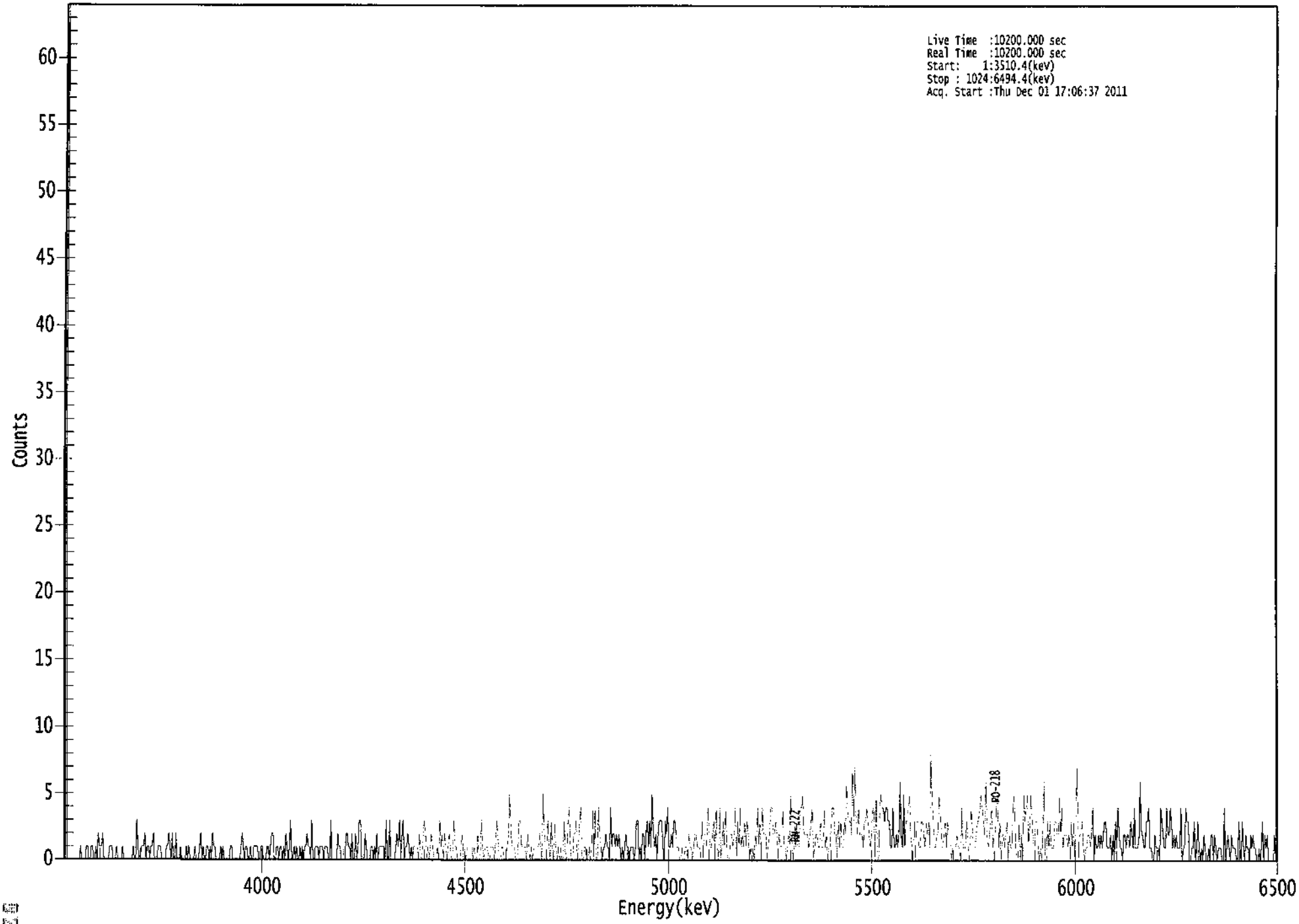
0000011028.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 18

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	1	0
17:	0	0	0	1	1	0	0	1
25:	1	0	0	1	0	2	1	1
33:	1	2	0	0	0	0	0	1
41:	1	1	0	0	0	1	0	0
49:	0	0	1	0	0	0	0	0
57:	0	0	0	1	0	0	3	1
65:	0	0	1	1	1	2	0	1
73:	1	0	1	1	2	0	0	0
81:	1	1	1	0	0	0	0	1
89:	1	2	1	0	2	0	0	2
97:	0	0	0	1	0	0	0	0
105:	1	0	1	0	0	0	0	1
113:	0	0	0	1	2	0	1	0
121:	0	1	1	0	1	0	2	1
129:	1	0	0	0	0	1	0	1
137:	0	0	0	0	0	1	1	0
145:	0	0	0	0	0	0	1	2
153:	1	0	1	1	0	0	1	0
161:	0	1	1	1	1	0	0	1
169:	1	0	0	0	1	1	0	1
177:	2	2	0	0	1	1	0	1
185:	1	0	1	0	2	1	0	1
193:	3	0	0	1	0	1	0	0
201:	1	0	1	0	1	1	2	1
209:	1	0	3	0	0	1	1	1
217:	0	1	1	1	0	1	1	1
225:	0	0	3	0	0	0	0	0
233:	2	1	1	0	0	0	0	2
241:	2	1	1	0	2	0	0	2
249:	0	1	3	3	0	0	0	2
257:	1	0	0	0	1	1	0	1
265:	0	2	0	1	1	1	1	1
273:	0	3	0	0	3	0	0	0
281:	0	1	2	1	3	0	2	3
289:	0	1	1	2	1	0	1	0
297:	1	1	1	1	0	2	0	0
305:	2	3	2	0	1	0	1	2
313:	1	0	0	0	1	0	3	1
321:	2	0	2	1	0	1	2	1
329:	0	0	3	1	1	0	0	0
337:	1	2	0	0	0	1	1	1
345:	1	1	0	1	0	0	2	0
353:	0	3	1	0	1	1	1	0
361:	0	1	1	1	0	1	3	2

369:	0	0	1	1	0	0	0	1

Sample Title: 18

Channel								
377:	2	5	2	1	1	1	0	0
385:	1	3	3	1	1	1	1	0
393:	2	1	0	1	0	1	1	1
401:	1	1	2	1	0	5	2	1
409:	1	3	1	0	3	1	0	3
417:	1	0	1	0	1	0	0	3
425:	0	0	3	4	1	0	0	2
433:	2	3	0	1	3	4	0	0
441:	1	1	0	0	1	0	1	4
449:	0	4	0	0	4	2	1	0
457:	1	1	2	1	1	0	4	1
465:	2	2	1	2	1	2	1	0
473:	1	0	1	2	1	1	0	1
481:	1	1	0	1	3	3	0	1
489:	0	2	2	0	2	3	1	3
497:	1	5	2	1	2	0	2	3
505:	3	3	1	0	3	2	4	1
513:	1	2	1	3	3	2	1	1
521:	0	0	1	0	0	1	1	0
529:	2	1	1	0	1	2	2	1
537:	1	1	0	3	0	2	2	1
545:	4	2	1	1	2	3	0	4
553:	1	0	4	0	1	3	1	4
561:	1	0	0	2	2	1	2	4
569:	0	3	1	4	1	2	1	3
577:	1	3	2	0	1	0	1	0
585:	2	1	4	1	3	0	4	2
593:	2	2	0	1	2	4	4	2
601:	2	3	2	0	2	1	1	4
609:	1	1	0	1	2	1	5	1
617:	0	2	1	3	1	1	4	4
625:	5	2	2	2	2	1	2	3
633:	4	0	1	2	2	1	1	3
641:	1	1	4	1	2	0	1	1
649:	3	4	4	2	2	0	3	1
657:	3	1	1	3	2	6	3	3
665:	3	2	7	3	7	3	2	4
673:	2	2	2	1	3	3	4	3
681:	2	1	2	4	4	0	5	0
689:	0	4	5	4	4	3	4	4
697:	3	3	1	1	4	1	1	2
705:	1	2	6	2	1	5	1	3
713:	3	4	5	2	1	0	3	0
721:	3	3	1	1	3	3	2	1
729:	3	2	3	1	8	5	3	1
737:	1	2	2	5	4	1	1	2
745:	3	1	3	2	2	0	1	1
753:	1	1	2	1	1	0	4	1
761:	1	1	3	2	0	1	4	2
769:	1	1	2	3	3	4	5	4
777:	3	2	6	2	1	2	3	4
785:	1	2	2	4	5	1	3	0
793:	2	2	1	2	3	0	2	1

801:	1	4	5	1	0	0	3	0

Sample Title: 18

Channel								
809:	2	0	5	3	4	5	1	3
817:	5	3	1	1	3	3	1	0
825:	1	0	2	6	0	0	3	1
833:	3	1	1	1	3	3	2	2
841:	5	2	4	1	2	2	2	1
849:	2	0	3	1	3	0	4	7
857:	0	2	2	3	1	0	1	1
865:	2	2	1	2	4	0	2	1
873:	1	2	1	2	1	2	3	3
881:	1	1	1	2	0	2	0	3
889:	1	4	2	1	1	0	2	2
897:	1	2	2	1	3	2	1	4
905:	1	1	1	2	6	2	2	1
913:	1	3	3	4	1	1	0	0
921:	2	1	1	1	0	4	3	2
929:	1	1	4	2	2	4	3	1
937:	2	1	2	1	1	1	4	0
945:	1	1	4	3	3	0	0	1
953:	1	3	0	1	3	1	0	1
961:	0	2	1	0	0	1	0	2
969:	2	0	2	1	0	1	1	1
977:	0	0	4	0	1	2	1	0
985:	2	1	1	1	0	0	3	1
993:	0	3	1	0	2	1	1	0
1001:	2	1	2	1	1	0	0	1
1009:	0	1	3	0	2	1	2	0
1017:	0	0	0	0	2	0	3	1

Apex-Alpha™

12424

Sample Description: IB3-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011033.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 19
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_011
Chamber Serial Number:
Detector Serial Number: 11
Env. Background: System Bkgd 9992
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.690E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:38 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8591 +/- 0.0000
Counting Efficiency: 0.2078 +/- 0.0040 on 10/22/2011 3:53:46 PM
Effective Efficiency: 0.1785 +/- 0.0034

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.791	51.24	28.83	4.76	0.00E+000	2.7
RN-222	5.284	54.77	27.38	3.23	0.00E+000	2.7
RA-226	4.588	53.47	27.25	1.53	0.00E+000	2.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.972	6003.00*	2.05E+000 +/- 5.95E-001	4.18E-001 +/- 1.56E-002
RN-222	0.973	5490.00*	2.19E+000 +/- 6.05E-001	3.64E-001 +/- 1.36E-002
RA-226	0.975	4785.00*	2.13E+000 +/- 5.87E-001	2.84E-001 +/- 1.06E-002

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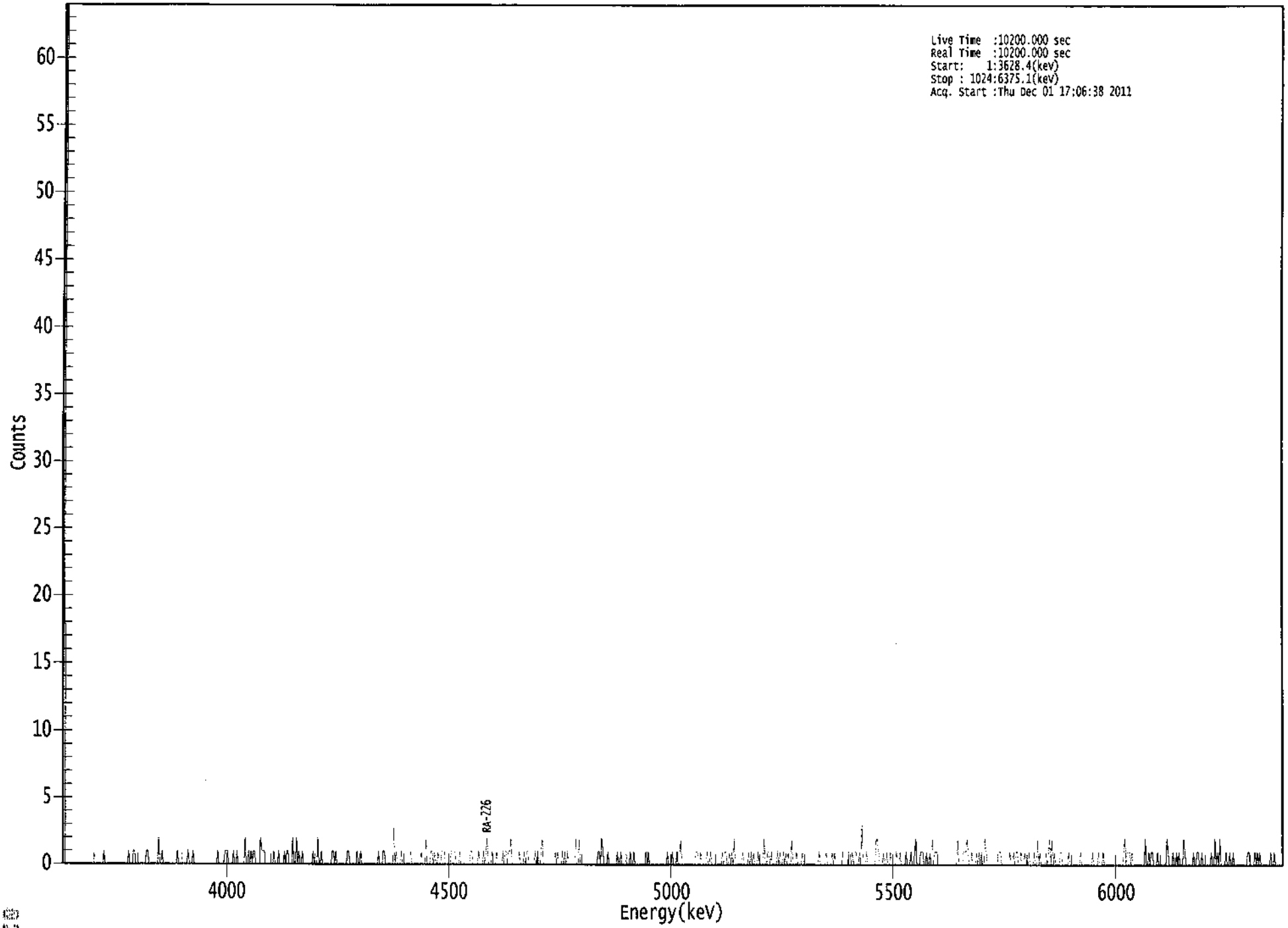
0000011033.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 19

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	1	0	0	0	1	1	0	0
65:	0	0	0	0	0	0	0	1
73:	1	0	0	0	0	0	0	0
81:	0	2	0	0	1	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	0	0	0
105:	0	0	1	0	0	0	1	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	1	0	0	0	0
137:	0	1	1	1	0	0	0	0
145:	1	0	0	1	0	0	0	0
153:	0	0	2	0	0	1	0	1
161:	0	1	1	0	0	0	0	2
169:	1	1	1	0	0	0	0	0
177:	0	0	1	0	0	0	1	0
185:	0	0	0	1	0	1	1	0
193:	0	0	2	0	0	2	0	1
201:	0	0	1	0	0	0	0	0
209:	0	0	0	1	0	0	0	2
217:	0	0	1	0	0	0	0	0
225:	0	0	0	1	1	0	1	0
233:	0	0	0	0	0	0	0	0
241:	1	1	0	0	0	0	0	0
249:	1	0	0	1	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	1	0	0	0	1	1
273:	0	0	0	0	0	0	0	3
281:	0	1	0	0	0	1	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	1	0
305:	0	0	2	0	0	0	1	1
313:	0	1	0	0	1	0	0	1
321:	1	1	0	0	0	0	0	1
329:	1	1	1	0	0	0	1	0
337:	0	0	0	0	0	0	0	1
345:	1	0	0	0	0	0	1	0
353:	0	0	1	0	1	2	0	0
361:	0	1	0	0	0	1	0	0

369:	0	0	1	0	1	1	0	1

Sample Title: 19

Channel								
377:	1	2	0	0	0	0	0	0
385:	1	0	0	0	1	0	1	1
393:	0	0	0	0	0	1	0	1
401:	0	0	1	2	0	0	0	0
409:	0	0	0	0	0	0	1	0
417:	1	0	0	0	1	0	1	0
425:	1	0	0	0	0	0	0	2
433:	0	0	2	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	1	1	0	2	1	0
457:	0	0	1	0	0	0	0	0
465:	0	0	1	0	0	1	0	0
473:	0	0	0	0	0	1	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	1	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	1	0	0	0	1	0	0	2
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	1	0	0
537:	1	0	0	0	0	1	0	0
545:	1	0	0	0	0	0	0	0
553:	0	0	1	0	1	1	0	0
561:	1	0	1	0	2	0	0	0
569:	0	0	0	1	0	0	0	0
577:	1	0	1	0	1	0	0	0
585:	1	0	0	0	0	2	0	0
593:	1	1	0	1	0	0	0	0
601:	1	0	1	0	0	1	0	1
609:	0	1	0	0	2	0	0	0
617:	1	0	0	0	0	1	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	1	0	0	0	0	1	0
649:	1	0	0	0	0	0	0	1
657:	0	0	0	0	1	1	0	1
665:	0	1	1	0	0	1	0	3
673:	0	0	0	1	0	0	0	0
681:	0	0	0	2	2	1	0	0
689:	0	1	0	0	1	0	0	1
697:	0	0	0	0	1	0	0	1
705:	0	0	0	0	1	0	0	0
713:	1	0	0	1	2	0	0	0
721:	1	1	1	0	0	1	0	0
729:	1	0	2	0	1	1	1	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	2
753:	0	0	0	0	1	1	1	2
761:	1	0	0	1	0	0	0	1
769:	0	1	0	1	0	0	2	1
777:	0	0	0	0	0	0	0	0
785:	0	1	1	1	0	0	0	0
793:	0	0	0	1	0	0	1	0

801:	1	1	0	0	1	0	0	1

Sample Title: 19

Channel								
809:	0	0	0	1	0	0	0	1
817:	0	0	2	0	1	0	0	0
825:	0	1	0	1	2	0	2	0
833:	1	0	0	0	0	1	1	0
841:	0	0	0	0	1	0	0	0
849:	0	0	0	0	0	0	1	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	1	0	0
873:	0	1	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	1	2	0	1	1	1
897:	0	1	0	0	0	0	0	0
905:	0	0	0	0	2	0	0	1
913:	0	1	1	0	0	0	1	0
921:	0	0	0	0	0	0	2	1
929:	0	0	0	1	0	0	1	0
937:	1	0	0	0	2	1	0	0
945:	0	0	0	0	1	0	0	1
953:	1	0	0	1	0	0	0	0
961:	0	0	0	1	0	0	2	0
969:	1	0	2	0	0	0	0	1
977:	0	0	1	0	0	1	0	0
985:	0	0	0	0	0	0	0	0
993:	0	1	1	0	0	0	0	1
1001:	0	1	0	1	0	0	0	0
1009:	0	0	0	0	1	0	0	1
1017:	0	0	0	0	0	0	0	1

Apex-Alpha™

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Sample Description: IB3-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011027.Cnf
Batch Identification: 1111139A-RA
Sample Identification: 20
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_012
Chamber Serial Number:
Detector Serial Number: 12
Env. Background: System Bkgd 9993
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 1:01:49 PM
Acquisition Date/Time: 12/1/2011 5:06:39 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8871 +/- 0.0000
Counting Efficiency: 0.2013 +/- 0.0039 on 10/22/2011 3:36:31 PM
Effective Efficiency: 0.1786 +/- 0.0034

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

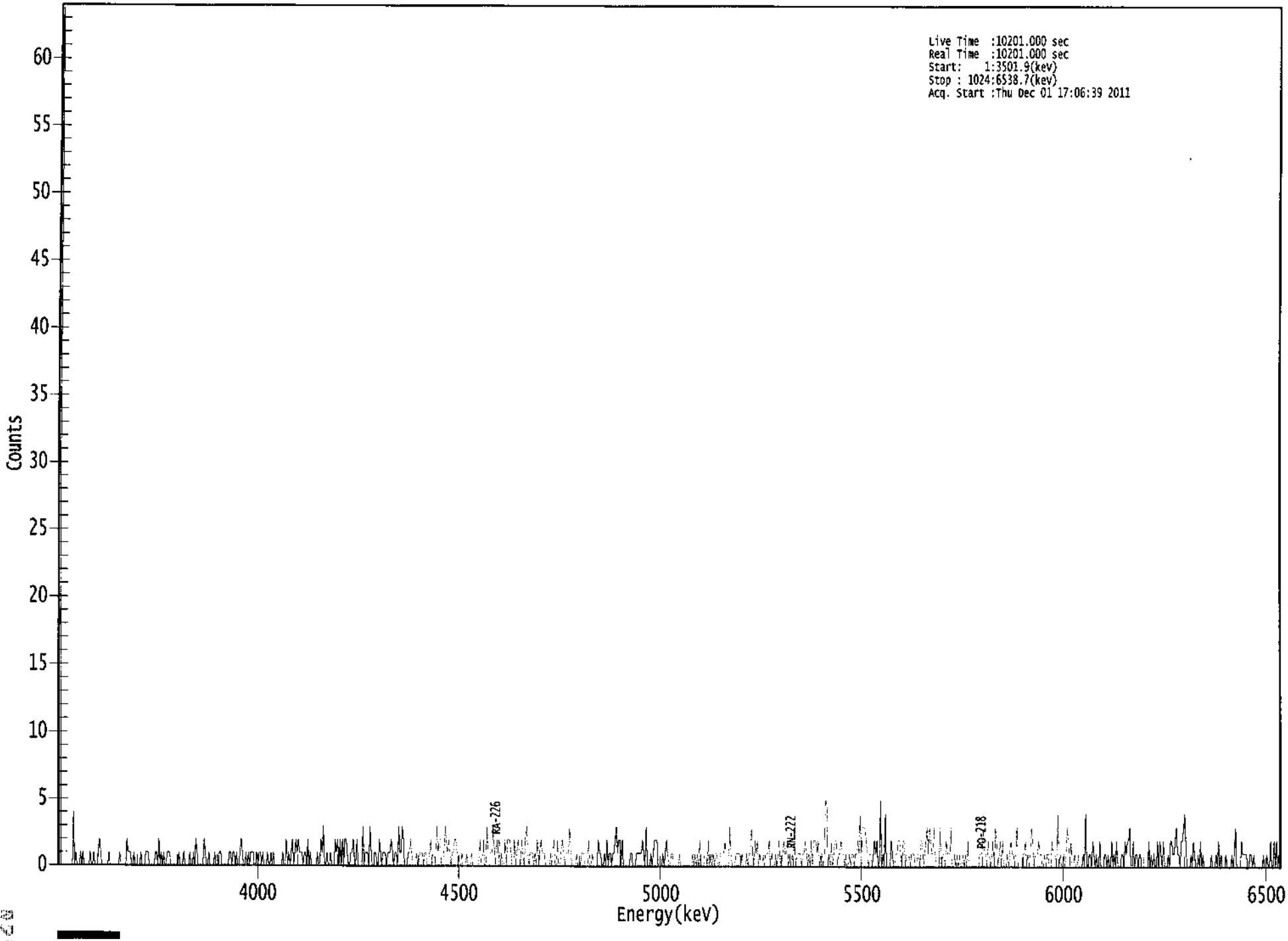
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.801	133.77	17.18	3.23	0.00E+000	3.0
RN-222	5.328	140.43	16.78	3.57	0.00E+000	6.3
RA-226	4.595	123.30	17.79	1.70	0.00E+000	3.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	4.82E+000 +/- 8.49E-001	3.28E-001 +/- 1.24E-002
RN-222	0.983	5490.00*	5.07E+000 +/- 8.72E-001	3.40E-001 +/- 1.28E-002
RA-226	0.977	4785.00*	4.45E+000 +/- 8.08E-001	2.65E-001 +/- 9.98E-003

AG
12/2/11

0000011027.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 20

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	4	0	1
17:	0	0	0	1	0	1	0	0
25:	0	0	0	1	0	0	1	0
33:	0	0	1	2	1	0	0	0
41:	0	0	0	1	0	0	0	0
49:	0	0	0	0	1	0	0	0
57:	0	0	2	1	1	1	0	0
65:	1	0	0	0	0	0	1	0
73:	0	0	1	1	1	0	0	0
81:	0	0	1	1	0	2	0	1
89:	0	1	0	0	1	1	1	0
97:	0	0	0	0	0	0	1	0
105:	0	0	1	0	0	0	0	1
113:	0	0	1	0	2	1	0	0
121:	0	0	0	2	1	0	0	1
129:	0	0	0	0	1	0	0	0
137:	1	1	0	0	0	0	0	0
145:	1	1	0	1	1	0	1	0
153:	0	1	2	1	0	0	1	0
161:	1	0	1	1	1	0	0	1
169:	0	1	1	0	1	0	0	0
177:	1	0	0	1	0	1	0	0
185:	0	0	0	0	0	1	0	0
193:	2	0	1	0	1	2	0	1
201:	2	1	2	1	1	1	0	1
209:	1	0	2	0	1	0	0	0
217:	0	0	1	0	0	2	1	3
225:	0	0	1	0	0	1	0	0
233:	0	2	1	2	0	2	0	2
241:	0	2	2	1	0	0	1	1
249:	2	0	0	2	0	0	0	0
257:	3	0	1	1	1	0	3	1
265:	0	0	1	1	0	0	2	1
273:	0	1	1	1	0	1	1	1
281:	2	1	0	1	1	0	3	1
289:	1	3	2	0	0	0	1	1
297:	2	1	0	0	0	1	0	0
305:	1	1	1	0	1	1	0	0
313:	1	2	0	1	1	0	3	1
321:	2	2	0	0	1	3	2	1
329:	2	1	0	1	1	2	2	1
337:	0	0	0	1	0	0	0	1
345:	0	0	0	1	0	0	0	0
353:	0	0	2	0	0	2	0	0
361:	3	1	1	1	1	3	1	0

369:	2	1	2	0	1	0	0	2

Sample Title: 20

Channel								
377:	0	2	2	2	1	0	0	2
385:	0	1	2	1	0	2	1	0
393:	2	3	1	0	1	1	1	0
401:	1	0	2	0	1	2	1	1
409:	1	0	0	0	0	1	0	1
417:	2	0	0	2	0	0	1	2
425:	1	0	1	1	1	3	1	0
433:	0	0	0	1	0	0	0	1
441:	1	1	0	0	0	2	0	0
449:	1	0	0	0	0	2	1	1
457:	0	0	1	0	2	0	1	1
465:	0	1	1	2	3	1	2	2
473:	0	2	0	0	0	0	0	0
481:	1	1	0	0	0	1	1	1
489:	1	1	2	1	0	3	0	0
497:	0	1	0	1	2	2	2	0
505:	0	0	0	1	0	1	2	1
513:	0	0	1	1	0	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	0	0	0	1	0	1	0
537:	1	0	2	0	0	0	1	1
545:	0	2	0	1	0	1	0	1
553:	1	0	0	1	1	1	1	2
561:	0	0	0	3	1	0	0	0
569:	1	1	1	1	0	1	0	0
577:	0	1	0	1	1	3	1	0
585:	2	1	2	0	1	0	0	1
593:	0	1	1	1	2	0	1	0
601:	0	1	0	1	2	0	0	1
609:	2	1	1	2	0	1	0	1
617:	0	3	0	1	1	1	1	0
625:	1	1	2	1	0	1	0	2
633:	0	2	2	2	1	2	0	1
641:	1	0	1	5	5	0	1	0
649:	2	0	1	2	2	0	1	1
657:	2	1	1	0	1	0	0	1
665:	0	1	1	0	1	1	2	1
673:	4	1	3	3	3	2	1	0
681:	1	1	0	1	2	1	2	0
689:	0	5	0	1	0	4	0	0
697:	0	0	2	1	0	0	1	1
705:	2	2	1	0	2	2	0	1
713:	1	1	0	1	1	1	0	0
721:	1	1	0	2	2	0	1	2
729:	3	1	3	2	1	1	3	1
737:	0	0	0	3	0	1	1	0
745:	2	1	1	1	3	0	0	1
753:	0	1	0	1	0	0	1	0
761:	1	0	2	0	0	0	0	0
769:	0	0	0	0	1	1	1	3
777:	1	1	0	2	1	0	1	2
785:	0	3	2	0	1	2	0	2
793:	0	0	0	1	0	1	2	1

801:	1	0	1	3	0	0	0	0

Sample Title: 20

Channel								
809:	1	1	2	0	1	0	1	3
817:	2	0	1	1	1	2	1	1
825:	0	0	1	0	1	1	0	0
833:	2	1	1	1	0	4	0	1
841:	0	0	1	0	1	3	2	0
849:	2	0	0	1	0	0	1	0
857:	0	0	1	0	4	0	0	1
865:	1	0	2	1	0	1	0	0
873:	2	0	0	0	1	1	0	1
881:	0	0	2	0	1	0	2	0
889:	0	0	1	1	0	2	1	2
897:	2	3	0	0	2	0	1	1
905:	0	1	1	0	0	0	0	0
913:	0	2	0	1	0	1	0	0
921:	2	0	2	1	0	2	0	0
929:	0	1	0	2	2	1	1	2
937:	3	1	1	0	2	2	3	4
945:	1	0	0	0	1	0	2	1
953:	0	0	1	0	2	0	1	0
961:	0	0	0	0	0	1	0	0
969:	0	1	0	2	0	1	0	0
977:	0	1	0	0	0	0	1	0
985:	1	3	0	0	0	0	2	1
993:	1	1	1	0	0	1	1	0
1001:	1	0	0	0	0	0	0	0
1009:	1	0	0	1	0	0	2	0
1017:	0	2	0	2	0	1	0	1

12/1/2011 5:48:13 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 12/1/2011
Time : 5:48:13 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	12/1/2011 5:34:38 AM
Alpha_010	AIM21F	ALL	Passed	12/1/2011 5:34:39 AM
Alpha_011	AIM21F	ALL	Passed	12/1/2011 5:34:40 AM
Alpha_012	AIM21F	ALL	Passed	12/1/2011 5:34:40 AM
Alpha_013	AIM21F	ALL	Passed	12/1/2011 5:34:41 AM
Alpha_014	AIM21F	ALL	Passed	12/1/2011 5:34:42 AM
Alpha_015	AIM21F	ALL	Passed	12/1/2011 5:34:43 AM
Alpha_017	AIM730	ALL	Passed	12/1/2011 5:34:44 AM
Alpha_020	AIM730	ALL	Passed	12/1/2011 5:34:44 AM
Alpha_021	AIM730	ALL	Passed	12/1/2011 5:34:45 AM
Alpha_022	AIM730	ALL	Passed	12/1/2011 5:34:46 AM
Alpha_023	AIM730	ALL	Passed	12/1/2011 5:34:47 AM
Alpha_024	AIM730	ALL	Passed	12/1/2011 5:34:49 AM
Alpha_025	AIM730	ALL	Passed	12/1/2011 5:34:49 AM
Alpha_026	AIM730	ALL	Passed	12/1/2011 5:34:50 AM
Alpha_028	AIM730	ALL	Passed	12/1/2011 5:34:51 AM
Alpha_029	AIM730	ALL	Passed	12/1/2011 5:34:52 AM
Alpha_030	AIM730	ALL	Passed	12/1/2011 5:34:53 AM
Alpha_031	AIM730	ALL	Passed	12/1/2011 5:34:53 AM
Alpha_033	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:34:55 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:34:56 AM
Alpha_035	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:34:58 AM
Alpha_036	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:34:59 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:00 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:02 AM
Alpha_039	Alpha Analyst100DC	Peak Energy	Action	12/1/2011 5:35:04 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:05 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:07 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:08 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:10 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	12/1/2011 5:35:11 AM

APPROVED BY: _____

APPROVAL DATE: 12/12

12/1/2011 8:02:10 AM

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 12/1/2011
Time : 8:02:10 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_041	Alpha Analyst100DC	ALL	Passed	12/1/2011 7:51:10 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	12/1/2011 7:51:11 AM
Alpha_043	Alpha Analyst100DC	ALL	Passed	12/1/2011 7:51:07 AM
Alpha_044	Alpha Analyst100DC	ALL	Passed	12/1/2011 7:51:09 AM

APPROVED BY: _____

APPROVAL DATE: 12/1/11

SECTION X

ANALYTICAL DATA (RADIUM-228)

11-11139
Ra228
Run 1

Work Order	11-11139
Analysis Code	Ra228
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 904.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	Yttirum
Carrier Conc (mg/ml)	30

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB1/2-1	80	11/18/11 14:18	9.9980E-01
04	DO	IB1/2-1	80	11/18/11 14:18	1.0208E+00
05	TRG	IB1/2-2	78	11/18/11 14:10	1.0079E+00
06	TRG	IB1/2-3	64	11/18/11 00:00	1.0205E+00
07	TRG	IB1/2-4	75	11/18/11 00:00	1.0122E+00
08	TRG	IB1/2-5	76	11/18/11 15:20	1.0345E+00
09	TRG	IB1/2-6	81	11/18/11 15:12	9.9980E-01
10	TRG	IB1/2-7	106	11/18/11 15:20	1.0155E+00
11	TRG	IB1/2-4A	82	11/18/11 00:00	1.0291E+00
12	TRG	IB1/2-4B	50	11/18/11 00:00	1.0465E+00
13	TRG	IB1/2-4C	52	11/18/11 00:00	1.0068E+00
14	TRG	IB1/2-4D	63	11/18/11 00:00	9.9940E-01
15	TRG	IB1/2-4E	57	11/18/11 00:00	1.0205E+00
16	TRG	IB3-1	44	11/18/11 15:47	1.0214E+00
17	TRG	IB3-2	84	11/18/11 15:42	1.0093E+00
18	TRG	IB3-3	68	11/18/11 15:40	1.0014E+00
19	TRG	IB3-4	49	11/18/11 15:50	1.0001E+00
20	TRG	IB3-5	47	11/18/11 15:37	1.0042E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9119	1010.8	466.9	102.54	2.000	0.0969	0.1506	0.0537	89.50	91.78	1.00	1.00
02	MBL	0.9056	1003.8	467.2	103.32	2.000	0.0973	0.1491	0.0518	86.33	89.20	1.00	1.00
03	DUP	0.9024	1000.3	439.6	97.56	2.000	0.0971	0.1514	0.0543	90.50	88.29	1.00	1.00
04	DO	0.9030	1001.0	403.7	89.54	2.000	0.0971	0.1516	0.0545	90.83	81.33	1.00	1.00
05	TRG	0.9030	1001.0	395.3	87.67	2.000	0.0973	0.1519	0.0546	91.00	79.78	1.00	1.00
06	TRG	0.9015	999.3	416.9	92.62	2.000	0.0968	0.1480	0.0512	85.33	79.03	1.00	1.00
07	TRG	0.9013	999.1	432.2	96.04	2.000	0.0975	0.1497	0.0522	87.00	83.55	1.00	1.00
08	TRG	0.9015	999.3	404.9	89.95	2.000	0.0971	0.1477	0.0506	84.33	75.86	1.00	1.00
09	TRG	0.9010	998.7	386.4	85.89	2.000	0.0967	0.1524	0.0557	92.83	79.73	1.00	1.00
10	TRG	0.8993	996.8	410.2	91.35	2.000	0.0969	0.1508	0.0539	89.83	82.06	1.00	1.00
11	TRG	0.8994	997.0	406.6	90.54	2.000	0.0971	0.1515	0.0544	90.67	82.09	1.00	1.00
12	TRG	0.8992	996.7	358.1	79.76	2.000	0.0958	0.1502	0.0544	90.67	72.31	1.00	1.00
13	TRG	0.9006	998.3	366.3	81.46	2.000	0.0962	0.1495	0.0533	88.83	72.36	1.00	1.00
14	TRG	0.8989	996.4	383.0	85.33	2.000	0.0965	0.1486	0.0521	86.83	74.10	1.00	1.00
15	TRG	0.8986	996.1	404.0	90.04	2.000	0.0955	0.1479	0.0524	87.33	78.64	1.00	1.00
16	TRG	0.8980	995.4	429.8	95.86	2.000	0.0961	0.1502	0.0541	90.17	86.43	1.00	1.00
17	TRG	0.8963	993.5	340.7	76.13	2.000	0.0961	0.1500	0.0539	89.83	68.39	1.00	1.00
18	TRG	0.8964	993.6	362.3	80.95	2.000	0.0954	0.1524	0.0570	95.00	76.90	1.00	1.00
19	TRG	0.8980	995.4	385.2	85.91	2.000	0.0956	0.1522	0.0566	94.33	81.04	1.00	1.00
20	TRG	0.8958	993.0	396.8	88.71	2.000	0.0962	0.1516	0.0554	92.33	81.91	1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11139
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
02	MBL			11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
03	DUP			11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
04	DO	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
05	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
06	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
07	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
08	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
09	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
10	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
11	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
12	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
13	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
14	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
15	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
16	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
17	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
18	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
19	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH
20	TRG	11/23/11 07:23	KSALLINGS	11/23/11 06:43	JBARNARD	11/30/11 10:34	TSMITH	12/06/11 06:47	TSMITH

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-Ra228-1

Run: 1
Analysis Code: Ra228
Eberline Services Work Order: 11-11139
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/g	7.22E+00	8.33E-01	1.08E+00	8.53E+00	84.63	OK		OK	
02	RA-228	MBL	BLANK	pCi/g	7.06E-01	5.11E-01	1.01E+00					OK	OK
03	RA-228	DUP	IB1/2-1	pCi/g	1.40E+01	1.07E+00	1.09E+00				NA	OK	
04	RA-228	DO	IB1/2-1	pCi/g	1.30E+01	1.10E+00	1.25E+00					OK	
05	RA-228	TRG	IB1/2-2	pCi/g	1.49E+01	1.19E+00	1.30E+00					OK	
06	RA-228	TRG	IB1/2-3	pCi/g	1.15E+01	1.05E+00	1.19E+00					OK	
07	RA-228	TRG	IB1/2-4	pCi/g	1.17E+01	1.01E+00	1.10E+00					OK	
08	RA-228	TRG	IB1/2-5	pCi/g	2.59E+01	1.48E+00	1.22E+00					OK	
09	RA-228	TRG	IB1/2-6	pCi/g	1.57E+01	1.24E+00	1.38E+00					OK	
10	RA-228	TRG	IB1/2-7	pCi/g	2.50E+01	1.45E+00	1.36E+00					OK	
11	RA-228	TRG	IB1/2-4A	pCi/g	1.10E+01	1.01E+00	1.16E+00					OK	
12	RA-228	TRG	IB1/2-4B	pCi/g	1.36E+01	1.20E+00	1.40E+00					OK	
13	RA-228	TRG	IB1/2-4C	pCi/g	1.10E+01	1.20E+00	1.61E+00					OK	
14	RA-228	TRG	IB1/2-4D	pCi/g	1.34E+01	1.18E+00	1.26E+00					OK	
15	RA-228	TRG	IB1/2-4E	pCi/g	1.22E+01	1.10E+00	1.28E+00					OK	
16	RA-228	TRG	IB3-1	pCi/g	1.27E+00	6.38E-01	1.22E+00					OK	
17	RA-228	TRG	IB3-2	pCi/g	1.51E+01	1.33E+00	1.57E+00					OK	
18	RA-228	TRG	IB3-3	pCi/g	7.71E+00	1.14E+00	1.73E+00					OK	
19	RA-228	TRG	IB3-4	pCi/g	1.44E+00	7.68E-01	1.48E+00					OK	
20	RA-228	TRG	IB3-5	pCi/g	2.92E+00	8.95E-01	1.61E+00					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11139-Ra228-1

Run: 1
Analysis Code: Ra228
Eberline Services Work Order: 11-11139
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	11/22/11 00:00	1.00E+00	102.54	89.50	91.78	1.00	11/30/2011 10:34	12/6/2011 6:47
02	RA-228	MBL	11/22/11 00:00	1.00E+00	103.32	86.33	89.20	1.00	11/30/2011 10:34	12/6/2011 6:47
03	RA-228	DUP	11/18/11 14:18	1.00E+00	97.56	90.50	88.29	1.00	11/30/2011 10:34	12/6/2011 6:47
04	RA-228	DO	11/18/11 14:18	1.02E+00	89.54	90.83	81.33	1.00	11/30/2011 10:34	12/6/2011 6:47
05	RA-228	TRG	11/18/11 14:10	1.01E+00	87.67	91.00	79.78	1.00	11/30/2011 10:34	12/6/2011 6:47
06	RA-228	TRG	11/18/11 00:00	1.02E+00	92.62	85.33	79.03	1.00	11/30/2011 10:34	12/6/2011 6:47
07	RA-228	TRG	11/18/11 00:00	1.01E+00	96.04	87.00	83.55	1.00	11/30/2011 10:34	12/6/2011 6:47
08	RA-228	TRG	11/18/11 15:20	1.03E+00	89.95	84.33	75.86	1.00	11/30/2011 10:34	12/6/2011 6:47
09	RA-228	TRG	11/18/11 15:12	1.00E+00	85.89	92.83	79.73	1.00	11/30/2011 10:34	12/6/2011 6:47
10	RA-228	TRG	11/18/11 15:20	1.02E+00	91.35	89.83	82.06	1.00	11/30/2011 10:34	12/6/2011 6:47
11	RA-228	TRG	11/18/11 00:00	1.03E+00	90.54	90.67	82.09	1.00	11/30/2011 10:34	12/6/2011 6:47
12	RA-228	TRG	11/18/11 00:00	1.05E+00	79.76	90.67	72.31	1.00	11/30/2011 10:34	12/6/2011 6:47
13	RA-228	TRG	11/18/11 00:00	1.01E+00	81.46	88.83	72.36	1.00	11/30/2011 10:34	12/6/2011 6:47
14	RA-228	TRG	11/18/11 00:00	9.99E-01	85.33	86.83	74.10	1.00	11/30/2011 10:34	12/6/2011 6:47
15	RA-228	TRG	11/18/11 00:00	1.02E+00	90.04	87.33	78.64	1.00	11/30/2011 10:34	12/6/2011 6:47
16	RA-228	TRG	11/18/11 15:47	1.02E+00	95.86	90.17	86.43	1.00	11/30/2011 10:34	12/6/2011 6:47
17	RA-228	TRG	11/18/11 15:42	1.01E+00	76.13	89.83	68.39	1.00	11/30/2011 10:34	12/6/2011 6:47
18	RA-228	TRG	11/18/11 15:40	1.00E+00	80.95	95.00	76.90	1.00	11/30/2011 10:34	12/6/2011 6:47
19	RA-228	TRG	11/18/11 15:50	1.00E+00	85.91	94.33	81.04	1.00	11/30/2011 10:34	12/6/2011 6:47
20	RA-228	TRG	11/18/11 15:37	1.00E+00	88.71	92.33	81.91	1.00	11/30/2011 10:34	12/6/2011 6:47

Preliminary Data Report & Analytical Calculations
Work Order: 11-11139-Ra228-1

Run: 1
Analysis Code: Ra228
Eberline Services Work Order: 11-11139
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	12/06/11 11:08		LB4110R	A2	120	580	1.066666667	0.4699
02	RA-228	MBL	12/06/11 11:08		LB4110R	A3	120	164	0.916666667	0.4809
03	RA-228	DUP	12/06/11 11:08		LB4110R	A4	120	971	1.016666667	0.4732
04	RA-228	DO	12/06/11 11:08		LB4110R	B1	120	887	1.2	0.4754
05	RA-228	TRG	12/06/11 11:08		LB4110R	B2	120	954	1.183333333	0.4658
06	RA-228	TRG	12/06/11 11:08		LB4110R	B3	120	759	1.016666667	0.4713
07	RA-228	TRG	12/06/11 11:08		LB4110R	B4	120	804	0.966666667	0.4773
08	RA-228	TRG	12/06/11 11:08		LB4110R	C1	120	1508	1	0.4705
09	RA-228	TRG	12/06/11 11:08		LB4110R	C3	120	994	1.283333333	0.4614
10	RA-228	TRG	12/06/11 11:08		LB4110R	C4	120	1597	1.433333333	0.4714
11	RA-228	TRG	12/06/11 11:08		LB4110R	D2	120	769	1.066666667	0.4753
12	RA-228	TRG	12/06/11 11:08		LB4110R	D4	120	861	1.266666667	0.4747
13	RA-228	TRG	12/06/11 11:09		LB4110A	C1	120	724	1.5	0.4667
14	RA-228	TRG	12/06/11 11:09		LB4110A	C2	120	762	0.883333333	0.4578
15	RA-228	TRG	12/06/11 11:09		LB4110A	C3	120	804	1.15	0.4699
16	RA-228	TRG	12/06/11 11:09		LB4110A	D2	120	228	1.266666667	0.4682
17	RA-228	TRG	12/06/11 11:09		LB4110A	D4	120	873	1.316666667	0.4741
18	RA-228	TRG	12/06/11 12:07		LB4110A	B1	120	539	1.516666667	0.4626
19	RA-228	TRG	12/06/11 12:07		LB4110A	B2	120	223	1.266666667	0.4691
20	RA-228	TRG	12/06/11 12:07		LB4110A	B3	120	310	1.416666667	0.449

Count Room Report
Client: Foxfire Scientific, Inc.

11-11139-Ra228-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9119	1010.8165	466.9000	102.54	1.00	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9056	1003.8331	467.2000	103.32	1.00	1.00
03	DUP	IB1/2-1	11/18/11 14:18	0.9998	0.9024	1000.2860	439.6000	97.56	1.00	1.00
04	DO	IB1/2-1	11/18/11 14:18	1.0208	0.9030	1000.9511	403.7000	89.54	1.00	1.00
05	TRG	IB1/2-2	11/18/11 14:10	1.0079	0.9030	1000.9511	395.3000	87.67	1.00	1.00
06	TRG	IB1/2-3	11/18/11 00:00	1.0205	0.9015	999.2884	416.9000	92.62	1.00	1.00
07	TRG	IB1/2-4	11/18/11 00:00	1.0122	0.9013	999.0667	432.2000	96.04	1.00	1.00
08	TRG	IB1/2-5	11/18/11 15:20	1.0345	0.9015	999.2884	404.9000	89.95	1.00	1.00
09	TRG	IB1/2-6	11/18/11 15:12	0.9998	0.9010	998.7342	386.4000	85.89	1.00	1.00
10	TRG	IB1/2-7	11/18/11 15:20	1.0155	0.8993	996.8498	410.2000	91.35	1.00	1.00
11	TRG	IB1/2-4A	11/18/11 00:00	1.0291	0.8994	996.9606	406.6000	90.54	1.00	1.00
12	TRG	IB1/2-4B	11/18/11 00:00	1.0465	0.8992	996.7389	358.1000	79.76	1.00	1.00
13	TRG	IB1/2-4C	11/18/11 00:00	1.0068	0.9006	998.2908	366.3000	81.46	1.00	1.00
14	TRG	IB1/2-4D	11/18/11 00:00	0.9994	0.8989	996.4064	383.0000	85.33	1.00	1.00
15	TRG	IB1/2-4E	11/18/11 00:00	1.0205	0.8986	996.0738	404.0000	90.04	1.00	1.00
16	TRG	IB3-1	11/18/11 15:47	1.0214	0.8980	995.4088	429.8000	95.86	1.00	1.00
17	TRG	IB3-2	11/18/11 15:42	1.0093	0.8963	993.5243	340.7000	76.13	1.00	1.00
18	TRG	IB3-3	11/18/11 15:40	1.0014	0.8964	993.6352	362.3000	80.95	1.00	1.00
19	TRG	IB3-4	11/18/11 15:50	1.0001	0.8980	995.4088	385.2000	85.91	1.00	1.00
20	TRG	IB3-5	11/18/11 15:37	1.0042	0.8958	992.9701	396.8000	88.71	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 6:43 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11139	1	Ra228	11/23/2011 6:42	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-11	46 218	11/23/2011	0.430	0.4097				8.53	0.435	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9119	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9056	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9024	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9030	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9030	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9015	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9013	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9015	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9010	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.8993	0.9100
11	Ba-133	Ba-6a	1108.473	11/23/2011	0.8994	0.9100
12	Ba-133	Ba-6a	1108.473	11/23/2011	0.8992	0.9100
13	Ba-133	Ba-6a	1108.473	11/23/2011	0.9006	0.9100
14	Ba-133	Ba-6a	1108.473	11/23/2011	0.8989	0.9100
15	Ba-133	Ba-6a	1108.473	11/23/2011	0.8986	0.9100
16	Ba-133	Ba-6a	1108.473	11/23/2011	0.8980	0.9100
17	Ba-133	Ba-6a	1108.473	11/23/2011	0.8963	0.9100
18	Ba-133	Ba-6a	1108.473	11/23/2011	0.8964	0.9100
19	Ba-133	Ba-6a	1108.473	11/23/2011	0.8980	0.9100
20	Ba-133	Ba-6a	1108.473	11/23/2011	0.8958	0.9100

Balance Printer Tapes

Tracer	LCS

Matrix Spike

0311A
By 12/14/11

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11139	1	Ra228	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	IB1/2-1	DUP					9.9980E-01	9.9980E-01				
04	IB1/2-1	DO					1.0208E+00	1.0208E+00				
05	IB1/2-2	TRG					1.0079E+00	1.0079E+00				
06	IB1/2-3	TRG					1.0205E+00	1.0205E+00				
07	IB1/2-4	TRG					1.0122E+00	1.0122E+00				
08	IB1/2-5	TRG					1.0345E+00	1.0345E+00				
09	IB1/2-6	TRG					9.9980E-01	9.9980E-01				
10	IB1/2-7	TRG					1.0155E+00	1.0155E+00				
11	IB1/2-4A	TRG					1.0291E+00	1.0291E+00				
12	IB1/2-4B	TRG					1.0465E+00	1.0465E+00				
13	IB1/2-4C	TRG					1.0068E+00	1.0068E+00				
14	IB1/2-4D	TRG					9.9940E-01	9.9940E-01				
15	IB1/2-4E	TRG					1.0205E+00	1.0205E+00				
16	IB3-1	TRG					1.0214E+00	1.0214E+00				
17	IB3-2	TRG					1.0093E+00	1.0093E+00				
18	IB3-3	TRG					1.0014E+00	1.0014E+00				
19	IB3-4	TRG					1.0001E+00	1.0001E+00				
20	IB3-5	TRG					1.0042E+00	1.0042E+00				

Comments	

Technician: _____ Date: 11 23 11

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11139	1	Ra228	Yttirum	30.0000	TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS	2.0000	0.0969	0.1506	0.0537	89.50
02	BLANK	MBL	2.0000	0.0973	0.1491	0.0518	86.33
03	DUP	DUP	2.0000	0.0971	0.1514	0.0543	90.50
04	IB1/2-1	DO	2.0000	0.0971	0.1516	0.0545	90.83
05	IB1/2-2	TRG	2.0000	0.0973	0.1519	0.0546	91.00
06	IB1/2-3	TRG	2.0000	0.0968	0.1480	0.0512	85.33
07	IB1/2-4	TRG	2.0000	0.0975	0.1497	0.0522	87.00
08	IB1/2-5	TRG	2.0000	0.0971	0.1477	0.0506	84.33
09	IB1/2-6	TRG	2.0000	0.0967	0.1524	0.0557	92.83
10	IB1/2-7	TRG	2.0000	0.0969	0.1508	0.0539	89.83
11	IB1/2-4A	TRG	2.0000	0.0971	0.1515	0.0544	90.67
12	IB1/2-4B	TRG	2.0000	0.0958	0.1502	0.0544	90.67
13	IB1/2-4C	TRG	2.0000	0.0962	0.1495	0.0533	88.83
14	IB1/2-4D	TRG	2.0000	0.0965	0.1486	0.0521	86.83
15	IB1/2-4E	TRG	2.0000	0.0955	0.1479	0.0524	87.33
16	IB3-1	TRG	2.0000	0.0961	0.1502	0.0541	90.17
17	IB3-2	TRG	2.0000	0.0961	0.1500	0.0539	89.83
18	IB3-3	TRG	2.0000	0.0954	0.1524	0.0570	95.00
19	IB3-4	TRG	2.0000	0.0956	0.1522	0.0566	94.33
20	IB3-5	TRG	2.0000	0.0962	0.1516	0.0554	92.33

Technician: [illegible] Date: 12/6/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11139	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	IB1/2-1	13.4800	253.0700	177.7300	239.5900	164.2500	31.45%	68.55%			
05	IB1/2-2	13.5100	257.3100	182.8000	243.8000	169.2900	30.56%	69.44%			
06	IB1/2-3	13.4700	232.9400	179.7000	219.4700	166.2300	24.26%	75.74%			
07	IB1/2-4	13.5000	192.6800	146.9300	179.1800	133.4300	25.53%	74.47%			
08	IB1/2-5	13.4300	259.1000	185.6800	245.6700	172.2500	29.89%	70.11%			
09	IB1/2-6	13.4800	249.6600	190.1300	236.1800	176.6500	25.21%	74.79%			
10	IB1/2-7	13.4200	207.9200	148.6500	194.5000	135.2300	30.47%	69.53%			
11	IB1/2-4A	13.5200	206.8700	156.5900	193.3500	143.0700	26.00%	74.00%			
12	IB1/2-4B	13.5200	209.6700	155.5400	196.1500	142.0200	27.60%	72.40%			
13	IB1/2-4C	13.4100	208.3500	159.5700	194.9400	146.1600	25.02%	74.98%			
14	IB1/2-4D	13.4500	168.3400	129.2400	154.8900	115.7900	25.24%	74.76%			
15	IB1/2-4E	13.6300	207.2400	159.0500	193.6100	145.4200	24.89%	75.11%			
16	IB3-1	13.7400	272.2200	234.9100	258.4800	221.1700	14.43%	85.57%			
17	IB3-2	13.6900	285.1000	205.9500	271.4100	192.2600	29.16%	70.84%			
18	IB3-3	13.4900	223.8000	181.1200	210.3100	167.6300	20.29%	79.71%			
19	IB3-4	13.3200	283.8400	247.9700	270.5200	234.6500	13.26%	86.74%			
20	IB3-5	13.4300	247.0500	195.7800	233.6200	182.3500	21.95%	78.05%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Sells Date: **Analysis: Rough Prep Logbook**

Analysis: Ra228 Page No. 7855

(R) 12/6/11 KVB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
A2	1111139-01	17	580	120	1400	12/6/11 13:08
C1	1111139-08	30	1508	120	1400	12/6/11 13:08
C3	1111139-09	17	994	120	1400	12/6/11 13:08
A3	1111139-02	10	154	120	1400	12/6/11 13:08
C4	1111139-10	33	1597	120	1400	12/6/11 13:08
A4	1111139-03	27	971	120	1400	12/6/11 13:08
B1	1111139-04	28	887	120	1400	12/6/11 13:08
B2	1111139-05	17	954	120	1400	12/6/11 13:08
B3	1111139-06	16	759	120	1400	12/6/11 13:08
D2	1111139-11	16	769	120	1400	12/6/11 13:08
D4	1111139-12	15	861	120	1400	12/6/11 13:08
B4	1111139-07	24	804	120	1400	12/6/11 13:08

(A) 12/6/11 JCB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1111139-13	28	724	120	1400	12/6/11 13:09
C2	1111139-14	22	762	120	1400	12/6/11 13:09
C3	1111139-15	20	804	120	1400	12/6/11 13:09
D2	1111139-16	10	228	120	1400	12/6/11 13:09
D4	1111139-17	22	873	120	1400	12/6/11 13:09

(A) 12/6/11 KB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
B1	1111139-18	19	539	120	1400	12/6/11 14:07
B2	1111139-19	18	223	120	1400	12/6/11 14:07
B3	1111139-20	13	310	120	1400	12/6/11 14:07

GPC Detector Report
(ALL Backgrounds)

12/6/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/6/2011	0.00E+00	P	-2.53E+01	3.62E-01	2.60E+01
LB4110A - A2	Alpha	11/18/2007	12/6/2011	0.00E+00	P	-2.15E+01	3.45E-01	2.22E+01
LB4110A - A3	Alpha	11/18/2007	12/6/2011	0.00E+00	P	-2.09E+01	2.99E-01	2.15E+01
LB4110A - A4	Alpha	11/18/2007	12/6/2011	0.00E+00	P	-2.22E+01	3.24E-01	2.29E+01
LB4110A - B1	Alpha	11/18/2007	12/6/2011	1.67E-02	P	-1.16E-01	7.48E-02	2.66E-01
LB4110A - B2	Alpha	11/18/2007	12/6/2011	3.33E-02	P	-6.68E-02	7.18E-02	2.10E-01
LB4110A - B3	Alpha	11/18/2007	12/6/2011	5.00E-02	P	-5.90E-02	4.80E-02	1.55E-01
LB4110A - B4	Alpha	11/18/2007	12/6/2011	3.33E-02	P	-4.95E-02	5.96E-02	1.69E-01
LB4110A - C1	Alpha	11/18/2007	12/6/2011	5.00E-02	P	-6.43E-02	7.58E-02	2.16E-01
LB4110A - C2	Alpha	11/18/2007	12/6/2011	5.00E-02	P	-1.83E-01	9.79E-02	3.79E-01
LB4110A - C3	Alpha	11/18/2007	12/6/2011	1.17E-01	P	-2.06E-01	1.05E-01	4.16E-01
LB4110A - C4	Alpha	11/18/2007	12/6/2011	6.67E-02	P	-6.84E-02	7.26E-02	2.14E-01
LB4110A - D1	Alpha	11/18/2007	12/6/2011	3.33E-02	P	-5.94E-02	8.31E-02	2.26E-01
LB4110A - D2	Alpha	11/18/2007	12/6/2011	6.67E-02	P	-7.00E-02	6.11E-02	1.92E-01
LB4110A - D3	Alpha	11/18/2007	12/6/2011	1.33E-01	P	-4.81E-02	6.87E-02	1.85E-01
LB4110A - D4	Alpha	11/18/2007	12/6/2011	1.00E-01	P	-5.78E-02	7.34E-02	2.05E-01
LB4110R - A1	Alpha	11/24/2006	12/6/2011	1.67E-01	P	-1.13E-01	8.99E-02	2.93E-01
LB4110R - A2	Alpha	11/24/2006	12/6/2011	3.33E-02	P	-9.49E-02	8.49E-02	2.65E-01
LB4110R - A3	Alpha	11/24/2006	12/6/2011	1.17E-01	P	-8.10E-02	7.28E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-5.23E-02	7.78E-02	2.08E-01
LB4110R - B1	Alpha	11/24/2006	12/6/2011	6.67E-02	P	-1.07E-01	6.38E-02	2.34E-01
LB4110R - B2	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-7.42E-02	6.91E-02	2.12E-01
LB4110R - B3	Alpha	11/24/2006	12/6/2011	6.67E-02	P	-6.86E-02	6.80E-02	2.05E-01
LB4110R - B4	Alpha	11/24/2006	12/6/2011	5.00E-02	P	-6.69E-02	7.57E-02	2.18E-01
LB4110R - C1	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-8.41E-02	7.90E-02	2.42E-01
LB4110R - C2	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-7.97E-02	7.74E-02	2.35E-01
LB4110R - C3	Alpha	11/24/2006	12/6/2011	8.33E-02	P	-9.72E-02	8.53E-02	2.68E-01
LB4110R - C4	Alpha	11/24/2006	12/6/2011	5.00E-02	P	-6.70E-02	8.67E-02	2.41E-01
LB4110R - D1	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-8.28E-02	8.22E-02	2.47E-01
LB4110R - D2	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-6.11E-02	8.19E-02	2.25E-01
LB4110R - D3	Alpha	11/24/2006	12/6/2011	1.67E-02	P	-5.73E-02	7.43E-02	2.06E-01
LB4110R - D4	Alpha	11/24/2006	12/6/2011	8.33E-02	P	-5.59E-02	8.81E-02	2.32E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

GPC Detector Report
(ALL Backgrounds)

12/6/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/6/2011	1.00E-01	P	-4.13E+01	2.72E+00	4.67E+01
LB4110A - A2	Beta	11/18/2007	12/6/2011	1.00E-01	P	-3.51E+01	1.90E+00	3.89E+01
LB4110A - A3	Beta	11/18/2007	12/6/2011	6.67E-02	P	-3.60E+01	1.69E+00	3.93E+01
LB4110A - A4	Beta	11/18/2007	12/6/2011	3.33E-02	P	-3.74E+01	2.22E+00	4.18E+01
LB4110A - B1	Beta	11/18/2007	12/6/2011	1.52E+00	P	-7.45E+00	3.00E+00	1.35E+01
LB4110A - B2	Beta	11/18/2007	12/6/2011	1.27E+00	P	1.96E-01	1.40E+00	2.60E+00
LB4110A - B3	Beta	11/18/2007	12/6/2011	1.42E+00	P	2.63E-01	1.41E+00	2.56E+00
LB4110A - B4	Beta	11/18/2007	12/6/2011	1.48E+00	P	1.25E-01	1.38E+00	2.63E+00
LB4110A - C1	Beta	11/18/2007	12/6/2011	1.50E+00	P	-6.33E+00	2.45E+00	1.12E+01
LB4110A - C2	Beta	11/18/2007	12/6/2011	8.83E-01	P	3.34E-01	1.32E+00	2.30E+00
LB4110A - C3	Beta	11/18/2007	12/6/2011	1.15E+00	P	4.78E-01	1.53E+00	2.59E+00
LB4110A - C4	Beta	11/18/2007	12/6/2011	9.27E+00	F	-1.71E+00	2.29E+00	6.28E+00
LB4110A - D1	Beta	11/18/2007	12/6/2011	2.12E+00	P	-3.01E+00	2.68E+00	8.38E+00
LB4110A - D2	Beta	11/18/2007	12/6/2011	1.27E+00	P	-9.04E-01	1.62E+00	4.15E+00
LB4110A - D3	Beta	11/18/2007	12/6/2011	4.55E+00	P	7.16E-01	4.36E+00	8.00E+00
LB4110A - D4	Beta	11/18/2007	12/6/2011	1.32E+00	P	-6.16E-01	1.43E+00	3.48E+00
LB4110R - A1	Beta	11/24/2006	12/6/2011	2.10E+01	P	-7.01E+01	4.40E+00	7.89E+01
LB4110R - A2	Beta	11/24/2006	12/6/2011	1.07E+00	P	-5.59E+01	2.37E+00	6.06E+01
LB4110R - A3	Beta	11/24/2006	12/6/2011	9.17E-01	P	-5.16E+01	3.27E+00	5.82E+01
LB4110R - A4	Beta	11/24/2006	12/6/2011	1.02E+00	P	-5.17E+01	2.26E+00	5.62E+01
LB4110R - B1	Beta	11/24/2006	12/6/2011	1.20E+00	P	-5.43E+01	2.27E+00	5.89E+01
LB4110R - B2	Beta	11/24/2006	12/6/2011	1.18E+00	P	-5.43E+01	2.32E+00	5.89E+01
LB4110R - B3	Beta	11/24/2006	12/6/2011	1.02E+00	P	-5.39E+01	3.10E+00	6.01E+01
LB4110R - B4	Beta	11/24/2006	12/6/2011	9.67E-01	P	-5.45E+01	2.15E+00	5.88E+01
LB4110R - C1	Beta	11/24/2006	12/6/2011	1.00E+00	P	-5.40E+01	3.57E+00	6.11E+01
LB4110R - C2	Beta	11/24/2006	12/6/2011	2.05E+00	P	-5.43E+01	3.04E+00	6.03E+01
LB4110R - C3	Beta	11/24/2006	12/6/2011	1.28E+00	P	-5.47E+01	2.89E+00	6.05E+01
LB4110R - C4	Beta	11/24/2006	12/6/2011	1.43E+00	P	-6.17E+01	3.36E+00	6.85E+01
LB4110R - D1	Beta	11/24/2006	12/6/2011	7.85E+00	P	-5.05E+01	6.89E+00	6.43E+01
LB4110R - D2	Beta	11/24/2006	12/6/2011	1.07E+00	P	-5.52E+01	2.18E+00	5.96E+01
LB4110R - D3	Beta	11/24/2006	12/6/2011	3.10E+00	P	-5.85E+01	6.33E+00	7.12E+01
LB4110R - D4	Beta	11/24/2006	12/6/2011	1.27E+00	P	-5.49E+01	2.53E+00	6.00E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

GPC Detector Report
(ALL Efficiencies)

12/6/11

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/6/2011	0.0000	F	0.1224	0.2392	0.3560
LB4110A - A2	Alpha	11/18/2007	12/6/2011	0.0000	F	0.1061	0.2102	0.3144
LB4110A - A3	Alpha	11/18/2007	12/6/2011	0.0000	F	0.1057	0.2078	0.3100
LB4110A - A4	Alpha	11/18/2007	12/6/2011	0.0000	F	0.1122	0.2185	0.3248
LB4110A - B1	Alpha	11/18/2007	12/6/2011	0.2180	P	0.2065	0.2270	0.2475
LB4110A - B2	Alpha	11/18/2007	12/6/2011	0.2096	W	0.2089	0.2249	0.2410
LB4110A - B3	Alpha	11/18/2007	12/6/2011	0.2375	P	0.2259	0.2410	0.2561
LB4110A - B4	Alpha	11/18/2007	12/6/2011	0.2230	W	0.2224	0.2381	0.2537
LB4110A - C1	Alpha	11/18/2007	12/6/2011	0.2270	P	0.2103	0.2215	0.2326
LB4110A - C2	Alpha	11/18/2007	12/6/2011	0.2211	P	0.2049	0.2259	0.2468
LB4110A - C3	Alpha	11/18/2007	12/6/2011	0.2510	P	0.2374	0.2494	0.2614
LB4110A - C4	Alpha	11/18/2007	12/6/2011	0.2206	P	0.2061	0.2272	0.2483
LB4110A - D1	Alpha	11/18/2007	12/6/2011	0.2282	P	0.2190	0.2365	0.2540
LB4110A - D2	Alpha	11/18/2007	12/6/2011	0.2595	P	0.2448	0.2611	0.2773
LB4110A - D3	Alpha	11/18/2007	12/6/2011	0.2607	P	0.2464	0.2663	0.2862
LB4110A - D4	Alpha	11/18/2007	12/6/2011	0.1907	P	0.1785	0.2044	0.2302
LB4110R - A1	Alpha	11/24/2006	12/6/2011	0.2420	P	0.2042	0.2396	0.2749
LB4110R - A2	Alpha	11/24/2006	12/6/2011	0.2132	P	0.1949	0.2227	0.2506
LB4110R - A3	Alpha	11/24/2006	12/6/2011	0.2196	P	0.2002	0.2266	0.2529
LB4110R - A4	Alpha	11/24/2006	12/6/2011	0.2498	P	0.2183	0.2465	0.2746
LB4110R - B1	Alpha	11/24/2006	12/6/2011	0.2170	P	0.1881	0.2276	0.2671
LB4110R - B2	Alpha	11/24/2006	12/6/2011	0.2141	P	0.1817	0.2195	0.2574
LB4110R - B3	Alpha	11/24/2006	12/6/2011	0.2342	P	0.2073	0.2449	0.2825
LB4110R - B4	Alpha	11/24/2006	12/6/2011	0.2274	P	0.1978	0.2347	0.2717
LB4110R - C1	Alpha	11/24/2006	12/6/2011	0.2097	P	0.1872	0.2161	0.2450
LB4110R - C2	Alpha	11/24/2006	12/6/2011	0.2207	P	0.1988	0.2260	0.2532
LB4110R - C3	Alpha	11/24/2006	12/6/2011	0.2391	P	0.2083	0.2412	0.2741
LB4110R - C4	Alpha	11/24/2006	12/6/2011	0.2168	P	0.1942	0.2269	0.2596
LB4110R - D1	Alpha	11/24/2006	12/6/2011	0.2247	P	0.1981	0.2285	0.2589
LB4110R - D2	Alpha	11/24/2006	12/6/2011	0.2548	P	0.2295	0.2592	0.2889
LB4110R - D3	Alpha	11/24/2006	12/6/2011	0.2518	P	0.2256	0.2536	0.2816
LB4110R - D4	Alpha	11/24/2006	12/6/2011	0.1922	P	0.1748	0.2069	0.2389
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

12/6/11

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/6/2011	0.3488	F	0.4817	0.5791	0.6765
LB4110A - A2	Beta	11/18/2007	12/6/2011	0.2967	F	0.4159	0.5122	0.6084
LB4110A - A3	Beta	11/18/2007	12/6/2011	0.3021	F	0.4267	0.5175	0.6082
LB4110A - A4	Beta	11/18/2007	12/6/2011	0.3225	F	0.4467	0.5395	0.6323
LB4110A - B1	Beta	11/18/2007	12/6/2011	0.5170	P	0.4930	0.5336	0.5742
LB4110A - B2	Beta	11/18/2007	12/6/2011	0.4968	W	0.4930	0.5316	0.5702
LB4110A - B3	Beta	11/18/2007	12/6/2011	0.5447	P	0.5058	0.5494	0.5930
LB4110A - B4	Beta	11/18/2007	12/6/2011	0.5295	W	0.5227	0.5541	0.5856
LB4110A - C1	Beta	11/18/2007	12/6/2011	0.5039	P	0.4802	0.5032	0.5261
LB4110A - C2	Beta	11/18/2007	12/6/2011	0.4921	P	0.4401	0.5029	0.5657
LB4110A - C3	Beta	11/18/2007	12/6/2011	0.5868	P	0.5647	0.5880	0.6114
LB4110A - C4	Beta	11/18/2007	12/6/2011	0.5136	P	0.4798	0.5290	0.5781
LB4110A - D1	Beta	11/18/2007	12/6/2011	0.5459	P	0.5121	0.5618	0.6116
LB4110A - D2	Beta	11/18/2007	12/6/2011	0.5739	P	0.5212	0.5996	0.6779
LB4110A - D3	Beta	11/18/2007	12/6/2011	0.6072	P	0.5660	0.6200	0.6739
LB4110A - D4	Beta	11/18/2007	12/6/2011	0.4512	P	0.4170	0.4847	0.5523
LB4110R - A1	Beta	11/24/2006	12/6/2011	0.5577	P	0.4811	0.5697	0.6583
LB4110R - A2	Beta	11/24/2006	12/6/2011	0.5218	P	0.4163	0.5087	0.6011
LB4110R - A3	Beta	11/24/2006	12/6/2011	0.5297	P	0.4647	0.5448	0.6250
LB4110R - A4	Beta	11/24/2006	12/6/2011	0.6060	P	0.5093	0.5913	0.6734
LB4110R - B1	Beta	11/24/2006	12/6/2011	0.5284	P	0.4553	0.5467	0.6381
LB4110R - B2	Beta	11/24/2006	12/6/2011	0.5152	P	0.4321	0.5239	0.6157
LB4110R - B3	Beta	11/24/2006	12/6/2011	0.5777	P	0.5008	0.5913	0.6819
LB4110R - B4	Beta	11/24/2006	12/6/2011	0.5385	P	0.4694	0.5554	0.6414
LB4110R - C1	Beta	11/24/2006	12/6/2011	0.4951	P	0.4258	0.5049	0.5841
LB4110R - C2	Beta	11/24/2006	12/6/2011	0.5302	P	0.4517	0.5315	0.6113
LB4110R - C3	Beta	11/24/2006	12/6/2011	0.5659	P	0.4802	0.5733	0.6663
LB4110R - C4	Beta	11/24/2006	12/6/2011	0.5187	P	0.4456	0.5350	0.6244
LB4110R - D1	Beta	11/24/2006	12/6/2011	0.5447	P	0.4634	0.5454	0.6274
LB4110R - D2	Beta	11/24/2006	12/6/2011	0.6124	P	0.5229	0.6110	0.6991
LB4110R - D3	Beta	11/24/2006	12/6/2011	0.5891	P	0.5080	0.5909	0.6739
LB4110R - D4	Beta	11/24/2006	12/6/2011	0.4669	P	0.4039	0.4921	0.5804
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

SECTION XI

BARIUM-133 ANALYTICAL TRACER DATA

VAX/VMS Peak Search Report Generated 30-NOV-2011 14:54:08.89

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113901_GE5_BAFIL_171540.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 14:38:17
Sample ID : 1111139-01 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.18 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

AG 11/30/11

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.63	18	3	0.84	107.56	102	12	1.98E-02	30.8	
2	8	20.06	8	15	0.33	197.97	196	22	9.27E-03	61.1	2.08E+00
3	8	21.14	110	31	0.79	208.36	196	22	1.22E-01	16.1	
4	0	30.98	2297	81	0.80	302.66	289	27	2.55E+00	2.4	
5	6	35.07	385	37	0.64	341.93	329	30	4.28E-01	6.6	1.08E+00
6	6	35.94	97	28	0.74	350.25	329	30	1.08E-01	23.1	
7	0	51.93	34	24	0.99	503.56	490	20	3.75E-02	35.9	
8	0	53.41	56	16	0.59	517.79	510	20	6.23E-02	20.1	
9	0	59.08	16	13	0.15	572.13	564	13	1.80E-02	46.8	
10	0	61.95	280	41	0.72	599.61	586	29	3.11E-01	8.2	
11	0	66.26	120	40	0.57	641.01	626	28	1.33E-01	15.7	
12	2	79.99	55	16	0.82	772.62	759	39	6.06E-02	45.3	3.08E+00
13	2	81.21	925	13	0.71	784.27	759	39	1.03E+00	3.4	
14	0	84.15	37	11	1.81	812.48	801	22	4.11E-02	25.4	
15	0	112.21	201	32	0.73	1081.55	1070	20	2.23E-01	9.1	
16	0	116.53	48	31	0.69	1122.89	1112	19	5.31E-02	28.0	
17	5	160.79	21	11	0.74	1547.26	1542	16	2.34E-02	35.6	2.76E+00
18	5	161.55	17	9	0.48	1554.60	1542	16	1.88E-02	29.0	
19	0	168.30	11	9	0.30	1619.30	1606	17	1.25E-02	59.0	
20	0	276.99	43	9	1.12	2661.32	2648	20	4.83E-02	21.0	
21	3	303.13	29	10	0.95	2912.00	2902	25	3.23E-02	38.4	1.55E+00
22	3	303.64	67	7	0.69	2916.85	2902	25	7.40E-02	18.4	
23	3	304.10	15	2	0.69	2921.31	2902	25	1.72E-02	61.3	
24	10	333.35	14	0	0.85	3201.69	3198	24	1.56E-02	18.3	2.06E+01
25	10	334.53	147	3	0.98	3213.00	3198	24	1.63E-01	5.0	
26	0	356.80	482	7	0.82	3426.59	3412	28	5.36E-01	4.7	
27	5	384.44	54	0	0.73	3691.58	3681	23	5.97E-02	17.4	5.74E-01
28	5	385.13	32	0	0.60	3698.18	3681	23	3.56E-02	23.8	
29	2	387.29	43	4	1.02	3718.90	3708	27	4.79E-02	30.0	4.20E+00
30	2	387.93	167	2	1.02	3725.00	3708	27	1.86E-01	7.9	
31	0	391.94	46	3	0.55	3763.44	3748	26	5.15E-02	16.6	
32	0	415.58	39	2	0.71	3990.10	3977	22	4.31E-02	18.0	

Sample ID : 1111139-01 Acquisition date : 30-NOV-2011 14:38:17

Total number of lines in spectrum	32	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	8	25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.669E+02	4.669E+02	0.779E+02	16.68	
			---	---			
	Total Activity :		4.669E+02	4.669E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.273E+00	1.273E+00	0.785E+00	61.65	
PA-234	4.47E+09Y	1.00	5.091E+00	5.091E+00	1.657E+00	32.55	
TH-234	4.47E+09Y	1.00	2.527E+02	2.527E+02	0.430E+02	17.00	
AM-241	432.20Y	1.00	1.353E+00	1.353E+00	1.266E+00	93.60	
			---	---			
	Total Activity :		2.604E+02	2.604E+02			

Grand Total Activity : 7.273E+02 7.274E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-01
Acquisition date : 30-NOV-2011 14:38:17

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.669E+02	4.669E+02	16.68	OK
	302.84	17.80	2.575E+00	1.904E+02	1.905E+02	81.30	OK
	356.01	60.00	4.312E+00	5.599E+02	5.599E+02	17.25	OK

Final Mean for 3 Valid Peaks = 4.669E+02+/- 7.787E+01 (16.68%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.273E+00	1.273E+00	61.65	OK
	10.11	20.20	1.000E+02	2.648E+00	2.648E+00	61.65	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	1.476E+03	1.476E+03	80.68	OK

Final Mean for 3 Valid Peaks = 1.273E+00+/- 7.850E-01 (61.65%)

PA-234	9.89	89.00	1.000E+02	6.009E-01	6.009E-01	61.65	OK
	21.72	64.90*	1.000E+02	5.091E+00	5.091E+00	32.55	OK
	37.93	23.75	1.000E+02	1.227E+01	1.227E+01	46.33	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 5.091E+00+/- 1.657E+00 (32.55%)

TH-234	63.29	3.80*	8.750E+01	2.527E+02	2.527E+02	17.00	OK

Final Mean for 1 Valid Peaks = 2.527E+02+/- 4.297E+01 (17.00%)

AM-241	59.54	35.90*	1.000E+02	1.353E+00	1.353E+00	93.60	OK

Final Mean for 1 Valid Peaks = 1.353E+00+/- 1.266E+00 (93.60%)

Flag: "*" = Keyline

Sample ID : 1111139-01 Acquisition date : 30-NOV-2011 14:38:17

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.669E+02	7.787E+01	1.336E+01	1.967E+00	34.949
PA-231	1.273E+00	7.850E-01	1.821E+00	2.050E-02	0.699
PA-234	5.091E+00	1.657E+00	9.407E-01	1.059E-02	5.413
TH-234	2.527E+02	4.297E+01	2.836E+01	3.649E-01	8.909
AM-241	1.353E+00	1.266E+00	2.896E+00	3.260E-02	0.467

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.246E+01		1.458E+01	2.246E+01	7.613E+00	-0.555
CD-109	-6.603E+01		9.295E+01	1.532E+02	1.474E+01	-0.431
NP-237	1.775E+01		2.680E+01	4.864E+01	4.290E+00	0.365

VAX/VMS Peak Search Report Generated 30-NOV-2011 15:11:21.76

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113902_GE5_BAFIL_171543.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 14:56:05
Sample ID : 1111139-02 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.18 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

AG 11/30/11

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.28	9	13	0.17	104.25	99	12	1.01E-02	83.8	
2	0	21.18	114	39	0.78	208.71	200	27	1.27E-01	19.9	
3	0	25.06	26	8	0.55	245.92	240	14	2.93E-02	29.0	
4	3	27.99	44	0	0.77	274.04	269	58	4.89E-02	18.5	2.89E+00
5	3	28.72	43	1	0.58	281.00	269	58	4.80E-02	28.3	
6	3	29.37	32	1	0.43	287.31	269	58	3.59E-02	30.5	
7	3	31.03	2372	19	0.78	303.17	269	58	2.64E+00	2.1	
8	4	35.10	527	16	0.69	342.23	330	29	5.86E-01	4.8	1.38E+00
9	4	36.02	81	3	0.60	351.06	330	29	9.05E-02	26.0	
10	0	53.69	31	31	0.28	520.44	508	17	3.43E-02	39.8	
11	0	61.92	256	50	0.61	599.33	586	27	2.85E-01	9.0	
12	0	66.24	108	42	0.51	640.78	628	26	1.20E-01	17.0	
13	1	79.79	86	14	0.76	770.69	760	36	9.57E-02	17.6	1.75E+00
14	1	81.25	925	6	0.67	784.64	760	36	1.03E+00	3.3	
15	0	112.17	197	36	0.57	1081.17	1071	21	2.18E-01	9.8	
16	0	116.45	27	39	0.73	1122.15	1106	21	3.01E-02	52.3	
17	3	276.44	16	4	1.02	2656.11	2648	22	1.81E-02	39.2	5.14E-01
18	3	277.06	22	4	1.06	2662.02	2648	22	2.44E-02	31.5	
19	5	303.52	116	3	1.15	2915.73	2903	25	1.29E-01	9.9	1.29E+00
20	5	303.97	14	3	0.95	2920.00	2903	25	1.58E-02	75.8	
21	0	308.25	18	5	0.33	2961.06	2947	21	1.97E-02	34.2	
22	2	334.31	126	3	1.03	3210.91	3197	26	1.40E-01	7.8	3.58E+00
23	2	334.83	15	1	1.07	3215.94	3197	26	1.63E-02	59.2	
24	0	356.81	396	21	0.96	3426.60	3412	28	4.40E-01	5.6	
25	0	384.83	81	8	1.27	3695.30	3679	29	9.03E-02	13.2	
26	4	386.99	32	3	1.02	3716.00	3709	26	3.54E-02	24.6	1.59E+00
27	4	387.82	91	2	1.04	3723.98	3709	26	1.01E-01	13.7	
28	0	391.87	34	7	1.28	3762.76	3747	25	3.76E-02	24.8	
29	0	415.37	23	2	0.72	3988.08	3977	19	2.56E-02	24.0	

Sample ID : 1111139-02 Acquisition date : 30-NOV-2011 14:56:05

Total number of lines in spectrum	29	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	7	24.14%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.671E+02	4.672E+02	0.778E+02	16.65	
			---	---			
Total Activity :			4.671E+02	4.672E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	6.500E-01	6.500E-01	10.89E-01	167.60	
PA-234	4.47E+09Y	1.00	5.284E+00	5.284E+00	2.117E+00	40.05	
TH-234	4.47E+09Y	1.00	2.316E+02	2.316E+02	0.427E+02	18.42	
			---	---			
Total Activity :			2.375E+02	2.375E+02			

Grand Total Activity :	7.046E+02	7.047E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-02
Acquisition date : 30-NOV-2011 14:56:05

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.671E+02	4.672E+02	16.65	OK
	302.84	17.80	2.575E+00	7.618E+02	7.619E+02	33.01	OK
	356.01	60.00	4.312E+00	4.600E+02	4.601E+02	18.28	OK

Final Mean for 3 Valid Peaks = 4.672E+02+/- 7.778E+01 (16.65%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	6.500E-01	6.500E-01	167.60	OK
	10.11	20.20	1.000E+02	1.351E+00	1.351E+00	167.60	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	5.905E+03	5.905E+03	31.46	OK

Final Mean for 3 Valid Peaks = 6.500E-01+/- 1.089E+00 (167.60%)

PA-234	9.89	89.00	1.000E+02	3.067E-01	3.067E-01	167.60	OK
	21.72	64.90*	1.000E+02	5.284E+00	5.284E+00	40.05	OK
	37.93	23.75	1.000E+02	1.030E+01	1.030E+01	52.25	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 5.284E+00+/- 2.117E+00 (40.05%)

TH-234	63.29	3.80*	8.750E+01	2.316E+02	2.316E+02	18.42	OK

Final Mean for 1 Valid Peaks = 2.316E+02+/- 4.266E+01 (18.42%)

Flag: "*" = Keyline

Sample ID : 1111139-02
Acquisition date : 30-NOV-2011 14:56:05

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.672E+02	7.778E+01	1.211E+01	1.784E+00	38.564
PA-231	6.500E-01	1.089E+00	1.203E+00	1.354E-02	0.540
PA-234	5.284E+00	2.117E+00	1.423E+00	1.601E-02	3.714
TH-234	2.316E+02	4.266E+01	2.489E+01	3.202E-01	9.304

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.986E+00		1.383E+01	2.760E+01	9.356E+00	0.289
CD-109	-1.653E+01		9.582E+01	1.718E+02	1.653E+01	-0.096
NP-237	-1.839E+01		2.545E+01	4.192E+01	3.697E+00	-0.439
AM-241	1.126E+00		1.584E+00	2.681E+00	3.018E-02	0.420

VAX/VMS Peak Search Report Generated 30-NOV-2011 15:28:19.40

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113903_GE5_BAFIL_171544.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-1
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 15:12:56
Sample ID : 1111139-03 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

AG
11/30/11

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	20.88	143	7	1.63	205.88	193	27	1.59E-01	9.8	
2	0	30.97	2094	62	0.74	302.63	288	26	2.33E+00	2.4	
3	2	35.12	411	9	0.64	342.40	330	29	4.57E-01	5.5	9.67E-01
4	2	36.02	70	9	0.60	351.00	330	29	7.78E-02	28.1	
5	0	53.42	49	25	0.77	517.88	502	23	5.46E-02	25.9	
6	0	61.93	224	52	0.84	599.43	585	31	2.49E-01	10.4	
7	1	65.53	8	14	0.67	634.00	623	34	8.66E-03	160.8	1.59E+00
8	1	66.06	115	16	0.67	639.00	623	34	1.28E-01	11.2	
9	3	78.37	32	3	0.92	757.06	753	42	3.53E-02	12.5	2.61E+00
10	3	79.57	67	7	0.76	768.59	753	42	7.49E-02	15.4	
11	3	81.25	871	3	0.69	784.71	753	42	9.67E-01	3.4	
12	0	112.16	174	39	0.98	1081.00	1071	20	1.94E-01	10.7	
13	0	116.53	34	21	0.72	1122.94	1114	16	3.83E-02	30.7	
14	0	134.79	12	13	1.43	1297.98	1285	20	1.35E-02	68.6	
15	0	161.10	18	9	0.41	1550.26	1539	18	2.04E-02	40.1	
16	0	276.90	44	0	0.38	2660.45	2649	21	4.89E-02	15.1	
17	0	303.60	108	0	0.79	2916.53	2903	24	1.20E-01	9.6	
18	0	334.41	39	14	1.01	3211.84	3196	27	4.28E-02	25.7	
19	0	356.79	355	16	0.95	3426.41	3412	25	3.95E-01	5.8	
20	0	384.75	74	10	0.67	3694.49	3680	27	8.23E-02	14.7	
21	2	387.63	109	20	1.06	3722.17	3708	26	1.21E-01	13.4	2.63E+00
22	2	388.14	59	12	1.02	3727.00	3708	26	6.54E-02	20.9	
23	0	392.08	35	7	0.59	3764.81	3750	25	3.84E-02	24.4	
24	0	415.66	24	2	0.77	3990.91	3977	23	2.62E-02	24.8	

Sample ID : 1111139-03 Acquisition date : 30-NOV-2011 15:12:56

Total number of lines in spectrum	24	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	7	29.17%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.395E+02	4.396E+02	0.733E+02	16.67	
		Total Activity :	4.395E+02	4.396E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.026E+02	2.026E+02	0.429E+02	21.19	
		Total Activity :	2.026E+02	2.026E+02			

Grand Total Activity : 6.422E+02 6.422E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-03
Acquisition date : 30-NOV-2011 15:12:56

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.395E+02	4.396E+02	16.67	OK
	302.84	17.80	2.575E+00	7.075E+02	7.076E+02	32.67	OK
	356.01	60.00	4.312E+00	4.123E+02	4.124E+02	18.58	OK

Final Mean for 3 Valid Peaks = 4.396E+02+/- 7.330E+01 (16.67%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.026E+02	2.026E+02	21.19	OK

Final Mean for 1 Valid Peaks = 2.026E+02+/- 4.294E+01 (21.19%)

Flag: "*" = Keyline

Sample ID : 1111139-03 Acquisition date : 30-NOV-2011 15:12:56

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.396E+02	7.330E+01	1.333E+01	1.962E+00	32.988
TH-234	2.026E+02	4.294E+01	2.077E+01	2.672E-01	9.754

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	6.771E+00		1.316E+01	2.637E+01	8.938E+00	0.257
CD-109	3.751E+01		9.748E+01	1.872E+02	1.802E+01	0.200
PA-231	-5.566E-01		9.505E-01	1.584E+00	1.783E-02	-0.351
PA-234	6.618E+00	+	1.323E+00	2.200E+00	2.477E-02	3.008
NP-237	-3.430E+01		2.718E+01	4.048E+01	3.571E+00	-0.847
AM-241	4.394E-01		1.458E+00	2.348E+00	2.643E-02	0.187

VAX/VMS Peak Search Report Generated 30-NOV-2011 15:46:33.72

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113904_GE5_BAFIL_171548.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
AG
11/30/11
Client ID : IB1/2-1
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 15:31:18
Sample ID : 1111139-04 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	14.85	20	3	0.93	148.08	141	16	2.20E-02	31.6	
2	0	19.27	12	15	0.73	190.42	180	15	1.33E-02	76.0	
3	1	20.64	38	15	0.50	203.53	200	17	4.24E-02	19.9	1.18E+00
4	1	21.15	50	22	0.62	208.46	200	17	5.59E-02	29.4	
5	3	29.71	42	74	0.64	290.56	281	48	4.62E-02	61.0	2.08E+00
6	3	30.98	2002	54	0.71	302.73	281	48	2.22E+00	2.4	
7	1	35.07	354	26	0.61	341.96	328	31	3.93E-01	6.6	1.51E+00
8	1	35.96	144	6	0.66	350.42	328	31	1.60E-01	14.3	
9	0	51.87	25	7	0.43	502.95	497	13	2.81E-02	26.8	
10	0	53.37	40	12	0.45	517.34	509	15	4.44E-02	22.8	
11	0	61.89	213	61	0.94	599.05	585	23	2.36E-01	10.6	
12	0	66.21	114	22	0.91	640.47	626	27	1.27E-01	13.5	
13	3	70.04	11	4	0.49	677.19	675	17	1.24E-02	29.3	3.59E-01
14	3	70.87	20	15	0.74	685.18	675	17	2.24E-02	39.6	
15	1	79.86	37	32	0.69	771.34	760	34	4.16E-02	36.2	8.06E-01
16	1	81.20	800	18	0.64	784.22	760	34	8.88E-01	3.7	
17	0	112.14	196	42	0.61	1080.81	1071	20	2.18E-01	10.0	
18	0	277.26	35	18	1.14	2663.93	2648	23	3.87E-02	29.0	
19	0	303.44	107	3	0.85	2914.97	2903	23	1.19E-01	10.2	
20	0	308.21	22	8	1.05	2960.65	2944	24	2.39E-02	35.0	
21	0	334.32	33	11	0.39	3211.01	3198	24	3.62E-02	27.5	
22	0	356.79	365	15	1.10	3426.45	3411	29	4.05E-01	5.7	
23	0	384.71	102	4	0.77	3694.13	3679	26	1.14E-01	10.6	
24	0	387.73	155	3	0.95	3723.05	3709	28	1.72E-01	8.4	

Sample ID : 1111139-04 Acquisition date : 30-NOV-2011 15:31:18

Total number of lines in spectrum	24	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	6	25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.037E+02	4.037E+02	0.685E+02	16.97	
			---	---			
Total Activity :			4.037E+02	4.037E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.921E+02	1.921E+02	0.415E+02	21.63	
			---	---			
Total Activity :			1.921E+02	1.921E+02			

Grand Total Activity :	5.957E+02	5.958E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-04
Acquisition date : 30-NOV-2011 15:31:18

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.037E+02	4.037E+02	16.97	OK
	302.84	17.80	2.575E+00	7.013E+02	7.013E+02	33.31	OK
	356.01	60.00	4.312E+00	4.231E+02	4.232E+02	18.41	OK

Final Mean for 3 Valid Peaks = 4.037E+02+/- 6.849E+01 (16.97%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.921E+02	1.921E+02	21.63	OK

Final Mean for 1 Valid Peaks = 1.921E+02+/- 4.155E+01 (21.63%)

Flag: "*" = Keyline

Sample ID : 1111139-04 Acquisition date : 30-NOV-2011 15:31:18

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.037E+02	6.849E+01	1.237E+01	1.821E+00	32.643
TH-234	1.921E+02	4.155E+01	2.994E+01	3.852E-01	6.416

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.273E+00		1.452E+01	2.760E+01	9.357E+00	0.082
CD-109	1.641E+02		1.026E+02	2.188E+02	2.106E+01	0.750
PA-231	8.686E-02		1.043E+00	1.905E+00	2.144E-02	0.046
PA-234	2.328E+00	+	1.373E+00	1.949E+00	2.194E-02	1.194
NP-237	-1.537E+01		2.855E+01	4.833E+01	4.263E+00	-0.318
AM-241	-7.064E-02		1.647E+00	2.463E+00	2.772E-02	-0.029

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VAX/VMS Peak Search Report Generated 30-NOV-2011 16:08:26.63

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113905_GE5_BAFIL_171549.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-2
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 15:52:37
Sample ID : 1111139-05 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	16.53	7	12	0.27	164.16	157	10	8.27E-03	95.2	
2	0	21.10	99	10	0.43	208.01	201	16	1.10E-01	12.7	
3	0	25.12	20	8	0.15	246.56	239	15	2.27E-02	36.7	
4	0	30.98	1835	79	0.71	302.74	293	23	2.04E+00	2.7	
5	3	35.10	444	10	0.70	342.21	331	27	4.93E-01	5.3	1.96E+00
6	3	35.97	93	8	0.59	350.59	331	27	1.03E-01	19.1	
7	0	53.46	25	16	0.59	518.27	512	12	2.82E-02	33.7	
8	0	61.90	253	19	0.70	599.20	585	28	2.82E-01	7.5	
9	0	66.21	95	51	1.06	640.50	624	31	1.05E-01	21.5	
10	3	79.73	54	0	0.92	770.13	760	34	6.05E-02	18.3	8.83E-01
11	3	81.23	783	7	0.71	784.45	760	34	8.70E-01	3.7	
12	0	102.45	14	8	0.54	987.98	981	13	1.55E-02	45.7	
13	0	112.17	181	48	0.79	1081.09	1070	21	2.01E-01	11.1	
14	0	161.25	36	11	1.16	1551.70	1538	22	3.95E-02	26.3	
15	0	276.91	40	2	0.87	2660.61	2648	21	4.43E-02	17.5	
16	0	303.51	102	12	0.92	2915.59	2902	25	1.13E-01	12.1	
17	3	333.90	45	4	0.98	3207.00	3199	22	4.95E-02	16.5	1.60E+00
18	3	334.72	33	3	0.71	3214.82	3199	22	3.64E-02	21.9	
19	0	356.83	351	7	0.98	3426.83	3412	27	3.90E-01	5.6	
20	1	384.28	32	5	1.02	3690.00	3680	25	3.58E-02	24.7	1.28E+00
21	1	384.90	48	5	1.02	3696.00	3680	25	5.35E-02	17.7	
22	0	387.67	147	7	1.09	3722.49	3708	27	1.64E-01	9.0	

Sample ID : 1111139-05 Acquisition date : 30-NOV-2011 15:52:37

Total number of lines in spectrum	22	
Number of unidentified lines	16	
Number of lines tentatively identified by NID	6	27.27%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.952E+02	3.953E+02	0.669E+02	16.91	
			---	---			
Total Activity :			3.952E+02	3.953E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.289E+02	2.289E+02	0.356E+02	15.54	
			---	---			
Total Activity :			2.289E+02	2.289E+02			

Grand Total Activity :	6.241E+02	6.242E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-05
Acquisition date : 30-NOV-2011 15:52:37

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.952E+02	3.953E+02	16.91	OK
	302.84	17.80	2.575E+00	6.683E+02	6.684E+02	35.85	OK
	356.01	60.00	4.312E+00	4.077E+02	4.078E+02	18.24	OK

Final Mean for 3 Valid Peaks = 3.953E+02+/- 6.686E+01 (16.91%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.289E+02	2.289E+02	15.54	OK

Final Mean for 1 Valid Peaks = 2.289E+02+/- 3.556E+01 (15.54%)

Flag: "*" = Keyline

Sample ID : 1111139-05 Acquisition date : 30-NOV-2011 15:52:37

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.953E+02	6.686E+01	1.237E+01	1.821E+00	31.962
TH-234	2.289E+02	3.556E+01	2.489E+01	3.202E-01	9.195

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.557E+00		1.532E+01	2.798E+01	9.484E+00	-0.056
CD-109	4.749E+01		8.592E+01	1.718E+02	1.653E+01	0.276
PA-231	2.628E-01		8.850E-01	1.700E+00	1.914E-02	0.155
PA-234	4.579E+00	+	1.175E+00	2.176E+00	2.450E-02	2.104
NP-237	-9.299E+00		2.324E+01	4.058E+01	3.579E+00	-0.229
AM-241	1.573E+00		1.136E+00	2.293E+00	2.581E-02	0.686

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VAX/VMS Peak Search Report Generated 30-NOV-2011 16:25:06.19

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113906_GE5_BAFIL_171551.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-3
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 16:09:48
Sample ID : 1111139-06 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	19.86	23	6	0.76	196.09	190	12	2.57E-02	29.7	
2	0	21.16	118	6	0.67	208.59	202	17	1.31E-01	10.8	
3	0	24.98	13	28	0.14	245.21	237	16	1.48E-02	97.8	
4	0	30.98	2056	66	0.73	302.69	289	26	2.28E+00	2.5	
5	4	35.14	440	32	0.65	342.63	331	29	4.89E-01	5.7	1.51E+00
6	4	36.05	95	6	0.65	351.37	331	29	1.06E-01	21.3	
7	0	52.11	19	26	0.39	505.28	495	16	2.06E-02	58.1	
8	7	52.86	8	9	0.42	512.52	510	16	9.21E-03	59.1	3.56E+00
9	7	53.43	63	15	0.64	518.00	510	16	6.99E-02	15.7	
10	0	61.87	271	29	0.92	598.91	587	25	3.01E-01	7.6	
11	0	66.16	145	14	1.02	640.05	627	27	1.62E-01	10.2	
12	2	79.78	67	8	0.84	770.60	758	41	7.43E-02	26.8	8.07E-01
13	2	81.24	826	6	0.68	784.61	758	41	9.17E-01	3.6	
14	0	112.18	225	47	0.88	1081.23	1069	24	2.50E-01	9.6	
15	0	116.58	25	52	0.38	1123.37	1108	24	2.77E-02	67.6	
16	6	145.74	12	1	0.42	1403.00	1401	19	1.30E-02	25.5	2.08E-01
17	6	146.88	19	4	0.88	1413.89	1401	19	2.12E-02	24.8	
18	0	277.10	45	8	1.14	2662.46	2651	20	5.03E-02	18.7	
19	0	303.57	101	7	0.60	2916.19	2901	24	1.12E-01	11.1	
20	0	334.33	57	3	0.52	3211.08	3197	26	6.34E-02	14.7	
21	0	356.82	373	9	0.93	3426.72	3411	33	4.15E-01	5.5	
22	0	384.62	83	7	1.30	3693.25	3678	25	9.19E-02	13.2	
23	1	387.20	10	7	1.02	3718.00	3709	25	1.15E-02	99.9	8.72E+00
24	1	387.82	211	5	1.02	3724.00	3709	25	2.35E-01	5.9	
25	0	391.80	29	6	0.14	3762.10	3748	26	3.23E-02	25.7	

Sample ID : 1111139-06 Acquisition date : 30-NOV-2011 16:09:48

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.169E+02	4.169E+02	0.703E+02	16.85	
			---	---			
Total Activity :			4.169E+02	4.169E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.448E+02	2.448E+02	0.385E+02	15.72	
			---	---			
Total Activity :			2.448E+02	2.448E+02			

Grand Total Activity :	6.617E+02	6.618E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-06
Acquisition date : 30-NOV-2011 16:09:48

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.169E+02	4.169E+02	16.85	OK
	302.84	17.80	2.575E+00	6.598E+02	6.599E+02	34.55	OK
	356.01	60.00	4.312E+00	4.335E+02	4.335E+02	18.12	OK

Final Mean for 3 Valid Peaks = 4.169E+02+/- 7.026E+01 (16.85%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.448E+02	2.448E+02	15.72	OK

Final Mean for 1 Valid Peaks = 2.448E+02+/- 3.849E+01 (15.72%)

Flag: "*" = Keyline

Sample ID : 1111139-06
Acquisition date : 30-NOV-2011 16:09:48

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.169E+02	7.026E+01	1.421E+01	2.093E+00	29.334
TH-234	2.448E+02	3.849E+01	1.403E+01	1.806E-01	17.445

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.318E+00		1.443E+01	2.842E+01	9.633E+00	0.258
CD-109	-4.892E+01		8.421E+01	1.423E+02	1.370E+01	-0.344
PA-231	-1.287E-01		9.905E-01	1.768E+00	1.990E-02	-0.073
PA-234	5.440E+00	+	1.193E+00	2.261E+00	2.545E-02	2.406
NP-237	-2.983E+01		2.668E+01	4.085E+01	3.603E+00	-0.730
AM-241	1.484E+00		1.310E+00	2.454E+00	2.763E-02	0.605

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VAX/VMS Peak Search Report Generated 30-NOV-2011 16:49:12.93

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113907_GE5_BAFIL_171552.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 16:33:53
Sample ID : 1111139-07 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	3	20.01	24	12	0.74	197.53	186	31	2.69E-02	52.4	9.17E-01
2	3	21.12	100	15	0.75	208.18	186	31	1.12E-01	13.8	
3	0	30.99	2181	68	0.78	302.81	289	26	2.42E+00	2.4	
4	4	35.05	360	28	0.52	341.71	331	29	4.00E-01	6.3	1.77E+00
5	4	36.00	127	10	0.66	350.85	331	29	1.41E-01	18.7	
6	0	53.42	50	8	0.71	517.85	510	17	5.53E-02	18.2	
7	1	61.85	205	35	0.73	598.63	586	31	2.27E-01	9.3	1.29E+00
8	1	62.30	41	29	0.66	603.00	586	31	4.53E-02	44.4	
9	0	66.29	123	44	0.89	641.27	625	30	1.36E-01	16.1	
10	0	77.03	13	10	0.55	744.21	732	15	1.44E-02	53.3	
11	3	79.74	65	46	0.92	770.17	761	37	7.17E-02	19.3	3.80E+00
12	3	81.24	856	23	0.67	784.55	761	37	9.51E-01	3.6	
13	0	112.21	188	45	0.62	1081.50	1071	20	2.09E-01	10.5	
14	0	116.42	57	24	0.56	1121.83	1113	23	6.31E-02	23.9	
15	2	276.84	32	5	0.92	2659.91	2643	29	3.52E-02	25.7	4.16E-01
16	2	277.48	18	4	0.91	2666.09	2643	29	1.97E-02	35.5	
17	0	303.50	123	3	0.70	2915.51	2902	25	1.37E-01	9.5	
18	4	333.38	13	0	0.64	3202.02	3198	25	1.49E-02	19.8	1.30E+00
19	4	334.46	74	0	1.01	3212.35	3198	25	8.20E-02	11.7	
20	0	338.79	24	0	0.31	3253.83	3240	24	2.67E-02	20.4	
21	0	356.77	412	6	1.07	3426.29	3412	25	4.57E-01	5.1	
22	0	384.64	93	3	1.02	3693.46	3679	26	1.03E-01	11.1	
23	1	387.30	64	11	1.02	3719.00	3709	28	7.07E-02	20.2	2.07E+00
24	1	388.14	86	14	1.02	3727.00	3709	28	9.60E-02	16.2	
25	0	391.85	34	6	1.49	3762.62	3747	27	3.81E-02	23.1	

Sample ID : 1111139-07 Acquisition date : 30-NOV-2011 16:33:53

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.321E+02	4.322E+02	0.730E+02	16.90	
			---	---			
Total Activity :			4.321E+02	4.322E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	3.685E+01	3.685E+01	3.277E+01	88.93	
			---	---			
Total Activity :			3.685E+01	3.685E+01			

Grand Total Activity :	4.689E+02	4.690E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-07
Acquisition date : 30-NOV-2011 16:33:53

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.321E+02	4.322E+02	16.90	OK
	302.84	17.80	2.575E+00	8.067E+02	8.068E+02	32.48	OK
	356.01	60.00	4.312E+00	4.780E+02	4.780E+02	17.67	OK

Final Mean for 3 Valid Peaks = 4.322E+02+/- 7.305E+01 (16.90%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	3.685E+01	3.685E+01	88.93	OK

Final Mean for 1 Valid Peaks = 3.685E+01+/- 3.277E+01 (88.93%)

Flag: "*" = Keyline

Sample ID : 1111139-07 Acquisition date : 30-NOV-2011 16:33:53

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.322E+02	7.305E+01	1.378E+01	2.029E+00	31.367
TH-234	3.685E+01	3.277E+01	3.237E+01	4.165E-01	1.138

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-7.420E+00		1.350E+01	2.276E+01	7.716E+00	-0.326
CD-109	7.029E+01		9.621E+01	1.923E+02	1.851E+01	0.366
PA-231	-2.520E-01		9.259E-01	1.627E+00	1.832E-02	-0.155
PA-234	4.645E+00	+	1.296E+00	2.206E+00	2.483E-02	2.106
NP-237	-1.067E+01		2.761E+01	4.784E+01	4.220E+00	-0.223
AM-241	9.784E-01		1.662E+00	2.742E+00	3.087E-02	0.357

VAX/VMS Peak Search Report Generated 30-NOV-2011 17:07:43.50

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113908_GE5_BAFIL_171556.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-5
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 16:52:23
Sample ID : 1111139-08 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

AG
11/30/11

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.59	10	23	0.90	68.89	57	19	1.11E-02	120.8	
2	0	10.28	14	3	0.14	104.21	98	12	1.53E-02	37.1	
3	0	16.35	29	8	0.14	162.43	155	16	3.22E-02	28.6	
4	0	21.12	86	19	0.65	208.17	200	19	9.60E-02	17.1	
5	0	30.98	1898	115	0.77	302.72	292	24	2.11E+00	2.8	
6	1	35.13	396	11	0.66	342.47	333	28	4.40E-01	5.8	1.35E+00
7	1	36.06	88	3	0.66	351.42	333	28	9.77E-02	23.4	
8	0	53.45	49	15	0.37	518.15	509	22	5.48E-02	22.0	
9	0	61.95	242	37	0.82	599.67	587	26	2.68E-01	8.8	
10	1	65.81	63	30	0.73	636.64	628	26	7.04E-02	22.1	1.02E+00
11	1	66.31	44	27	0.60	641.41	628	26	4.88E-02	32.9	
12	1	67.18	20	12	0.60	649.80	628	26	2.21E-02	38.2	
13	0	81.23	802	39	0.62	784.52	777	19	8.91E-01	3.9	
14	0	87.66	29	3	0.95	846.16	836	19	3.20E-02	22.5	
15	0	112.10	202	23	0.64	1080.44	1066	26	2.25E-01	8.8	
16	0	116.41	22	30	0.78	1121.82	1111	18	2.44E-02	54.2	
17	0	239.34	19	8	0.55	2300.38	2288	21	2.14E-02	35.9	
18	0	276.99	41	3	0.63	2661.32	2648	24	4.59E-02	17.6	
19	2	303.23	121	3	1.00	2912.91	2899	29	1.35E-01	9.6	2.83E+00
20	2	303.95	27	3	0.91	2919.88	2899	29	2.96E-02	39.6	
21	0	307.96	22	10	0.67	2958.30	2946	20	2.44E-02	34.3	
22	0	334.42	52	7	1.06	3211.99	3198	26	5.72E-02	17.3	
23	0	356.78	353	6	0.79	3426.37	3412	27	3.92E-01	5.5	
24	0	384.63	77	3	0.83	3693.41	3679	25	8.60E-02	12.2	
25	1	387.61	156	14	1.12	3721.98	3707	29	1.73E-01	9.6	6.38E-01
26	1	388.03	17	10	1.12	3725.98	3707	29	1.91E-02	78.7	

Sample ID : 1111139-08 Acquisition date : 30-NOV-2011 16:52:23

Total number of lines in spectrum	26	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	8	30.77%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CD-109	464.00D	1.00	2.016E+02	2.019E+02	0.933E+02	46.21	
BA-133	10.50Y	1.00	4.048E+02	4.049E+02	0.693E+02	17.12	
NP-237	2.14E+06Y	1.00	5.440E+01	5.440E+01	2.505E+01	46.05	
			---	---			
Total Activity :			6.608E+02	6.611E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	9.821E-01	9.821E-01	7.303E-01	74.36	
PA-234	4.47E+09Y	1.00	3.999E+00	3.999E+00	1.376E+00	34.40	
TH-234	4.47E+09Y	1.00	2.181E+02	2.181E+02	0.393E+02	18.02	
			---	---			
Total Activity :			2.231E+02	2.231E+02			

Grand Total Activity : 8.839E+02 8.842E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-08 Acquisition date : 30-NOV-2011 16:52:23

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
CD-109	88.03	3.72*	1.153E+01	2.016E+02	2.019E+02	46.21	OK
Final Mean for 1 Valid Peaks = 2.019E+02+/- 9.327E+01 (46.21%)							
BA-133	81.00	33.00*	1.802E+01	4.048E+02	4.049E+02	17.12	OK
	302.84	17.80	2.575E+00	7.953E+02	7.954E+02	32.70	OK
	356.01	60.00	4.312E+00	4.094E+02	4.095E+02	18.22	OK
Final Mean for 3 Valid Peaks = 4.049E+02+/- 6.933E+01 (17.12%)							
NP-237	86.50	12.60*	1.262E+01	5.440E+01	5.440E+01	46.05	OK
Final Mean for 1 Valid Peaks = 5.440E+01+/- 2.505E+01 (46.05%)							

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	9.821E-01	9.821E-01	74.36	OK
	10.11	20.20	1.000E+02	2.042E+00	2.042E+00	74.36	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	6.164E+03	6.164E+03	31.14	OK
Final Mean for 3 Valid Peaks = 9.821E-01+/- 7.303E-01 (74.36%)							
PA-234	9.89	89.00	1.000E+02	4.635E-01	4.635E-01	74.36	OK
	21.72	64.90*	1.000E+02	3.999E+00	3.999E+00	34.40	OK
	37.93	23.75	1.000E+02	1.112E+01	1.112E+01	46.92	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent
Final Mean for 3 Valid Peaks = 3.999E+00+/- 1.376E+00 (34.40%)							
TH-234	63.29	3.80*	8.750E+01	2.181E+02	2.181E+02	18.02	OK
Final Mean for 1 Valid Peaks = 2.181E+02+/- 3.932E+01 (18.02%)							

Flag: "*" = Keyline

Sample ID : 1111139-08 Acquisition date : 30-NOV-2011 16:52:23

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CD-109	2.019E+02	9.327E+01	1.518E+02	1.460E+01	1.330
BA-133	4.049E+02	6.933E+01	2.162E+01	3.183E+00	18.727
PA-231	9.821E-01	7.303E-01	1.388E+00	1.562E-02	0.708
PA-234	3.999E+00	1.376E+00	9.407E-01	1.059E-02	4.251
TH-234	2.181E+02	3.932E+01	2.836E+01	3.649E-01	7.690
NP-237	5.440E+01	2.505E+01	4.966E+01	4.381E+00	1.095

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.671E+00		1.366E+01	2.655E+01	8.999E+00	0.138
AM-241	1.785E+00		1.404E+00	2.633E+00	2.964E-02	0.678

VAX/VMS Peak Search Report Generated 1-DEC-2011 05:23:50.39

12/1/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113909_GE5_BAFIL_171558.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-6
Deposition Date :
Sample Date : 30-NOV-2011 00:00:00 Acquisition date : 30-NOV-2011 17:09:11
Sample ID : 1111139-09 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.19	67	35	0.49	208.89	199	19	7.48E-02	25.0	
2	0	25.30	28	5	0.38	248.29	243	15	3.14E-02	24.2	
3	0	30.99	1939	98	0.75	302.77	290	23	2.15E+00	2.6	
4	0	35.26	485	26	0.54	343.71	331	27	5.39E-01	5.4	
5	0	37.40	7	7	0.31	364.26	359	10	7.94E-03	87.4	
6	0	53.38	54	11	0.67	517.49	510	16	6.04E-02	17.8	
7	0	61.85	255	30	0.77	598.67	585	26	2.84E-01	8.0	
8	1	65.74	25	26	0.67	636.00	628	24	2.75E-02	55.7	2.46E+00
9	1	66.37	52	49	0.67	642.00	628	24	5.82E-02	31.4	
10	3	79.78	62	14	0.89	770.61	760	38	6.86E-02	23.5	5.55E-01
11	3	81.25	765	9	0.65	784.68	760	38	8.50E-01	3.8	
12	0	84.51	19	13	0.36	815.90	807	16	2.09E-02	43.7	
13	0	93.00	17	15	1.31	897.33	887	18	1.88E-02	51.8	
14	0	112.15	177	27	0.48	1080.90	1072	20	1.97E-01	9.7	
15	1	115.84	19	10	0.71	1116.28	1111	18	2.09E-02	39.4	1.64E+00
16	1	116.54	48	24	0.75	1123.00	1111	18	5.30E-02	19.6	
17	0	161.19	19	20	1.32	1551.16	1540	20	2.11E-02	54.1	
18	0	277.02	43	3	0.47	2661.62	2648	27	4.75E-02	17.7	
19	0	303.55	95	6	0.67	2916.01	2902	26	1.06E-01	11.6	
20	1	334.01	18	15	0.98	3208.00	3200	22	2.02E-02	48.0	1.37E+00
21	1	334.42	20	17	0.98	3212.00	3200	22	2.24E-02	49.5	
22	6	356.89	423	16	1.09	3427.37	3412	25	4.70E-01	4.7	2.69E+00
23	6	357.58	10	7	1.00	3434.00	3412	25	1.12E-02	67.3	
24	1	384.59	65	5	1.02	3693.00	3679	25	7.27E-02	14.7	7.96E-01
25	1	385.32	14	4	0.92	3699.98	3679	25	1.50E-02	41.8	
26	0	387.68	124	14	0.84	3722.59	3707	27	1.37E-01	10.9	

Sample ID : 1111139-09 Acquisition date : 30-NOV-2011 17:09:11

Total number of lines in spectrum	26	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	7	26.92%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.864E+02	3.864E+02	0.657E+02	17.00	
NP-237	2.14E+06Y	1.00	3.551E+01	3.551E+01	3.124E+01	87.96	
			---	---			
Total Activity :			4.219E+02	4.219E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.306E+02	2.306E+02	0.381E+02	16.53	
			---	---			
Total Activity :			2.306E+02	2.306E+02			

Grand Total Activity : 6.525E+02 6.525E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-09
Acquisition date : 30-NOV-2011 17:09:11

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.864E+02	3.864E+02	17.00	OK
	302.84	17.80	2.575E+00	6.225E+02	6.226E+02	35.18	OK
	356.01	60.00	4.312E+00	4.909E+02	4.910E+02	17.29	OK

Final Mean for 3 Valid Peaks = 3.864E+02+/- 6.570E+01 (17.00%)

NP-237	86.50	12.60*	1.262E+01	3.551E+01	3.551E+01	87.96	OK

Final Mean for 1 Valid Peaks = 3.551E+01+/- 3.124E+01 (87.96%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.306E+02	2.306E+02	16.53	OK

Final Mean for 1 Valid Peaks = 2.306E+02+/- 3.812E+01 (16.53%)

Flag: "*" = Keyline

Sample ID : 1111139-09 Acquisition date : 30-NOV-2011 17:09:11

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.864E+02	6.570E+01	1.291E+01	1.900E+00	29.938
TH-234	2.306E+02	3.812E+01	3.044E+01	3.916E-01	7.576
NP-237	3.551E+01	3.124E+01	4.926E+01	4.345E+00	0.721

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.032E-01		1.425E+01	2.679E+01	9.082E+00	0.026
CD-109	-1.048E-01		9.184E+01	1.693E+02	1.630E+01	-0.001
PA-231	-4.628E-01		9.871E-01	1.675E+00	1.886E-02	-0.276
PA-234	3.115E+00	+	1.561E+00	1.967E+00	2.214E-02	1.584
AM-241	6.934E-02		1.567E+00	2.391E+00	2.691E-02	0.029

VAX/VMS Peak Search Report Generated 1-DEC-2011 07:35:23.04

12/1/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113910_GE5_BAFIL_171564.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-7
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 07:20:07.
Sample ID : 1111139-10 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.64	16	9	0.32	69.34	65	11	1.73E-02	47.7	
2	0	13.13	28	10	0.48	131.60	124	15	3.13E-02	31.8	
3	0	14.59	20	4	0.85	145.56	139	14	2.26E-02	29.6	
4	0	21.06	85	15	0.62	207.58	201	15	9.44E-02	14.7	
5	0	25.87	18	29	0.72	253.75	236	19	1.96E-02	76.5	
6	0	30.99	1929	78	0.75	302.81	292	25	2.14E+00	2.6	
7	1	35.13	403	24	0.66	342.54	331	28	4.47E-01	6.0	3.11E+00
8	1	35.91	133	19	0.60	350.00	331	28	1.47E-01	16.6	
9	0	52.15	13	19	0.14	505.69	495	19	1.40E-02	76.0	
10	0	53.49	42	12	0.36	518.52	513	15	4.68E-02	21.9	
11	0	61.98	202	46	0.91	599.91	588	25	2.24E-01	10.6	
12	0	66.09	114	26	0.88	639.31	626	26	1.27E-01	13.9	
13	4	79.83	56	17	0.85	771.10	763	33	6.25E-02	19.1	7.54E-01
14	4	81.27	813	13	0.68	784.91	763	33	9.03E-01	3.6	
15	0	112.29	190	57	0.85	1082.31	1070	24	2.11E-01	11.6	
16	0	116.51	18	24	0.44	1122.76	1114	16	1.98E-02	57.7	
17	0	186.26	12	12	0.41	1791.46	1771	22	1.36E-02	65.4	
18	0	195.74	15	11	0.15	1882.34	1869	21	1.61E-02	50.0	
19	0	239.37	18	8	0.32	2300.67	2291	16	2.00E-02	36.0	
20	0	276.94	36	5	0.61	2660.87	2651	20	4.01E-02	20.3	
21	1	303.24	93	5	0.95	2913.00	2902	26	1.04E-01	12.5	3.39E+00
22	1	304.28	23	3	0.95	2923.00	2902	26	2.58E-02	33.3	
23	0	334.67	47	14	0.57	3214.34	3202	24	5.28E-02	21.7	
24	5	356.76	302	14	0.95	3426.19	3413	27	3.36E-01	6.7	4.30E+00
25	5	357.26	131	6	1.00	3431.00	3413	27	1.46E-01	14.1	
26	0	384.65	65	12	0.81	3693.58	3677	29	7.22E-02	17.5	
27	2	387.09	70	17	1.02	3717.00	3709	27	7.76E-02	15.4	4.78E+00
28	2	387.71	22	22	0.99	3722.88	3709	27	2.42E-02	70.5	
29	0	392.13	27	5	0.49	3765.27	3753	21	2.97E-02	25.3	

Sample ID : 1111139-10 Acquisition date : 1-DEC-2011 07:20:07

Total number of lines in spectrum	29	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	5	17.24%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.102E+02	4.102E+02	0.693E+02	16.90	
			---	---			
Total Activity :			4.102E+02	4.102E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.822E+02	1.822E+02	0.393E+02	21.59	
			---	---			
Total Activity :			1.822E+02	1.822E+02			

Grand Total Activity :	5.924E+02	5.925E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-10 Acquisition date : 1-DEC-2011 07:20:07

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.102E+02	4.102E+02	16.90	OK
	302.84	17.80	2.575E+00	6.113E+02	6.114E+02	36.40	OK
	356.01	60.00	4.312E+00	3.508E+02	3.508E+02	19.70	OK

Final Mean for 3 Valid Peaks = 4.102E+02+/- 6.933E+01 (16.90%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.822E+02	1.822E+02	21.59	OK

Final Mean for 1 Valid Peaks = 1.822E+02+/- 3.934E+01 (21.59%)

Flag: "*" = Keyline

Sample ID : 1111139-10 Acquisition date : 1-DEC-2011 07:20:07

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.102E+02	6.933E+01	1.355E+01	1.995E+00	30.270
TH-234	1.822E+02	3.934E+01	2.294E+01	2.951E-01	7.945

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.400E+00		1.398E+01	2.698E+01	9.146E+00	0.126
CD-109	-1.530E+01		1.078E+02	1.921E+02	1.849E+01	-0.080
PA-231	3.156E-01		9.650E-01	1.837E+00	2.068E-02	0.172
PA-234	3.933E+00	+	1.168E+00	2.097E+00	2.361E-02	1.875
NP-237	-7.340E+00		2.856E+01	5.027E+01	4.434E+00	-0.146
AM-241	4.094E-01		1.603E+00	2.529E+00	2.846E-02	0.162

VAX/VMS Peak Search Report Generated 1-DEC-2011 07:55:00.74

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113911_GE5_BAFIL_171565.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4A
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 07:39:41.
Sample ID : 1111139-11 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	12.04	14	6	0.79	121.07	115	11	1.50E-02	43.3	
2	0	18.55	9	8	0.23	183.58	177	11	9.51E-03	73.6	
3	1	20.79	73	23	0.56	205.00	195	24	8.08E-02	19.7	1.81E+00
4	1	21.31	42	13	0.56	210.00	195	24	4.63E-02	33.7	
5	0	25.19	24	9	0.57	247.21	242	13	2.67E-02	33.4	
6	0	30.98	2086	123	0.72	302.73	293	28	2.32E+00	2.7	
7	6	35.04	330	33	0.55	341.66	335	26	3.66E-01	7.1	2.89E+00
8	6	35.70	171	37	1.07	347.99	335	26	1.90E-01	17.2	
9	0	53.63	31	49	0.31	519.82	506	19	3.50E-02	49.3	
10	0	61.84	247	35	0.87	598.62	586	26	2.75E-01	8.4	
11	0	66.07	137	22	0.72	639.12	625	27	1.52E-01	11.8	
12	4	79.69	30	19	1.01	769.75	760	36	3.28E-02	37.3	1.07E+00
13	4	79.96	26	22	0.76	772.34	760	36	2.88E-02	67.5	
14	4	81.22	805	14	0.58	784.44	760	36	8.95E-01	3.7	
15	2	111.43	28	23	0.74	1074.00	1069	29	3.13E-02	31.6	2.17E+00
16	2	112.17	188	41	0.72	1081.14	1069	29	2.09E-01	10.5	
17	6	115.42	14	25	1.20	1112.25	1105	35	1.55E-02	71.3	1.48E+00
18	6	116.12	43	37	0.75	1119.00	1105	35	4.76E-02	34.1	
19	6	116.88	15	27	0.55	1126.30	1105	35	1.61E-02	81.6	
20	0	147.58	7	10	1.20	1420.66	1406	16	7.52E-03	99.7	
21	0	161.12	28	12	0.43	1550.40	1542	18	3.11E-02	31.1	
22	1	276.44	14	0	0.90	2656.11	2650	24	1.58E-02	29.8	1.41E+00
23	1	277.16	53	0	0.93	2663.00	2650	24	5.86E-02	14.1	
24	6	303.52	172	5	0.92	2915.73	2902	23	1.91E-01	6.5	5.74E+00
25	6	304.18	13	3	0.69	2922.01	2902	23	1.44E-02	41.6	
26	0	307.94	28	5	0.83	2958.06	2947	20	3.11E-02	24.1	
27	0	334.31	44	12	1.18	3210.93	3198	25	4.84E-02	22.4	
28	0	356.87	355	17	0.91	3427.20	3412	28	3.95E-01	5.9	
29	0	384.70	41	11	0.56	3694.04	3678	25	4.53E-02	23.4	
30	0	387.86	156	15	0.97	3724.37	3709	28	1.74E-01	9.5	

Sample ID : 1111139-11 Acquisition date : 1-DEC-2011 07:39:41

Total number of lines in spectrum	30	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	6	20.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.065E+02	4.066E+02	0.691E+02	17.00	
			---	---			
Total Activity :			4.065E+02	4.066E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.234E+02	2.234E+02	0.387E+02	17.33	
			---	---			
Total Activity :			2.234E+02	2.234E+02			

Grand Total Activity :	6.299E+02	6.300E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-11
Acquisition date : 1-DEC-2011 07:39:41

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.065E+02	4.066E+02	17.00	OK
	302.84	17.80	2.575E+00	1.128E+03	1.128E+03	29.47	OK
	356.01	60.00	4.312E+00	4.126E+02	4.126E+02	18.61	OK

Final Mean for 3 Valid Peaks = 4.066E+02+/- 6.911E+01 (17.00%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.234E+02	2.234E+02	17.33	OK

Final Mean for 1 Valid Peaks = 2.234E+02+/- 3.871E+01 (17.33%)

Flag: "*" = Keyline

Sample ID : 1111139-11 Acquisition date : 1-DEC-2011 07:39:41

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.066E+02	6.911E+01	1.309E+01	1.928E+00	31.052
TH-234	2.234E+02	3.871E+01	1.302E+01	1.676E-01	17.152

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.523E+00		1.609E+01	3.039E+01	1.030E+01	0.116
CD-109	-2.042E+01		1.108E+02	1.960E+02	1.886E+01	-0.104
PA-231	3.162E-01		1.032E+00	1.940E+00	2.184E-02	0.163
PA-234	1.929E+00	+	1.301E+00	2.054E+00	2.312E-02	0.939
NP-237	-8.851E+00		2.836E+01	4.959E+01	4.374E+00	-0.179
AM-241	3.992E-01		1.782E+00	2.760E+00	3.107E-02	0.145

VAX/VMS Peak Search Report Generated 1-DEC-2011 08:12:00.51

12/11/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113912_GE5_BAFIL_171566.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4B
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 07:56:44.
Sample ID : 1111139-12 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.05	90	27	0.56	207.48	197	22	1.00E-01	18.2	
2	0	30.98	1824	134	0.67	302.69	292	28	2.03E+00	3.0	
3	0	35.04	296	120	0.60	341.62	335	15	3.29E-01	10.0	
4	0	36.13	45	28	0.37	352.08	349	11	5.01E-02	34.3	
5	0	37.86	5	6	0.11	368.70	359	12	5.56E-03	107.7	
6	0	53.49	27	28	0.38	518.51	508	17	3.00E-02	43.0	
7	0	61.87	201	29	0.73	598.85	587	28	2.23E-01	9.5	
8	0	65.97	78	46	0.71	638.15	624	26	8.63E-02	23.4	
9	0	75.37	10	19	0.33	728.29	719	14	1.15E-02	82.4	
10	3	79.80	34	26	0.92	770.78	761	33	3.75E-02	37.8	1.02E+00
11	3	81.25	709	15	0.65	784.65	761	33	7.88E-01	4.0	
12	4	111.74	81	40	0.74	1077.00	1071	18	9.02E-02	15.9	7.68E+00
13	4	112.36	79	21	0.51	1082.97	1071	18	8.73E-02	18.1	
14	0	116.61	15	26	0.34	1123.68	1110	18	1.64E-02	79.9	
15	0	142.05	11	6	0.57	1367.65	1354	17	1.17E-02	54.4	
16	0	160.91	28	0	0.57	1548.43	1539	17	3.11E-02	18.9	
17	0	277.13	41	12	0.50	2662.73	2649	24	4.56E-02	23.0	
18	5	303.51	95	0	0.98	2915.59	2901	26	1.05E-01	10.6	4.69E+00
19	5	304.17	43	0	0.95	2922.00	2901	26	4.77E-02	16.5	
20	1	334.21	51	3	0.98	3210.00	3195	27	5.64E-02	15.0	1.97E+00
21	1	334.74	16	1	0.98	3215.00	3195	27	1.79E-02	41.2	
22	0	356.79	348	16	0.93	3426.48	3412	27	3.87E-01	5.9	
23	2	384.07	40	4	1.02	3688.00	3679	26	4.50E-02	18.8	1.58E+00
24	2	384.89	24	5	0.83	3695.85	3679	26	2.70E-02	38.6	
25	1	387.51	99	11	1.02	3721.00	3708	25	1.10E-01	12.7	1.33E+00
26	1	388.32	33	6	0.92	3728.72	3708	25	3.72E-02	19.6	

Sample ID : 1111139-12 Acquisition date : 1-DEC-2011 07:56:44

Total number of lines in spectrum	26	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	6	23.08%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.580E+02	3.581E+02	0.615E+02	17.19	
			---	---			
Total Activity :			3.580E+02	3.581E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.814E+02	1.814E+02	0.351E+02	19.38	
			---	---			
Total Activity :			1.814E+02	1.814E+02			

Grand Total Activity :	5.394E+02	5.394E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-12 Acquisition date : 1-DEC-2011 07:56:44

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.580E+02	3.581E+02	17.19	OK
	302.84	17.80	2.575E+00	6.215E+02	6.215E+02	33.92	OK
	356.01	60.00	4.312E+00	4.038E+02	4.038E+02	18.66	OK

Final Mean for 3 Valid Peaks = 3.581E+02+/- 6.154E+01 (17.19%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.814E+02	1.814E+02	19.38	OK

Final Mean for 1 Valid Peaks = 1.814E+02+/- 3.514E+01 (19.38%)

Flag: "*" = Keyline

Sample ID : 1111139-12 Acquisition date : 1-DEC-2011 07:56:44

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.581E+02	6.154E+01	1.132E+01	1.666E+00	31.642
TH-234	1.814E+02	3.514E+01	2.077E+01	2.672E-01	8.731

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.627E+00		1.560E+01	2.756E+01	9.341E+00	-0.168
CD-109	-3.743E+01		9.054E+01	1.571E+02	1.512E+01	-0.238
PA-231	-8.823E-01		1.016E+00	1.612E+00	1.815E-02	-0.547
PA-234	4.162E+00	+	1.526E+00	2.102E+00	2.366E-02	1.981
NP-237	6.478E+00		2.510E+01	4.782E+01	4.218E+00	0.135
AM-241	3.031E-01		1.494E+00	2.357E+00	2.653E-02	0.129

VAX/VMS Peak Search Report Generated 1-DEC-2011 08:29:01.10

72/11u

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113913_GE5_BAFIL_171567.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4C
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 08:13:45.
Sample ID : 1111139-13 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	12.90	23	13	0.92	129.38	118	17	2.54E-02	41.5	
2	0	21.04	93	38	0.64	207.41	196	19	1.03E-01	19.0	
3	0	30.97	1923	66	0.72	302.60	290	24	2.14E+00	2.5	
4	2	35.07	368	19	0.67	341.95	333	29	4.08E-01	6.0	1.06E+00
5	2	36.12	70	11	0.60	352.00	333	29	7.77E-02	26.7	
6	0	51.93	25	10	0.82	503.61	497	12	2.78E-02	29.6	
7	0	53.36	55	7	0.65	517.26	510	14	6.11E-02	16.1	
8	0	56.51	15	8	0.42	547.48	539	13	1.62E-02	44.3	
9	0	61.91	191	42	0.70	599.30	586	25	2.13E-01	10.5	
10	2	65.74	39	12	0.67	635.94	629	25	4.30E-02	24.2	1.69E+00
11	2	66.23	48	17	0.73	640.66	629	25	5.34E-02	25.9	
12	0	77.24	19	8	0.56	746.24	736	17	2.09E-02	38.0	
13	1	79.75	37	13	0.76	770.34	760	40	4.13E-02	28.8	1.08E+00
14	1	81.23	725	13	0.67	784.53	760	40	8.06E-01	3.8	
15	0	112.22	135	47	0.75	1081.62	1065	26	1.50E-01	14.2	
16	0	116.43	19	18	0.25	1121.98	1115	14	2.11E-02	47.2	
17	0	276.93	36	5	0.34	2660.78	2648	23	3.96E-02	21.3	
18	0	303.60	100	3	0.55	2916.50	2903	26	1.11E-01	10.7	
19	0	334.29	46	3	0.60	3210.73	3196	26	5.13E-02	16.7	
20	0	356.84	332	0	0.53	3426.89	3412	31	3.69E-01	5.5	
21	0	384.72	70	8	0.63	3694.26	3680	25	7.79E-02	14.8	
22	0	387.72	94	17	0.74	3722.98	3708	27	1.04E-01	13.8	
23	0	415.64	24	2	0.72	3990.66	3977	22	2.66E-02	24.2	

Sample ID : 1111139-13 Acquisition date : 1-DEC-2011 08:13:45

Total number of lines in spectrum	23	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	6	26.09%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.662E+02	3.663E+02	0.625E+02	17.07	
			---	---			
Total Activity :			3.662E+02	3.663E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.728E+02	1.728E+02	0.371E+02	21.49	
			---	---			
Total Activity :			1.728E+02	1.728E+02			

Grand Total Activity :	5.390E+02	5.391E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-13 Acquisition date : 1-DEC-2011 08:13:45

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.662E+02	3.663E+02	17.07	OK
	302.84	17.80	2.575E+00	6.544E+02	6.544E+02	33.94	OK
	356.01	60.00	4.312E+00	3.854E+02	3.854E+02	18.16	OK

Final Mean for 3 Valid Peaks = 3.663E+02+/- 6.254E+01 (17.07%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.728E+02	1.728E+02	21.49	OK

Final Mean for 1 Valid Peaks = 1.728E+02+/- 3.714E+01 (21.49%)

Flag: "*" = Keyline

Sample ID : 1111139-13 Acquisition date : 1-DEC-2011 08:13:45

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.663E+02	6.254E+01	1.185E+01	1.745E+00	30.895
TH-234	1.728E+02	3.714E+01	2.644E+01	3.402E-01	6.536

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.017E+01		1.197E+01	1.831E+01	6.205E+00	-0.556
CD-109	-1.697E+01		9.982E+01	1.784E+02	1.717E+01	-0.095
PA-231	5.614E-02		9.014E-01	1.671E+00	1.881E-02	0.034
PA-234	4.287E+00	+	1.643E+00	1.979E+00	2.227E-02	2.167
NP-237	1.034E+00		2.542E+01	4.704E+01	4.149E+00	0.022
AM-241	1.170E-01		1.473E+00	2.276E+00	2.562E-02	0.051

VAX/VMS Peak Search Report Generated 1-DEC-2011 08:45:47.34 12/1/14

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113914_GE5_BAFIL_171571.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4D
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 08:30:33.
Sample ID : 1111139-14 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.22	13	4	0.46	132.44	128	10	1.46E-02	41.2	
2	0	14.27	8	5	0.33	142.52	138	10	8.72E-03	64.4	
3	0	21.00	94	21	0.56	207.00	196	21	1.05E-01	15.9	
4	2	29.45	51	75	0.59	288.00	279	35	5.68E-02	35.7	5.13E+00
5	2	30.97	1788	57	0.71	302.65	279	35	1.99E+00	2.7	
6	2	35.06	380	4	0.63	341.83	330	29	4.22E-01	5.8	1.00E+00
7	2	35.97	113	7	0.71	350.59	330	29	1.26E-01	18.0	
8	0	53.34	48	13	0.42	517.05	508	16	5.29E-02	20.6	
9	0	61.91	248	54	0.38	599.26	583	29	2.76E-01	9.5	
10	2	65.96	110	17	0.81	638.08	627	31	1.22E-01	12.3	1.36E+00
11	2	66.51	20	11	0.81	643.35	627	31	2.24E-02	70.2	
12	2	79.81	52	16	0.84	770.86	758	48	5.81E-02	34.6	7.24E-01
13	2	81.23	759	13	0.67	784.51	758	48	8.43E-01	3.8	
14	0	84.12	17	9	0.55	812.23	806	13	1.93E-02	38.6	
15	0	112.18	152	52	0.90	1081.26	1070	19	1.69E-01	12.6	
16	0	116.44	29	28	0.40	1122.10	1109	21	3.17E-02	43.5	
17	0	277.07	56	0	1.38	2662.14	2651	21	6.22E-02	13.4	
18	1	303.12	15	11	1.05	2911.91	2903	25	1.64E-02	76.3	5.21E-01
19	1	303.65	98	11	0.95	2917.00	2903	25	1.09E-01	12.5	
20	4	334.21	37	9	0.98	3210.00	3198	24	4.14E-02	25.5	1.82E+00
21	4	334.93	31	3	0.64	3216.87	3198	24	3.41E-02	20.0	
22	0	356.81	369	10	0.92	3426.60	3411	28	4.10E-01	5.5	
23	0	384.76	59	14	0.79	3694.64	3679	25	6.58E-02	18.6	
24	0	387.76	120	25	0.82	3723.37	3706	28	1.33E-01	12.7	
25	0	392.17	19	12	0.15	3765.71	3748	26	2.13E-02	44.6	
26	0	415.68	24	6	0.32	3991.10	3976	23	2.69E-02	28.1	

Sample ID : 1111139-14 Acquisition date : 1-DEC-2011 08:30:33

Total number of lines in spectrum	26	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	6	23.08%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.830E+02	3.830E+02	0.652E+02	17.03	
			---	---			
Total Activity :			3.830E+02	3.830E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.244E+02	2.244E+02	0.437E+02	19.49	
			---	---			
Total Activity :			2.244E+02	2.244E+02			

Grand Total Activity :	6.074E+02	6.075E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-14 Acquisition date : 1-DEC-2011 08:30:33

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.830E+02	3.830E+02	17.03	OK
	302.84	17.80	2.575E+00	9.646E+01	9.647E+01	154.88	OK
	356.01	60.00	4.312E+00	4.282E+02	4.282E+02	18.20	OK

Final Mean for 3 Valid Peaks = 3.830E+02+/- 6.523E+01 (17.03%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.244E+02	2.244E+02	19.49	OK

Final Mean for 1 Valid Peaks = 2.244E+02+/- 4.374E+01 (19.49%)

Flag: "*" = Keyline

Sample ID : 1111139-14 Acquisition date : 1-DEC-2011 08:30:33

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.830E+02	6.523E+01	1.320E+01	1.943E+00	29.020
TH-234	2.244E+02	4.374E+01	2.963E+01	3.812E-01	7.574

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.632E+00		1.308E+01	2.419E+01	8.200E+00	-0.067
CD-109	-2.377E+01		9.473E+01	1.681E+02	1.618E+01	-0.141
PA-231	3.266E-01		9.435E-01	1.806E+00	2.033E-02	0.181
PA-234	4.358E+00	+	1.401E+00	1.944E+00	2.189E-02	2.241
NP-237	4.295E-01		2.563E+01	4.482E+01	3.954E+00	0.010
AM-241	9.720E-01		1.467E+00	2.502E+00	2.816E-02	0.389

VAX/VMS Peak Search Report Generated 1-DEC-2011 09:03:25.87

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113915_GE5_BAFIL_171572.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB1/2-4E
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 08:48:07.
Sample ID : 1111139-15 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.18	77	24	0.53	208.74	201	17	8.58E-02	19.5	
2	4	29.15	43	21	0.71	285.18	274	46	4.79E-02	42.4	2.44E+00
3	4	30.97	1996	44	0.78	302.64	274	46	2.22E+00	2.4	
4	2	35.13	425	28	0.72	342.49	332	27	4.72E-01	5.9	1.89E+00
5	2	35.92	91	14	0.60	350.06	332	27	1.02E-01	24.5	
6	0	53.41	23	44	0.18	517.80	502	24	2.54E-02	68.1	
7	0	61.93	206	39	0.61	599.44	589	19	2.29E-01	9.3	
8	1	64.70	29	2	0.66	626.00	624	35	3.24E-02	8.9	3.04E+00
9	1	65.53	19	11	0.67	634.00	624	35	2.09E-02	61.0	
10	1	66.06	95	10	0.67	639.00	624	35	1.05E-01	12.8	
11	0	77.78	9	13	0.14	751.45	741	14	9.53E-03	86.2	
12	1	79.78	65	15	0.76	770.58	759	39	7.22E-02	22.9	1.32E+00
13	1	81.23	800	13	0.69	784.53	759	39	8.89E-01	3.6	
14	0	92.93	12	9	1.05	896.63	887	15	1.28E-02	58.9	
15	0	112.40	151	68	0.92	1083.35	1067	26	1.68E-01	14.8	
16	2	116.33	61	20	0.75	1121.00	1108	29	6.80E-02	19.2	2.64E+00
17	2	117.14	24	8	0.91	1128.76	1108	29	2.69E-02	38.4	
18	3	303.39	88	7	0.85	2914.49	2900	27	9.75E-02	12.8	7.04E-01
19	3	304.14	17	1	0.94	2921.69	2900	27	1.90E-02	41.6	
20	6	356.79	317	0	1.00	3426.42	3412	25	3.52E-01	5.8	1.04E+00
21	6	357.58	41	0	0.53	3433.99	3412	25	4.61E-02	22.2	
22	0	384.72	74	14	0.62	3694.24	3681	23	8.22E-02	15.4	
23	1	387.72	224	18	1.02	3723.00	3709	24	2.49E-01	6.3	8.37E+00
24	1	388.14	10	14	1.02	3727.00	3709	24	1.15E-02	112.7	

Sample ID : 1111139-15 Acquisition date : 1-DEC-2011 08:48:07

Total number of lines in spectrum	24	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	5	20.83%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.040E+02	4.040E+02	0.683E+02	16.91	
			---	---			
Total Activity :			4.040E+02	4.040E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.864E+02	1.864E+02	0.354E+02	19.00	
			---	---			
Total Activity :			1.864E+02	1.864E+02			

Grand Total Activity :	5.903E+02	5.904E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-15 Acquisition date : 1-DEC-2011 08:48:07

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.040E+02	4.040E+02	16.91	OK
	302.84	17.80	2.575E+00	5.750E+02	5.750E+02	36.76	OK
	356.01	60.00	4.312E+00	3.683E+02	3.683E+02	18.53	OK

Final Mean for 3 Valid Peaks = 4.040E+02+/- 6.832E+01 (16.91%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.864E+02	1.864E+02	19.00	OK

Final Mean for 1 Valid Peaks = 1.864E+02+/- 3.540E+01 (19.00%)

Flag: "*" = Keyline

Sample ID : 1111139-15 Acquisition date : 1-DEC-2011 08:48:07

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.040E+02	6.832E+01	1.185E+01	1.745E+00	34.079
TH-234	1.864E+02	3.540E+01	2.489E+01	3.202E-01	7.487

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	4.256E+00		1.716E+01	3.223E+01	1.093E+01	0.132
CD-109	-6.646E+01		9.708E+01	1.607E+02	1.546E+01	-0.414
PA-231	-3.650E-01		8.837E-01	1.522E+00	1.713E-02	-0.240
PA-234	3.572E+00	+	1.404E+00	2.001E+00	2.252E-02	1.785
NP-237	-1.262E+01		2.787E+01	4.782E+01	4.218E+00	-0.264
AM-241	-2.820E-01		1.455E+00	2.200E+00	2.476E-02	-0.128

VAX/VMS Peak Search Report Generated 1-DEC-2011 09:28:26.25

12/1 m

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113916_GE5_BAFIL_171573.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-1
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 09:12:33.
Sample ID : 1111139-16 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3.62	17	69	0.21	40.40	37	10	1.90E-02	102.3	
2	0	14.50	13	7	0.11	144.74	139	10	1.41E-02	49.1	
3	0	21.09	95	22	0.65	207.85	200	15	1.06E-01	14.9	
4	0	30.95	2121	107	0.74	302.44	284	32	2.36E+00	2.6	
5	3	35.06	412	0	0.68	341.83	332	26	4.58E-01	5.5	2.65E+00
6	3	35.96	139	0	0.66	350.42	332	26	1.55E-01	12.3	
7	0	53.75	23	35	1.14	521.02	506	19	2.56E-02	56.3	
8	3	59.68	22	15	0.87	577.88	566	42	2.41E-02	42.3	8.69E-01
9	3	61.81	218	9	0.88	598.26	566	42	2.42E-01	7.6	
10	1	66.04	107	19	0.73	638.85	628	33	1.19E-01	13.8	1.24E+00
11	1	66.79	47	12	0.67	646.00	628	33	5.23E-02	29.1	
12	3	79.74	43	12	0.92	770.19	761	33	4.82E-02	25.8	1.31E+00
13	3	81.21	851	17	0.69	784.27	761	33	9.46E-01	3.6	
14	0	112.10	165	58	0.59	1080.48	1070	24	1.83E-01	13.0	
15	0	116.40	15	32	0.38	1121.64	1111	16	1.63E-02	78.5	
16	0	276.91	38	3	0.59	2660.64	2648	23	4.22E-02	18.5	
17	0	303.52	113	7	0.91	2915.68	2903	22	1.26E-01	10.6	
18	0	334.39	49	3	0.45	3211.65	3197	25	5.49E-02	15.9	
19	3	356.62	247	6	0.92	3424.86	3411	31	2.75E-01	7.9	4.58E+00
20	3	357.16	212	8	1.00	3430.00	3411	31	2.36E-01	9.1	
21	2	383.91	12	1	0.82	3686.47	3680	25	1.28E-02	59.5	3.25E+00
22	2	384.70	120	8	1.02	3694.00	3680	25	1.34E-01	8.8	
23	3	386.67	23	8	1.23	3712.95	3707	30	2.59E-02	22.1	1.83E+00
24	3	387.62	86	12	1.02	3722.00	3707	30	9.53E-02	15.6	
25	3	388.30	49	3	0.74	3728.57	3707	30	5.40E-02	22.8	
26	1	391.06	27	2	1.02	3755.00	3748	23	3.04E-02	20.6	2.44E+00
27	1	392.10	37	14	1.02	3765.00	3748	23	4.06E-02	18.1	

Sample ID : 1111139-16 Acquisition date : 1-DEC-2011 09:12:33

Total number of lines in spectrum	27	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	7	25.93%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.297E+02	4.298E+02	0.724E+02	16.84	
			---	---			
Total Activity :			4.297E+02	4.298E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.968E+02	1.968E+02	0.309E+02	15.71	
AM-241	432.20Y	1.00	1.815E+00	1.815E+00	1.536E+00	84.64	
			---	---			
Total Activity :			1.986E+02	1.986E+02			

Grand Total Activity :	6.283E+02	6.284E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-16 Acquisition date : 1-DEC-2011 09:12:33

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.297E+02	4.298E+02	16.84	OK
	302.84	17.80	2.575E+00	7.407E+02	7.407E+02	33.82	OK
	356.01	60.00	4.312E+00	2.871E+02	2.871E+02	21.45	OK

Final Mean for 3 Valid Peaks = 4.298E+02+/- 7.236E+01 (16.84%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.968E+02	1.968E+02	15.71	OK

Final Mean for 1 Valid Peaks = 1.968E+02+/- 3.092E+01 (15.71%)

AM-241	59.54	35.90*	1.000E+02	1.815E+00	1.815E+00	84.64	OK

Final Mean for 1 Valid Peaks = 1.815E+00+/- 1.536E+00 (84.64%)

Flag: "*" = Keyline

Sample ID : 1111139-16 Acquisition date : 1-DEC-2011 09:12:33

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.298E+02	7.236E+01	1.185E+01	1.745E+00	36.253
TH-234	1.968E+02	3.092E+01	2.942E+01	3.785E-01	6.688
AM-241	1.815E+00	1.536E+00	2.135E+00	2.403E-02	0.850

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.092E+00		1.414E+01	2.484E+01	8.420E+00	-0.205
CD-109	6.796E+00		9.499E+01	1.762E+02	1.695E+01	0.039
PA-231	-3.262E-01		8.387E-01	1.455E+00	1.638E-02	-0.224
PA-234	4.399E+00	+	1.326E+00	2.101E+00	2.365E-02	2.094
NP-237	-1.718E-01		2.848E+01	5.176E+01	4.566E+00	-0.003

VAX/VMS Peak Search Report Generated 1-DEC-2011 09:45:25.65 12/11/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113917_GE5_BAFIL_171578.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-2
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 09:30:07.
Sample ID : 1111139-17 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.24	66	50	0.64	209.35	196	20	7.33E-02	29.0	
2	2	29.71	54	66	0.64	290.56	277	42	6.03E-02	47.1	1.83E+00
3	2	30.99	1761	62	0.71	302.77	277	42	1.96E+00	2.7	
4	1	35.06	326	30	0.56	341.87	334	23	3.62E-01	7.0	2.06E+00
5	1	35.85	93	19	0.66	349.42	334	23	1.04E-01	21.4	
6	0	53.47	31	33	0.29	518.34	505	21	3.40E-02	44.6	
7	0	61.86	169	44	0.33	598.80	589	19	1.88E-01	11.1	
8	0	66.09	110	15	0.82	639.29	626	29	1.22E-01	12.7	
9	0	79.77	37	26	0.52	770.51	759	17	4.06E-02	27.8	
10	0	81.26	675	51	0.66	784.78	775	20	7.50E-01	4.5	
11	4	112.04	128	24	0.73	1079.86	1070	22	1.42E-01	13.1	3.26E+00
12	4	112.57	98	12	0.74	1085.00	1070	22	1.09E-01	15.3	
13	0	116.28	31	11	0.71	1120.54	1111	15	3.48E-02	26.1	
14	0	276.90	43	5	0.47	2660.55	2648	23	4.75E-02	18.8	
15	1	303.34	51	2	0.95	2914.00	2902	22	5.62E-02	17.6	4.14E-01
16	1	303.97	21	2	0.95	2920.00	2902	22	2.35E-02	31.1	
17	0	307.94	21	0	0.49	2958.10	2947	21	2.33E-02	21.8	
18	0	334.55	32	16	0.93	3213.27	3194	27	3.55E-02	32.1	
19	0	356.81	283	10	0.93	3426.67	3412	28	3.14E-01	6.4	
20	0	384.70	70	3	0.73	3694.00	3679	25	7.83E-02	12.9	
21	3	386.99	25	1	1.02	3716.00	3708	25	2.83E-02	31.5	1.73E+00
22	3	387.69	107	5	1.08	3722.74	3708	25	1.19E-01	10.6	
23	0	392.08	20	13	0.89	3764.81	3746	25	2.20E-02	45.7	

Sample ID : 1111139-17 Acquisition date : 1-DEC-2011 09:30:07

Total number of lines in spectrum	23	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	5	21.74%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.406E+02	3.407E+02	0.602E+02	17.67	
			---	---			
Total Activity :			3.406E+02	3.407E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.525E+02	1.525E+02	0.346E+02	22.66	
			---	---			
Total Activity :			1.525E+02	1.525E+02			

Grand Total Activity : 4.931E+02 4.932E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-17 Acquisition date : 1-DEC-2011 09:30:07

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.406E+02	3.407E+02	17.67	OK
	302.84	17.80	2.575E+00	3.313E+02	3.313E+02	43.94	OK
	356.01	60.00	4.312E+00	3.281E+02	3.281E+02	19.35	OK

Final Mean for 3 Valid Peaks = 3.407E+02+/- 6.019E+01 (17.67%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.525E+02	1.525E+02	22.66	OK

Final Mean for 1 Valid Peaks = 1.525E+02+/- 3.456E+01 (22.66%)

Flag: "*" = Keyline

Sample ID : 1111139-17 Acquisition date : 1-DEC-2011 09:30:07

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.407E+02	6.019E+01	1.365E+00	2.009E-01	249.643
TH-234	1.525E+02	3.456E+01	3.284E+01	4.225E-01	4.643

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.383E+00		1.437E+01	2.800E+01	9.493E+00	0.192
CD-109	-4.514E-01		9.391E+01	1.726E+02	1.661E+01	-0.003
PA-231	-1.580E-01		6.971E-01	1.267E+00	1.427E-02	-0.125
PA-234	3.052E+00	+	1.775E+00	1.978E+00	2.226E-02	1.543
NP-237	-2.302E+01		2.594E+01	4.146E+01	3.657E+00	-0.555
AM-241	7.667E-01		1.248E+00	2.221E+00	2.500E-02	0.345

VAX/VMS Peak Search Report Generated 1-DEC-2011 10:05:40.83

12/1/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113918_GE5_BAFIL_171579.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-3
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 09:50:25.
Sample ID : 1111139-18 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.06 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	14.61	7	11	0.60	145.74	133	15	8.06E-03	107.0	
2	0	21.07	95	36	0.62	207.73	199	16	1.06E-01	17.4	
3	0	30.99	2006	81	0.65	302.78	290	30	2.23E+00	2.6	
4	1	35.13	375	10	0.66	342.45	329	29	4.17E-01	5.9	7.19E-01
5	1	36.08	89	6	0.55	351.61	329	29	9.84E-02	14.9	
6	0	53.68	25	34	0.60	520.34	508	18	2.73E-02	54.1	
7	0	61.84	266	32	0.89	598.60	583	32	2.96E-01	8.1	
8	0	66.19	127	18	0.72	640.33	626	28	1.41E-01	12.0	
9	0	79.92	50	24	0.70	771.93	761	16	5.52E-02	24.3	
10	0	81.24	718	60	0.50	784.61	776	22	7.97E-01	4.5	
11	0	84.18	22	8	0.46	812.81	803	16	2.42E-02	32.8	
12	0	112.19	164	46	0.67	1081.36	1070	22	1.82E-01	12.0	
13	1	116.02	37	12	0.75	1118.00	1113	16	4.06E-02	20.4	4.95E+00
14	1	116.54	28	13	0.75	1123.00	1113	16	3.11E-02	30.5	
15	0	187.41	17	9	0.91	1802.50	1792	18	1.92E-02	39.3	
16	0	277.20	31	16	0.64	2663.33	2650	21	3.43E-02	30.5	
17	3	303.34	64	2	0.95	2914.00	2903	24	7.08E-02	16.8	7.13E-01
18	3	303.90	38	3	0.71	2919.33	2903	24	4.25E-02	27.1	
19	2	334.10	18	5	1.07	3208.94	3198	24	1.95E-02	47.0	4.28E-01
20	2	334.67	32	4	0.79	3214.35	3198	24	3.55E-02	23.8	
21	0	356.85	383	7	0.89	3427.03	3412	29	4.25E-01	5.3	
22	1	384.18	24	1	0.92	3689.03	3679	25	2.62E-02	35.3	1.20E+00
23	1	384.90	72	3	1.02	3696.00	3679	25	7.97E-02	12.3	
24	1	387.09	64	10	1.02	3717.00	3709	26	7.13E-02	15.8	4.74E+00
25	1	387.93	141	10	1.02	3725.00	3709	26	1.57E-01	9.4	

Sample ID : 1111139-18 Acquisition date : 1-DEC-2011 09:50:25

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.622E+02	3.623E+02	0.641E+02	17.69	
			---	---			
Total Activity :			3.622E+02	3.623E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.402E+02	2.402E+02	0.404E+02	16.81	
			---	---			
Total Activity :			2.402E+02	2.402E+02			

Grand Total Activity :	6.025E+02	6.025E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-18 Acquisition date : 1-DEC-2011 09:50:25

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.622E+02	3.623E+02	17.69	OK
	302.84	17.80	2.575E+00	4.176E+02	4.176E+02	42.75	OK
	356.01	60.00	4.312E+00	4.443E+02	4.443E+02	17.97	OK

Final Mean for 3 Valid Peaks = 3.623E+02+/- 6.410E+01 (17.69%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.402E+02	2.402E+02	16.81	OK

Final Mean for 1 Valid Peaks = 2.402E+02+/- 4.039E+01 (16.81%)

Flag: "*" = Keyline

Sample ID : 1111139-18 Acquisition date : 1-DEC-2011 09:50:25

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.623E+02	6.410E+01	1.365E+00	2.009E-01	265.469
TH-234	2.402E+02	4.039E+01	2.294E+01	2.951E-01	10.475

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.915E+00		1.311E+01	2.549E+01	8.642E+00	0.114
CD-109	7.671E+01		1.032E+02	2.040E+02	1.963E+01	0.376
PA-231	-2.708E-01		8.987E-01	1.576E+00	1.774E-02	-0.172
PA-234	4.401E+00	+	1.546E+00	2.220E+00	2.499E-02	1.983
NP-237	-1.408E+01		2.959E+01	4.712E+01	4.156E+00	-0.299
AM-241	1.182E+00		1.271E+00	2.328E+00	2.620E-02	0.508

VAX/VMS Peak Search Report Generated 1-DEC-2011 10:27:56.93

12/11/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113919_GE5_BAFIL_171580.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-4
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 10:12:41.
Sample ID : 1111139-19 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.29	47	53	0.55	209.83	202	17	5.18E-02	41.3	
2	0	25.31	25	5	0.78	248.30	240	17	2.72E-02	28.0	
3	0	30.98	1991	91	0.75	302.72	291	25	2.21E+00	2.6	
4	4	35.04	359	25	0.63	341.59	330	29	3.99E-01	6.6	9.44E-01
5	4	35.89	125	16	0.74	349.77	330	29	1.39E-01	18.8	
6	0	61.89	232	40	0.78	599.02	584	30	2.58E-01	9.4	
7	0	66.10	75	47	0.45	639.43	629	19	8.29E-02	22.1	
8	0	81.23	763	49	0.59	784.51	777	19	8.48E-01	4.1	
9	0	93.20	10	13	0.64	899.29	883	19	1.15E-02	76.9	
10	0	112.18	160	54	0.91	1081.21	1070	20	1.78E-01	12.3	
11	0	116.43	55	26	0.60	1122.01	1111	25	6.09E-02	24.8	
12	0	140.92	17	5	0.51	1356.75	1349	15	1.89E-02	34.6	
13	0	161.63	18	21	0.94	1555.36	1539	20	2.05E-02	55.6	
14	1	276.76	25	12	1.02	2659.16	2651	20	2.77E-02	27.6	3.77E-01
15	1	277.46	14	4	0.83	2665.89	2651	20	1.50E-02	42.4	
16	5	302.94	51	6	1.05	2910.19	2902	26	5.66E-02	18.1	3.52E+00
17	5	303.55	45	15	0.95	2916.00	2902	26	4.96E-02	27.5	
18	5	304.05	30	12	0.56	2920.77	2902	26	3.34E-02	31.2	
19	1	307.72	19	1	0.95	2956.00	2948	18	2.06E-02	28.8	1.02E+00
20	1	308.23	16	2	0.86	2960.92	2948	18	1.83E-02	27.3	
21	0	334.53	46	0	0.49	3213.04	3197	25	5.11E-02	14.7	
22	0	356.82	386	19	0.90	3426.75	3411	28	4.29E-01	5.7	
23	0	384.71	92	5	0.51	3694.16	3679	26	1.02E-01	11.9	
24	1	387.82	98	14	1.12	3723.98	3709	24	1.09E-01	13.6	2.59E+00
25	1	388.29	59	11	0.92	3728.50	3709	24	6.58E-02	16.5	
26	0	391.86	27	2	0.78	3762.67	3748	24	2.96E-02	23.2	

Sample ID : 1111139-19 Acquisition date : 1-DEC-2011 10:12:41

Total number of lines in spectrum	26	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	5	19.23%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.852E+02	3.852E+02	0.668E+02	17.33	
			---	---			
Total Activity :			3.852E+02	3.852E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.098E+02	2.098E+02	0.402E+02	19.17	
			---	---			
Total Activity :			2.098E+02	2.098E+02			

Grand Total Activity :	5.950E+02	5.950E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-19 Acquisition date : 1-DEC-2011 10:12:41

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.852E+02	3.852E+02	17.33	OK
	302.84	17.80	2.575E+00	3.339E+02	3.339E+02	44.79	OK
	356.01	60.00	4.312E+00	4.478E+02	4.478E+02	18.38	OK

Final Mean for 3 Valid Peaks = 3.852E+02+/- 6.676E+01 (17.33%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.098E+02	2.098E+02	19.17	OK

Final Mean for 1 Valid Peaks = 2.098E+02+/- 4.022E+01 (19.17%)

Flag: "*" = Keyline

Sample ID : 1111139-19 Acquisition date : 1-DEC-2011 10:12:41

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.852E+02	6.676E+01	2.234E+01	3.290E+00	17.240
TH-234	2.098E+02	4.022E+01	3.101E+01	3.989E-01	6.766

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.135E+00		1.124E+01	1.958E+01	6.639E+00	-0.262
CD-109	6.591E+01		8.897E+01	1.806E+02	1.738E+01	0.365
PA-231	-1.380E+00		9.444E-01	1.309E+00	1.473E-02	-1.055
PA-234	2.156E+00	+	1.785E+00	2.051E+00	2.309E-02	1.051
NP-237	-2.580E+01		2.498E+01	3.873E+01	3.416E+00	-0.666
AM-241	-7.913E-02		1.551E+00	2.328E+00	2.620E-02	-0.034

VAX/VMS Peak Search Report Generated 1-DEC-2011 11:00:12.45

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111113920_GE5_BAFIL_171585.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-5
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 10:44:57.
Sample ID : 1111139-20 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	11.55	8	7	0.98	116.44	108	14	8.89E-03	78.6	
2	0	21.23	67	41	0.31	209.24	200	16	7.44E-02	25.2	
3	0	25.32	18	8	0.58	248.48	243	14	2.00E-02	39.4	
4	4	29.55	39	52	0.59	289.00	282	33	4.33E-02	41.0	1.33E+00
5	4	30.97	1946	48	0.76	302.63	282	33	2.16E+00	2.5	
6	4	35.10	438	13	0.78	342.20	331	27	4.86E-01	5.5	1.06E+00
7	4	36.12	73	1	0.53	351.96	331	27	8.15E-02	20.1	
8	0	39.31	9	8	0.59	382.59	371	15	9.44E-03	78.1	
9	0	53.46	45	15	0.66	518.21	508	17	5.05E-02	22.0	
10	0	61.88	205	51	1.03	598.96	584	28	2.28E-01	10.9	
11	1	65.95	56	36	0.67	638.00	629	22	6.18E-02	27.2	9.02E-01
12	1	66.37	13	42	0.67	642.00	629	22	1.49E-02	21.7	
13	2	79.86	69	21	0.84	771.39	760	37	7.69E-02	21.6	1.18E+00
14	2	81.22	786	9	0.67	784.39	760	37	8.73E-01	3.7	
15	0	112.20	178	38	0.67	1081.41	1066	28	1.98E-01	11.1	
16	3	115.23	20	5	0.94	1110.50	1108	19	2.18E-02	16.2	4.49E+00
17	3	115.91	18	18	0.75	1117.00	1108	19	2.04E-02	56.8	
18	3	116.45	20	10	0.55	1122.16	1108	19	2.18E-02	38.4	
19	0	276.98	44	5	0.89	2661.22	2645	27	4.85E-02	19.4	
20	1	303.44	32	4	0.95	2915.00	2902	22	3.52E-02	32.4	1.57E+00
21	1	303.82	60	4	0.86	2918.57	2902	22	6.66E-02	14.8	
22	0	334.51	44	11	1.34	3212.81	3196	27	4.93E-02	21.3	
23	3	356.23	84	0	0.92	3421.05	3412	28	9.32E-02	19.8	2.11E+00
24	3	356.86	297	0	0.84	3427.13	3412	28	3.30E-01	6.3	
25	0	384.64	79	5	0.82	3693.44	3679	25	8.75E-02	12.9	
26	0	387.70	140	7	0.90	3722.85	3709	27	1.56E-01	9.3	
27	0	392.10	16	13	0.13	3765.02	3749	21	1.83E-02	48.4	

Sample ID : 1111139-20 Acquisition date : 1-DEC-2011 10:44:57

Total number of lines in spectrum	27	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	7	25.93%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.967E+02	3.968E+02	0.672E+02	16.94	
			---	---			
Total Activity :			3.967E+02	3.968E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-234	4.47E+09Y	1.00	3.096E+00	3.096E+00	1.565E+00	50.54	
TH-234	4.47E+09Y	1.00	1.850E+02	1.850E+02	0.410E+02	22.14	
			---	---			
Total Activity :			1.881E+02	1.881E+02			

Grand Total Activity :	5.848E+02	5.849E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111139-20 Acquisition date : 1-DEC-2011 10:44:57

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.967E+02	3.968E+02	16.94	OK
	302.84	17.80	2.575E+00	2.077E+02	2.077E+02	69.89	OK
	356.01	60.00	4.312E+00	9.737E+01	9.738E+01	42.10	OK

Final Mean for 3 Valid Peaks = 3.968E+02+/- 6.720E+01 (16.94%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-234	9.89	89.00	1.000E+02	2.699E-01	2.699E-01	157.18	OK
	21.72	64.90*	1.000E+02	3.096E+00	3.096E+00	50.54	OK
	37.93	23.75	1.000E+02	1.075E+00	1.075E+00	156.35	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.096E+00+/- 1.565E+00 (50.54%)

TH-234	63.29	3.80*	8.750E+01	1.850E+02	1.850E+02	22.14	OK

Final Mean for 1 Valid Peaks = 1.850E+02+/- 4.096E+01 (22.14%)

Flag: "*" = Keyline

Sample ID : 1111139-20 Acquisition date : 1-DEC-2011 10:44:57

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.968E+02	6.720E+01	1.261E+01	1.857E+00	31.455
PA-234	3.096E+00	1.565E+00	1.081E+00	1.217E-02	2.863
TH-234	1.850E+02	4.096E+01	3.015E+01	3.879E-01	6.135

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-6.649E+00		1.433E+01	2.460E+01	8.340E+00	-0.270
CD-109	-2.834E+01		9.192E+01	1.620E+02	1.559E+01	-0.175
PA-231	5.889E-01		9.474E-01	1.829E+00	2.059E-02	0.322
NP-237	-2.987E+00		2.423E+01	4.404E+01	3.885E+00	-0.068
AM-241	-2.218E-01		1.379E+00	2.044E+00	2.301E-02	-0.109

FOXFIRE SCIENTIFIC

Alcoa – TT ESL

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #11-11140-OR

December 14, 2011

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

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Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 11-11140

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		11.22.11	JWM	Sample Log-In
		12/8/11	KW	Data Compilation
		12-12-11	MLT	First Technical Data Review
		12/12/11	[illegible]	Second Technical Data Review
		12/14/11	[illegible]	Data Entry/Electronic Deliverable
		12/14/11	[illegible]	Case Narrative
		12/14/11	EJT	Electronic Deliverable Proof
		12/14/11	[illegible]	Samples Analyzed within Holding Time Yes? [ ] No? [ ] L/ES
		12/14/11	[illegible]	QA/QC Review
		12/08/11	EJT	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: [signature] 12/14/11

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY

EBERLINE SERVICES

Richmond Laboratory

Chain of Custody

CLIENT: Foxfire (~~Alcoa-TT~~ Scientific)

ADDRESS: 4621 S. Cooper St. #131-332
Arlington, TX 76017

PROJECT: Alcoa- TT ESL

SAMPLERS SIGNATURE:

PURCHASE ORDER NO.

DATE 11/21 PAGE 2 OF 4

TAT (IN DAYS) 14

PARAMETERS: Ra-226, Ra-228, total U

11-11140

SAMPLE NO.	DATE	TIME	LOCATION	Ra-226	Ra-228	total U	SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
IB1/2-4E	11/18	—		X	X	X	soil	1	homogenize prior to aliquot extraction
IB3-1	11/18	1547						1	
IB3-2		1542						1	
IB3-3		1540						1	
* ~~IB3-3~~		~~1550~~						1	
IB3-4		1537						1	
IB3-5		—						1	
4 IB3-6		—						1	
5 IB3-7		1426						1	
6 IB3-8		—						1	
7 IB3-9		—						1	
8 IB3-6A								1	

X Removed Per Client X sum 11-22-11

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
11/21/11	Justin McKenny 11-22-11 1119		
COMPANY: Foxfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 12

METHOD OF SHIPMENT:

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

REC'D NOV 22 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES

Richmond Laboratory

Chain of Custody

CLIENT: Foxfire Scientific

ADDRESS:

PROJECT: Alcoa-TT ESL

SAMPLERS SIGNATURE:

PURCHASE ORDER NO.

DATE 11/21 PAGE 3 OF 4

TAT (IN DAYS) 14

11-11140

SAMPLE NO.	DATE	TIME	LOCATION	Ra-226	Ra-228	Total U	SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
IB3-6B	11/18	–	9	x	x	x	soil	1	See pg. 2
IB3-6C		–	10					1	
IB3-6D		–	11					1	
IB3-6E		–	12					1	
IB4-1		1344	13					1	
IB4-2		1335	14					1	
IB4-3		1350	15					1	
IB4-4		1400	16					1	
IB4-5		1330	17					1	
BK6-1		–	18					1	
BK6-2		–	19					1	
BK6-3		1325	20					1	

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
Matthew Orr 11/21/11	Justin McKay 11.22.11 1119		
COMPANY: Foxfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 12

METHOD OF SHIPMENT:

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

RECD NOV 22 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11140
		Lab Deadline	12/2/2011
		Analysis	UUISO - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	41	L1.3
	05	88	L1.3
	06	52	L1.3
	07	60	L1.3
	08	50	L1.3
	09	44	L1.3
	10	54	L1.3
	11	47	L1.3
	12	35	L1.3
	13	38	L1.3
	14	52	L1.3
	15	47	L1.3
	16	47	L1.3
	17	48	L1.3
	18	53	L1.3
	19	53	L1.3
	20	45	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenny Sells	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0840	Kenny Sells	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0840
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 2040
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	MPD	11/23/11 2040
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	RM	11/30/11 0740
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 0740
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11140
		Lab Deadline	12/2/2011
		Analysis	Ra226 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	41	L1.3
	05	88	L1.3
	06	52	L1.3
	07	60	L1.3
	08	50	L1.3
	09	44	L1.3
	10	54	L1.3
	11	47	L1.3
	12	35	L1.3
	13	38	L1.3
	14	52	L1.3
	15	47	L1.3
	16	47	L1.3
	17	48	L1.3
	18	53	L1.3
	19	53	L1.3
	20	45	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenny Scales	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0840	Kenny Scales	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0840
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/28/11 1453
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-29-11 [illegible]
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-30-11 1355
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	11/30/11 1355
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/2/11 1823
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11140
		Lab Deadline	12/2/2011
		Analysis	Ra228 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	41	L1.3
	05	88	L1.3
	06	52	L1.3
	07	60	L1.3
	08	50	L1.3
	09	44	L1.3
	10	54	L1.3
	11	47	L1.3
	12	35	L1.3
	13	38	L1.3
	14	52	L1.3
	15	47	L1.3
	16	47	L1.3
	17	48	L1.3
	18	53	L1.3
	19	53	L1.3
	20	45	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenny Seely	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0840	Kenny Seely	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0840
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/28/11 1453
Received by	Sample Storage	Rough Prep	Prep	~~Separations~~	Count Room	[illegible]	11-29-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	~~Separations~~	Count Room	[illegible]	12-30-11 1355
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	11/30/11 1355
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/2/11 1823
Received by	Sample Storage	Rough Prep	Prep	~~Separations~~	Count Room	[illegible]	12-5-11 0940
Relinquished by	Sample Storage	Rough Prep	Prep	~~Separations~~	Count Room	[illegible]	12-8-11 1108
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/8/11 1110
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/8/11 1356
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Foxfire Scientific, Inc.	ALCOA - TT ESL	Environmental	11/22/2011	14	11-11140
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
ALCOA - TT ESL	ALCOA - TT ESL	H	12/02/2011	12/06/2011	12/06/2011

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	U(nat)	Tll
01	LCS	11/22/11	SO	L1.3	X	X	X	3
02	BLANK	11/22/11	SO	L1.3	X	X	X	3
03	DUP	11/22/11	SO	L1.3	X	X	X	3
04	IB3-6	11/18/11 00:00	SO	L1.3	X	X	X	3
05	IB3-7	11/18/11 14:26	SO	L1.3	X	X	X	3
06	IB3-8	11/18/11 00:00	SO	L1.3	X	X	X	3
07	IB3-9	11/18/11 00:00	SO	L1.3	X	X	X	3
08	IB3-6A	11/18/11 00:00	SO	L1.3	X	X	X	3
09	IB3-6B	11/18/11 00:00	SO	L1.3	X	X	X	3
10	IB3-6C	11/18/11 00:00	SO	L1.3	X	X	X	3
11	IB3-6D	11/18/11 00:00	SO	L1.3	X	X	X	3
12	IB3-6E	11/18/11 00:00	SO	L1.3	X	X	X	3
13	IB4-1	11/18/11 13:44	SO	L1.3	X	X	X	3
14	IB4-2	11/18/11 13:35	SO	L1.3	X	X	X	3
15	IB4-3	11/18/11 13:50	SO	L1.3	X	X	X	3
16	IB4-4	11/18/11 14:00	SO	L1.3	X	X	X	3
17	IB4-5	11/18/11 13:30	SO	L1.3	X	X	X	3
18	BKG-1	11/18/11 00:00	SO	L1.3	X	X	X	3
19	BKG-2	11/18/11 00:00	SO	L1.3	X	X	X	3
20	BKG-3	11/18/11 13:25	SO	L1.3	X	X	X	3
		Totals Per Analysis (non QA samples)			17	17	17	

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice
Accounts Payable
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017
Voice 817-995-6762
Fax

Contact
Matthew Arno
Voice 817-563-0579
Fax 877-433-2029

Report Data
Matthew Arno
Foxfire Scientific, Inc
4621 S. Cooper St. #131-332
Arlington, TX 76017
Voice 817-563-0579
Fax 877-433-2029

Printed: 11/22/2011 1:02 PM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 11-11140

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	Y	N	
If aqueous, properly preserved	Y	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	Y	N
Unbroken on outside of package?	Y	N
Present on samples?	Y	N
Unbroken on samples?	Y	N
Was chain of custody present upon sample receipt?	Y	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: (17) bags of soil

SIGNATURE: Justin McKamey DATE: 11·22·11

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-33136

December 14, 2011

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

CASE NARRATIVE
Work Order # 11-11140-OR

SAMPLE RECEIPT

This work order contains seventeen soil samples received 11/22/2011. Samples were analyzed for Isotopic Uranium, Total Uranium by Alpha and Radium-226/228.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
IB3-6	11-11140-04	IB4-1	11-11140-13
IB3-7	11-11140-05	IB4-2	11-11140-14
IB3-8	11-11140-06	IB4-3	11-11140-15
IB3-9	11-11140-07	IB4-4	11-11140-16
IB3-6A	11-11140-08	IB4-5	11-11140-17
IB3-6B	11-11140-09	BKG-1	11-11140-18
IB3-6C	11-11140-10	BKG-2	11-11140-19
IB3-6D	11-11140-11	BKG-3	11-11140-20
IB3-6E	11-11140-12		

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

0014

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

Samples demonstrated acceptable results for Uranium-234, Uranium-235 and Uranium-238 activity. Total Uranium results were calculated by mass conversion of Isotopic Uranium activity. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were prepared by drying, pulverizing and homogenization. Representative aliquots were removed and digested using mixed acids. Radium-226 was precipitated as Radium sulfate using elemental Barium and Lead as carriers. Sulfates were dissolved in alkaline EDTA. Radium-226 was selectively precipitated from slightly acidic EDTA. Precipitates were then mounted by semi-micro-precipitations onto micro-porous filters. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated acceptable results for Radium-226 activity. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for Radium-228 activity. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 12/14/2011

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG:	**11-11140**
Purchase Order:	ALCOA - TT ESL
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.02E+01	4.71E-01			pCi/g
11-11140-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.06E+01	1.25E+00	2.57E+00	2.13E-01	pCi/g
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.86E-02	8.49E-02	8.50E-02	1.99E-01	pCi/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.84E+00	7.40E-01	9.53E-01	4.25E-01	pCi/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.34E+00	6.39E-01	8.08E-01	2.99E-01	pCi/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.26E+01	1.56E+00	3.10E+00	3.09E-01	pCi/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.41E+01	1.69E+00	3.42E+00	3.22E-01	pCi/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	5.22E+00	9.43E-01	1.45E+00	2.41E-01	pCi/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.29E+00	6.33E-01	7.97E-01	2.77E-01	pCi/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.79E+00	5.46E-01	6.64E-01	2.92E-01	pCi/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.79E+00	5.10E-01	6.35E-01	1.76E-01	pCi/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.55E+00	6.56E-01	8.49E-01	2.04E-01	pCi/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.15E+00	6.14E-01	7.64E-01	2.90E-01	pCi/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.84E+00	6.49E-01	8.84E-01	2.54E-01	pCi/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.13E+00	6.52E-01	7.92E-01	4.32E-01	pCi/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.92E+00	7.04E-01	9.36E-01	2.91E-01	pCi/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	4.53E+00	9.34E-01	1.34E+00	3.18E-01	pCi/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	6.43E+00	1.13E+00	1.77E+00	3.26E-01	pCi/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	1.69E+00	5.67E-01	6.70E-01	2.70E-01	pCi/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	2.18E+00	6.50E-01	7.97E-01	3.06E-01	pCi/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	12/2/2011	11-11140	Radium-226	EPA 903.0 Modified	3.04E+00	7.07E-01	9.56E-01	2.90E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11140**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	8.54E+00	4.35E-01			pCi/g
11-11140-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	6.57E+00	8.03E-01	1.69E+00	1.11E+00	pCi/g
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	8.04E-01	4.73E-01	5.07E-01	9.15E-01	pCi/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.17E+00	6.21E-01	6.75E-01	1.20E+00	pCi/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.64E+00	5.88E-01	6.95E-01	1.07E+00	pCi/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.34E+01	1.09E+00	3.22E+00	1.20E+00	pCi/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.33E+01	1.09E+00	3.21E+00	1.19E+00	pCi/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	3.77E+00	7.88E-01	1.16E+00	1.33E+00	pCi/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.51E+00	5.13E-01	6.17E-01	9.25E-01	pCi/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.59E+00	5.20E-01	6.32E-01	9.15E-01	pCi/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	8.28E-01	4.94E-01	5.28E-01	9.58E-01	pCi/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.37E+00	5.71E-01	6.49E-01	1.05E+00	pCi/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	2.06E+00	5.71E-01	7.37E-01	9.70E-01	pCi/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.95E+00	6.54E-01	7.89E-01	1.18E+00	pCi/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	8.52E-01	5.95E-01	6.26E-01	1.18E+00	pCi/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.70E+00	5.99E-01	7.12E-01	1.08E+00	pCi/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	2.33E+00	6.88E-01	8.67E-01	1.20E+00	pCi/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.53E+00	6.58E-01	7.44E-01	1.23E+00	pCi/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.14E+00	6.93E-01	7.39E-01	1.36E+00	pCi/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	7.20E-01	5.57E-01	5.81E-01	1.11E+00	pCi/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	12/8/2011	11-11140	Radium-228	EPA 904.0 Modified	1.62E+00	5.99E-01	7.02E-01	1.10E+00	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: 11-11140
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	-3.37E-02	1.15E-01	1.15E-01	3.66E-01	ug/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	4.34E+00	8.74E-01	9.35E-01	2.61E-01	ug/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	3.76E+00	8.74E-01	9.20E-01	2.44E-01	ug/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	1.62E+01	2.38E+00	2.69E+00	2.11E-01	ug/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	1.74E+01	2.53E+00	2.86E+00	3.41E-01	ug/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	8.06E+00	1.61E+00	1.73E+00	2.85E-01	ug/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	3.92E+00	9.69E-01	1.01E+00	3.30E-01	ug/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	3.39E+00	7.32E-01	7.77E-01	2.96E-01	ug/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	2.02E+00	5.11E-01	5.34E-01	1.55E-01	ug/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	2.57E+00	6.10E-01	6.41E-01	2.01E-01	ug/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	3.64E+00	8.68E-01	9.12E-01	4.61E-01	ug/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	7.49E+00	1.55E+00	1.65E+00	3.69E-01	ug/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	2.71E+00	7.94E-01	8.21E-01	3.45E-01	ug/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	7.07E+00	1.78E+00	1.86E+00	8.00E-01	ug/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	8.69E+00	1.52E+00	1.66E+00	3.35E-01	ug/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	1.24E+01	2.22E+00	2.41E+00	3.07E-01	ug/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	3.33E+00	7.77E-01	8.18E-01	2.68E-01	ug/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	2.19E+00	5.68E-01	5.92E-01	1.95E-01	ug/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	11/30/2011	11-11140	Total Uranium	EML U-02 Modified	6.41E+00	1.63E+00	1.70E+00	4.43E-01	ug/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG:	**11-11140**
Purchase Order:	ALCOA - TT ESL
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	8.13E+00	2.93E-01			pCi/g
11-11140-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	7.06E+00	9.91E-01	1.11E+00	8.34E-02	pCi/g
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	-1.56E-02	3.86E-02	3.86E-02	1.10E-01	pCi/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.35E+00	2.84E-01	3.00E-01	9.49E-02	pCi/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.19E+00	2.87E-01	2.99E-01	8.76E-02	pCi/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	6.16E+00	8.87E-01	9.90E-01	7.20E-02	pCi/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	5.39E+00	8.03E-01	8.90E-01	8.34E-02	pCi/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	3.52E+00	6.58E-01	7.04E-01	1.02E-01	pCi/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.55E+00	3.61E-01	3.78E-01	8.45E-02	pCi/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.28E+00	2.63E-01	2.78E-01	6.75E-02	pCi/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	8.99E-01	2.03E-01	2.13E-01	4.69E-02	pCi/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.13E+00	2.43E-01	2.56E-01	5.07E-02	pCi/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	1.33E+00	3.05E-01	3.20E-01	1.07E-01	pCi/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	2.40E+00	5.08E-01	5.36E-01	7.65E-02	pCi/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	7.75E-01	2.45E-01	2.51E-01	1.01E-01	pCi/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	2.29E+00	5.83E-01	6.06E-01	1.88E-01	pCi/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	2.72E+00	4.89E-01	5.26E-01	7.97E-02	pCi/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	4.32E+00	7.74E-01	8.33E-01	7.75E-02	pCi/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	7.80E-01	2.12E-01	2.19E-01	6.05E-02	pCi/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	9.21E-01	2.20E-01	2.29E-01	6.65E-02	pCi/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	11/30/2011	11-11140	Uranium-234	EML U-02 Modified	2.19E+00	5.59E-01	5.80E-01	1.05E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG:	**11-11140**
Purchase Order:	ALCOA - TT ESL
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	3.89E-01	1.67E-01	1.70E-01	8.21E-02	pCi/g
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	7.25E-03	4.69E-02	4.69E-02	1.28E-01	pCi/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	1.21E-01	8.53E-02	8.57E-02	7.50E-02	pCi/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	5.14E-02	6.74E-02	6.75E-02	1.03E-01	pCi/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	3.30E-01	1.53E-01	1.55E-01	8.89E-02	pCi/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	3.09E-01	1.51E-01	1.52E-01	1.03E-01	pCi/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	2.45E-01	1.54E-01	1.55E-01	1.33E-01	pCi/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	1.31E-02	4.01E-02	4.01E-02	9.50E-02	pCi/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	2.19E-02	3.72E-02	3.73E-02	6.32E-02	pCi/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	4.84E-02	5.32E-02	5.33E-02	7.25E-02	pCi/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	9.15E-02	7.31E-02	7.34E-02	7.84E-02	pCi/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	8.47E-02	8.18E-02	8.20E-02	1.02E-01	pCi/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	2.22E-01	1.43E-01	1.44E-01	9.44E-02	pCi/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	3.45E-02	5.86E-02	5.86E-02	9.93E-02	pCi/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	1.84E-01	1.54E-01	1.55E-01	1.32E-01	pCi/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	1.92E-01	1.20E-01	1.21E-01	1.05E-01	pCi/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	3.17E-01	1.73E-01	1.74E-01	9.56E-02	pCi/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	6.24E-02	6.87E-02	6.89E-02	9.36E-02	pCi/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	6.84E-02	6.61E-02	6.62E-02	8.20E-02	pCi/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	11/30/2011	11-11140	Uranium-235	EML U-02 Modified	1.87E-01	1.64E-01	1.64E-01	1.86E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11140**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11140-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	7.93E+00	2.85E-01			pCi/g
11-11140-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	6.99E+00	9.83E-01	1.10E+00	9.85E-02	pCi/g
11-11140-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	-1.24E-02	3.79E-02	3.79E-02	1.03E-01	pCi/g
11-11140-03	DUP	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.44E+00	2.93E-01	3.11E-01	7.60E-02	pCi/g
11-11140-04	DO	IB3-6	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.25E+00	2.94E-01	3.07E-01	6.62E-02	pCi/g
11-11140-05	TRG	IB3-7	11/18/11 14:26	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	5.41E+00	8.01E-01	8.89E-01	5.71E-02	pCi/g
11-11140-06	TRG	IB3-8	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	5.80E+00	8.49E-01	9.45E-01	9.86E-02	pCi/g
11-11140-07	TRG	IB3-9	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	2.67E+00	5.41E-01	5.74E-01	7.49E-02	pCi/g
11-11140-08	TRG	IB3-6A	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.32E+00	3.26E-01	3.39E-01	9.62E-02	pCi/g
11-11140-09	TRG	IB3-6B	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.14E+00	2.46E-01	2.59E-01	8.95E-02	pCi/g
11-11140-10	TRG	IB3-6C	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	6.72E-01	1.71E-01	1.78E-01	4.07E-02	pCi/g
11-11140-11	TRG	IB3-6D	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	8.50E-01	2.05E-01	2.13E-01	5.54E-02	pCi/g
11-11140-12	TRG	IB3-6E	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.21E+00	2.91E-01	3.04E-01	1.39E-01	pCi/g
11-11140-13	TRG	IB4-1	11/18/11 13:44	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	2.48E+00	5.20E-01	5.50E-01	1.09E-01	pCi/g
11-11140-14	TRG	IB4-2	11/18/11 13:35	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	9.05E-01	2.67E-01	2.75E-01	1.01E-01	pCi/g
11-11140-15	TRG	IB4-3	11/18/11 13:50	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	2.35E+00	5.98E-01	6.21E-01	2.48E-01	pCi/g
11-11140-16	TRG	IB4-4	11/18/11 14:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	2.69E+00	5.10E-01	5.50E-01	9.64E-02	pCi/g
11-11140-17	TRG	IB4-5	11/18/11 13:30	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	4.12E+00	7.45E-01	8.01E-01	8.84E-02	pCi/g
11-11140-18	TRG	BKG-1	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	1.11E+00	2.61E-01	2.73E-01	7.55E-02	pCi/g
11-11140-19	TRG	BKG-2	11/18/11 00:00	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	7.25E-01	1.91E-01	1.97E-01	5.28E-02	pCi/g
11-11140-20	TRG	BKG-3	11/18/11 13:25	11/22/2011	11/30/2011	11-11140	Uranium-238	EML U-02 Modified	2.13E+00	5.47E-01	5.68E-01	1.20E-01	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials VK

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

U-8

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities

Refer to attached technical data sheet

Radioactive Daughters

Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11 MC

SOLUTION REFERENCE # IPL 479-50 CURRENT DATE 10/12/2010 0:00
SOLUTION # U-8

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide $^{234,235,238}U$
Certified Activity 8.016E+00 µCi
Certified Concentration µCi per gram

Reference Date 1/1/1995 0:00

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution
Uranyl nitrate in dilute HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 8.0160 µCi Which Equals 1.780E+07 dpm at the date listed above

And after dilution the activity of this solution is 1.77955E+04 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By _____ Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # IPL 478-50

Date 10/12/2010 0:00
Solution # U-8a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide of Interest $^{234,235,238}U$
Parent Solution Conc. 1.7796E+04 dpm/ml

Reference Date 1/1/1995 0:00

Chemical Composition of Standard Solution
Uranyl Nitrate in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 4.0000 ml
Total Activity: 7.1182E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1182E+01 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By _____ Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

RECORD COPY

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67

Measurement	Reference date:	01 March 2000
	Radioactive concentration U-232	6.739E+03 becquerels per gram of solution
	which is equivalent to	1.821E-01 microcuries per gram of solution
	Mass of solution	5.356 grams
	Volume of solution	5.035 millilitres
	Total activity of U-232	3.61E+04 becquerels
	which is equivalent to	9.76E-01 microcuries

Accuracy

Method of measurement (see reverse of this certificate)
Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity

Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity

The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition

Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data

Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks

For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Roger Wiltshire

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11

CURRENT DATE: 10/18/2010 0:00

SOLUTION REFERENCE #: AEA/Amersham 92/232/67 SOLUTION #: U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide: ^{232}U
Reference Date: 3/1/2000 0:00
Certified Activity: 9.760E-01 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 0.9760 µCi

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used: 2M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.9760 µCi Which Equals 2.167E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.167E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Martin R. Kelly Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # AEA/Amersham 92/232/67
Date 11/9/2009 0:00
Solution # U-10a

Principal Radionuclide: ^{232}U
Half Life, Years: 7.200E+01
Half Life, Days: 2.630E+04

Radionuclide of Interest: ^{232}U
Parent Solution Conc. 2.167E+03 dpm/ml
Reference Date 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:
Dilution Solvent Used 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Kelley Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

Ba-6
(# 6a)

National Institute of Standards & Technology

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

0031

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 9/30/2011 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium

Reference Date: 9/1/1999 0:00

Certified Activity: µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin R. Keller Date: 10/10/11

QC Approval J. Halas Date: 10/12/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS

SECONDARY DILUTION RECERTIFICATION

QCP-009-1-A

Solution Reference # NIST SRM4251C

Date 9/30/11

Solution # Ba-Be.

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.046E+01	3.828E+03

Radionuclide of Interest ^{133}Ba

Parent Solution Conc. 1.48E+05 dpm/ml

Reference Date 9/11/1993 0:00

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml

Total Activity: 3.6950E+06 dpm

Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin A. Keller Date: 10/10/11

QC Approval _____ Date: 10/10/11

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Ra-5
QA/QC REVIEWED
Date 2/8/94 Initials MT

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution:	5.1864 g (in a 5 ml Flame Sealed Ampoule)	
b. Chemical form:	Ra(NO3)2 in 1 N HNO3	
c. Carrier content:	None added	
d. Density:	1.0318	g/ml @ 20°C.

Radioimpurities None detected(other than daughters)

Radioactive Daughters
Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration
(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.4%
b. Random uncertainty in assay:	±3.1%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±4.6%

NIST Traceability
This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)
See reverse side for Leak Test(s) applied to this source.

Notes
1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Khan
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/30/2011 0:00

SOLUTION REFERENCE #: IPL 453-26 SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 30, 2012

Diluted By: _____ Date: 11/30/2011

Verified & Approved By: Martin R. Heller Date: 11/30/11

QC Approval: _____ Date: 11/30/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009
Solution Reference #: IPL-453-26

Date: 11/30/2011 0:00
Solution #: Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest: ^{226}Radium
Parent Solution Conc.: 2.22E+03 dpm/ml

Reference Date: 2/1/1994 0:00

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 20.0000 ml
Total Activity: 4.4440E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml
This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: November 30, 2012

Recertified By _____ Date: 11/30/2011 0:00

Verified & Approved By Martin R. Yeller Date: 11/30/11

QC Approval _____ Date: 11/30/11

RA-11

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 μg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

New vial from the 6/11/01 Shipment. R.S. Different activity Level 8/9/11

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 11/7/01

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 4/13/2011 0:00

SOLUTION REFERENCE #: Analytics 62680-416

SOLUTION #: Ra-11

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Ra	5.750E+00	2.100E+03

Radionuclide: ^{226}Ra

Reference Date: 11/7/2001 0:00

Certified Activity: 6.966E-02 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0699	µCi

Chemical Composition of Standard Solution

$^{226}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 13, 2012

Recertified By _____ Date: 4/20/11

Verified & Approved By _____ Date: 8/9/11

QC Approval _____ Date: 8/9/11

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	UUISO	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	1.86	86.85%	15.75%	100.00%	3.60%	8.13E+00	2.93E-01	7.06E+00	1.11E+00	U-8a	3.52E+01	3.60E+00	5.12E-01
U-238	1.63	88.25%	15.77%	100.00%	3.60%	7.93E+00	2.85E-01	6.99E+00	1.10E+00	U-8a	3.44E+01	3.60E+00	5.12E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

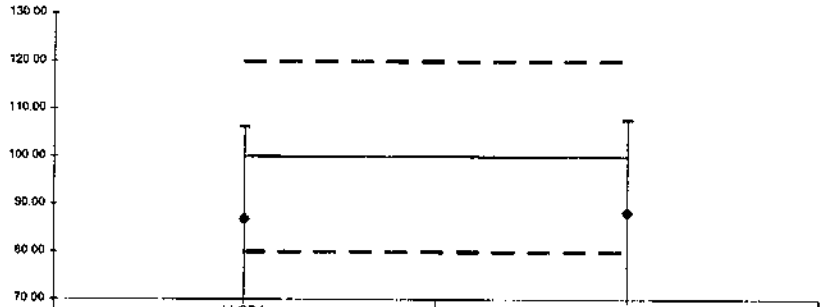
Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
U-234	0.72	12.22	1.19E+00	2.99E-01	1.35E+00	3.00E-01
U-238	0.83	13.70	1.25E+00	3.07E-01	1.44E+00	3.11E-01
U-235	1.25	80.88	5.14E-02	6.75E-02	1.21E-01	8.57E-02

QC Summary

Analyte	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
U-234	0.87	OK	OK			OK	OK
U-238	0.88	OK	OK			OK	OK
U-235		OK	OK			NA	OK

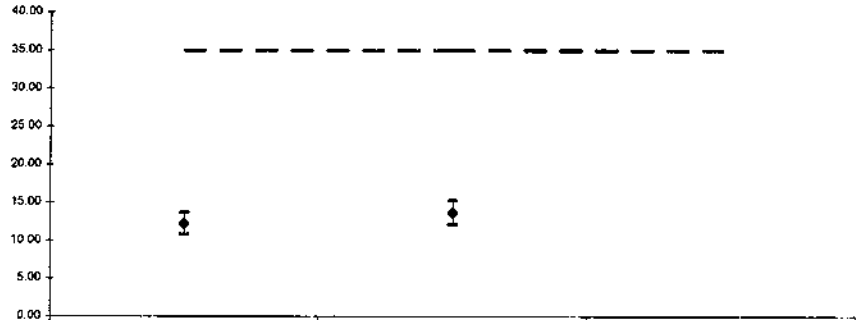
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	UUISO	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



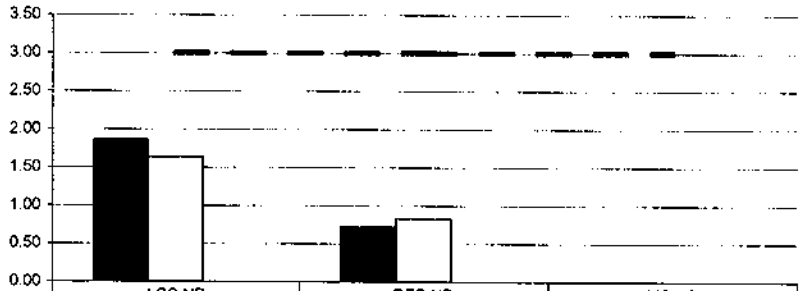
	U-234	U-238
Lower Error	67.50	68.88
Upper Error	106.20	107.62
%R	86.85	88.25
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	13.65	15.27	116.77
Upper Error	10.78	12.13	44.99
RPD	12.22	13.70	80.88
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	1.86	0.72	0.00
U-238	1.63	0.83	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	Ra226	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.29	103.69%	24.20%	100.00%	4.60%	1.02E+01	4.71E-01	1.06E+01	2.57E+00	Ra-5b	4.41E+01	4.60E+00	5.16E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

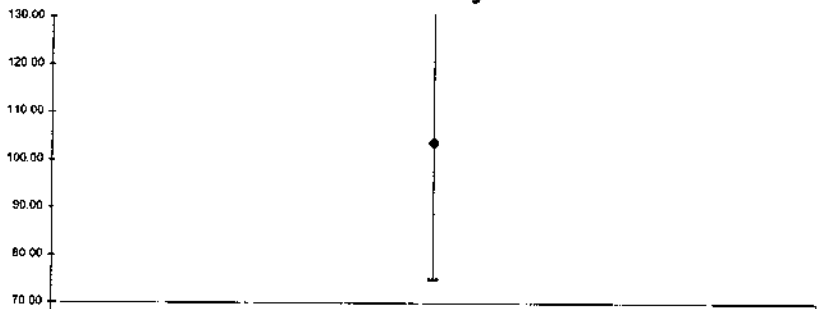
Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-226	0.78	19.27	2.34E+00	8.08E-01	2.84E+00	9.53E-01

QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
1.04	OK	OK			OK	OK

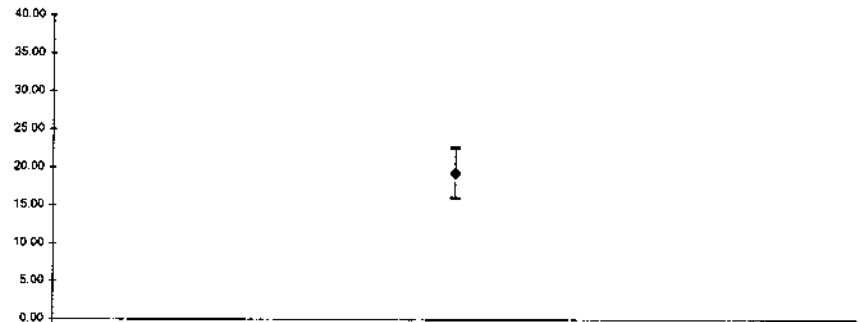
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	Ra226	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



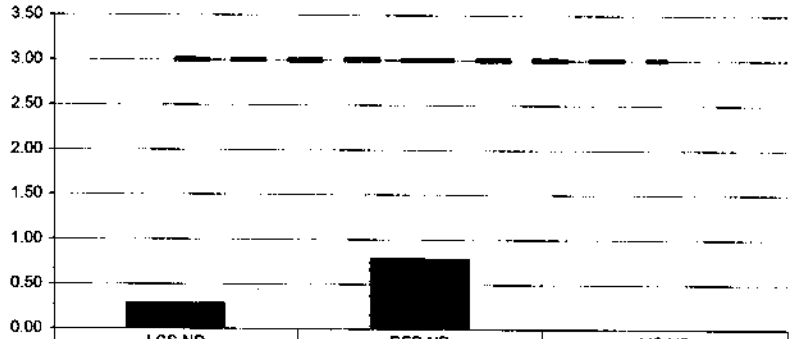
	RA-226
Lower Error	74.89
Upper Error	132.49
%R	103.69
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	22.55
Upper Error	15.99
RPD	19.27
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.29	0.78	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	Ra228	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	2.25	76.98%	25.73%	100.00%	5.10%	8.54E+00	4.35E-01	6.57E+00	1.69E+00	Ra-11	4.62E+01	5.10E+00	4.10E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-228	0.94	33.28	1.64E+00	6.95E-01	1.17E+00	6.75E-01

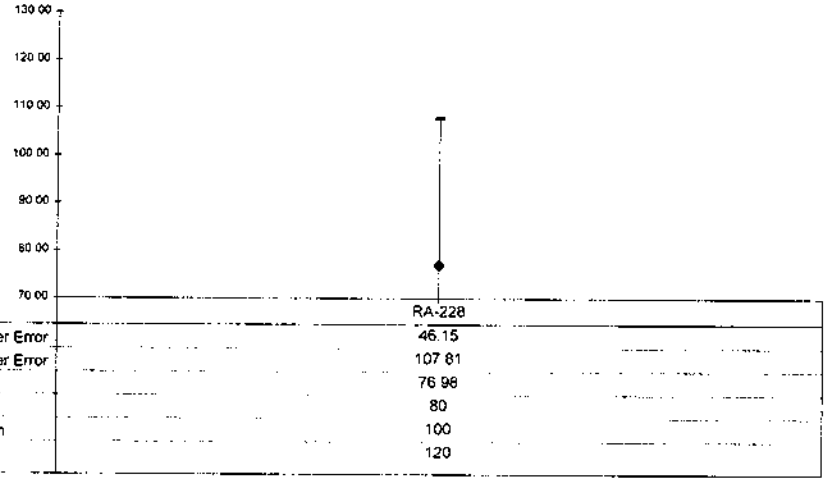
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
0.77	OK	OK			NA	OK

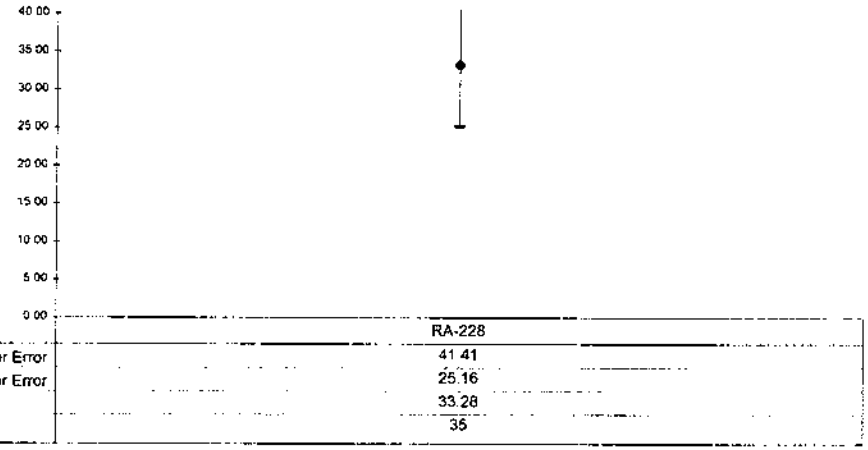
Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11140	Ra228	1	pCi	g	Foxfire Scientific, Inc.

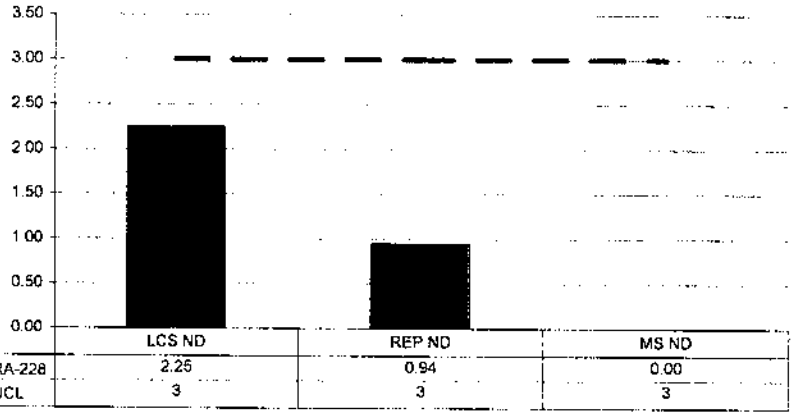
LCS % Recovery



Replicate Sample RPD



Normalized Difference



No Matrix Spike

Version

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO-U NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11140
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	11-11140
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS
2	11/29/11 18:24	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.

John DeMelas
11/29/11

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	11-11140
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:09	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPLES TO SEPARATIONS
2	11/29/11 18:24	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.
3	11/30/11 06:03	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES; LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY, COMPLETED PAPERWORK & SENT SET TO COUNT ROOM.

RM 11/30/11

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11140	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011745P	Anion Exchange Resin	Reagent Grade	JDEMELAS	11/29/2011
011812S	HCl - HF	6.5N - 0.04N	JDEMELAS	11/29/2011
011763D01	Hydrochloric Acid	0.5N	JDEMELAS	11/29/2011
011733S	Hydrochloric Acid	6.5N	JDEMELAS	11/29/2011
011819S	Hydrochloric Acid	8N	JDEMELAS	11/29/2011
011707P	Hydrochloric Acid	Reagent Grade	JDEMELAS	11/29/2011
011824S	Hydrochloric Acid	8N	JDEMELAS	11/29/2011
011831S	HCl - NH4I	8N - 0.1M	JDEMELAS	11/29/2011
011816S	Carbon substrate	Solution	RMARTZ	11/30/2011
011507P	Hydrofluoric Acid	Reagent Grade	RMARTZ	11/30/2011
011549S	Neodymium Carrier	1 mg/ml	RMARTZ	11/30/2011
011433P	Reagent Alcohol	Reagent Grade	RMARTZ	11/30/2011
011655P	Titanous Chloride	Reagent Grade	RMARTZ	11/30/2011

Alpha #2

DATE	Sample #	Client	Lab Time	CT Time	Analysis	Tech
11/28/14	1110138A(10-20)	USA	0876	24hr	44750	[illegible]
~~11/28/14~~	~~1110002A(15-20)~~					
11/28/14	1110138A (1-12)	USA	1205	24hr	74750	[illegible]
11/25/14	Daily Pulse	LAB	0522	10min	NA	[illegible]
11/25/14	1111178A(1-12)	Tox Free	0852	24hr	44750	[illegible]
11/25/14	1111147A(4,6,8,10)	LICOR	1154	24hr	74750	[illegible]
11/25/14	1111147A(4,6,8,10)	LICOR	1157	24hr	74750	[illegible]
11/25/14	1111147A(4)	LICOR	1159	24hr	[illegible]	[illegible]
11/25/14	1110002A(1-3)	USA	1201	24hr	74750	[illegible]
11/29/11	1111143A(1-4,6,8,10)	LICOR	1529	24hr	Th	ICB
11/29/11	1110002A(1-3)	USA	1535	24hr	Th	ICB
11/30/14	Daily Pulse	LAB	0517	10min	NA	[illegible]
11/30/14	Daily Pulse	LAB	0754	10min	NA	[illegible]
11/30/14	1111140A(1-12)	Tox Free	0847	24hr	44750	[illegible]

Alpha #3

DATE	Sample #	Client	Lead Time	CT Time	Analysis	Tech
11/28/11	1110057A(1-4)	UCOR	0800	2hr50m	U4Z50	C
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U4N7	C
11/28/11	1110138A(1,2)	USA	0825	2hr50m	U4Z50	C
11/28/11	1110002A(1-14)	USA	1055	2hr50m	U4Z50	C
11/28/11	1110138A(13,14)	USA	1207	2hr50m	Th Z50	C
	~~[illegible]~~					
11/28/11	1110138A(15-20)	USA	1351	2hr50m	Th	KB
11/28/11	1111027A(1-4)	Unitech	1404	2hr50m	Th	KB
11/28/11	1110138A(1-16)	USA	1740	2hr50m	Th	KB
11/29/11	Daily Pulse	LAB	0522	10min	N/A	C
11/29/11	1111473A(4,6,8,10)	UCOR	0808	2hr50m	Am-241	C
11/29/11	1111473A(1-4,6,8,10)	UCOR	0811	2hr50m	Am-241	C
11/29/11	1111138A(13-20)	Foxfire	1105	2hr50m	U4Z50	C
11/29/11	1111473A(1-4,6,8,10,13)	UCOR	1113	2hr50m	Pu-Z50	C
11/29/11	1111002A(4-19)	USA	1536	2hr50m	Th	KB
~~11/29/11~~	~~1111113A(4,6,8,10)~~	~~UCOR~~ KB 11/29/11	~~1527~~	~~2hr50m~~	~~PUNT~~	~~KB~~
11/30/11	Daily Pulse	LAB	0517	10min	N/A	C
11/30/11	1111062A(1-4,6,8)	UCOR	0748	2hr50m	Am-241	C
11/30/11	1111140A(13-20)	Foxfire	0847	2hr50m	U4Z50	C

RA-226 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11140
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	11-11140
Analysis Code	Ra226
Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP. VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	11/30/11 13:46	CHEM	TSMITH	Followed steps 12.2 to 12.8 in AP-006 rev. 9 . (Sringe filtered samples. Precipitated and filtered samples, obtained final weights, and took to count room)

11-30-11
JMR

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11140	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
010032P	Acetic Acid	Reagent Grade	TSMITH	11/30/2011
011383P	Acetic Acid	Reagent Grade	TSMITH	11/30/2011

Alpha #2

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
11/28/11	1110178A(10-20)	USA	0876	2hr50m	U4Z30	[illegible]
~~11/28/11~~	~~1110074(15-20)~~					
11/28/11	1110178A (1-12)	USA	1205	2hr50m	TLZ30	[illegible]
11/28/11	Daily Pulse	LAB	0522	10min	MA	[illegible]
11/29/11	1111178A(1-12)	Foxfire	0852	2hr50m	U4Z30	[illegible]
11/29/11	1111147A(4,6,8,10)	UCOR	1154	2hr50m	TLZ30	[illegible]
11/29/11	1111147A(4,6,8,10)	UCOR	1157	2hr50m	TLNT	[illegible]
11/29/11	1111147A(4)	UCOR	1159	2hr50m	[illegible]	[illegible]
11/29/11	1111002A(1-3)	USA	1201	2hr50m	TLI30	[illegible]
11/29/11	1111143A(1-4,6,8,10)	UCOR	1529	2hr50m	Th	ICB
11/29/11	1111002A(1-3)	USA	1535	2hr50m	Th	ICB
11/30/11	Daily Pulse	LAB	0517	10min	MA	[illegible]
11/30/11	Daily Pulse	LAB	0754	10min	MA	[illegible]
11/30/11	1111140A(1-12)	Foxfire	0847	2hr50m	U4Z30	[illegible]
11/30/11	1111055A(1-12)	MPA	1222	2hr50m	Rub	[illegible]
11/30/11	1111007A(17-20)	USA	1619	2HR50m	iso-Th	AG
11/30/11	1111007A(1-8)	USA	1630	2HR50m	iso-U	AG
12/1/11	Daily Pulse	LAB	0574	10min	MA	[illegible]
12/1/11	1111153A(4)	UCOR	0922	2hr50m	TLZ30	[illegible]
12/1/11	1111153ANT(4)	UCOR	0923	2hr50m	TLNT	[illegible]
12/1/11	1111057A(1-4)	UCOR	0926	2hr50m	TLZ30	[illegible]
12/1/11	1111057ANT(4)	UCOR	0926	2hr50m	TLNT	[illegible]
12/1/11	1111010A(1-5)	USA	0946	2hr50m	U4Z30	[illegible]
12/1/11	1111057A(1-4,7)	UCOR	1241	2hr50m	PU	ICB
12/1/11	1111057A(4)	UCOR	1243	2hr50m	PUNT	ICB
12/1/11	1111153A(1-4)	UCOR	1246	2hr50m	Rub	ICB
12/1/11	1111010A(4-15)	USA	1710	2hr50m	Th	ICB
12/2/11	Daily Pulse	LAB	0526	10min	MA	[illegible]
12/2/11	1111167A(1-3)	UCOR	0648	2hr50m	Rub	[illegible]
12/2/11	1111140A(12-20)	Foxfire	0648	2hr50m	Rub	[illegible]
12/2/11	1111167A(1-3)	UCOR	1042	2hr50m	Rub	[illegible]
12/2/11	1111140A(12-20)	Foxfire	1042	2hr50m	Rub	[illegible]

Alpha #2

DATE	Sample #	Client	Lost Time	CT Time	Analysis	Tech
11/28/11	1110138A(10-20)	USA	0876	2hr50m	UHZ50	[illegible]
~~11/28/11~~	~~1110007A(15-20)~~					
11/28/11	1110138A(1-12)	USA	1205	2hr50m	TLZ50	[illegible]
11/28/11	Daily Pulse	LAB	0822	10m	MA	[illegible]
11/29/11	1111138A(1-12)	Foxfire	0852	2hr50m	UHZ50	[illegible]
11/29/11	1111147A(4,6,8,10)	UCOR	1154	2hr50m	TLZ50	[illegible]
11/29/11	1111147A(4,6,8,10)	UCOR	1157	2hr50m	TLMT	[illegible]
11/29/11	1111147A(4)	UCOR	1159	2hr50m	[illegible]	[illegible]
11/29/11	1111002A(1-3)	USA	1201	2hr50m	TLI50	[illegible]
11/29/11	1111143A(1-4,6,8,10)	UCOR	1529	2hr50m	TL	ICB
11/29/11	1111002A(1-3)	USA	1535	2hr50m	TL	ICB
11/30/11	Daily Pulse	LAB	0557	10m	MA	[illegible]
11/30/11	Daily Pulse	LAB	0754	10m	MA	[illegible]
11/30/11	1111140A(1-12)	Foxfire	0847	2hr50m	UHZ50	[illegible]
11/30/11	1111055A(1-12)	MPA	1222	2hr50m	RL6	[illegible]
11/30/11	1111007A(17-20)	USA	1619	2HR50m	iso-TL	AG
11/30/11	1111007A(1-8)	USA	1630	2HR50m	iso-U	AG
12/1/11	Daily Pulse	LAB	0574	10m	MA	[illegible]
12/1/11	1111157A(4)	UCOR	0922	2hr50m	TLZ50	[illegible]
12/1/11	1111157ANZ(4)	UCOR	0923	2hr50m	TLMT	[illegible]
12/1/11	1111057A(1-4)	UCOR	0926	2hr50m	TLZ50	[illegible]
12/1/11	1111057ANZ(4)	UCOR	0926	2hr50m	TLMT	[illegible]
12/1/11	1110010A(1-5)	USA	0946	2hr50m	UHZ50	[illegible]
12/1/11	1111057A(1-4,7)	UCOR	1241	2hr50m	PU	ICB
12/1/11	1111057A(4)	UCOR	1243	2hr50m	PUMT	ICB
12/1/11	1111153A(1-4)	UCOR	1246	2hr50m	RU6	ICB
12/1/11	1110010A(4-15)	USA	1710	2hr50m	TL	ICB
12/2/11	Daily Pulse	LAB	0556	10m	MA	[illegible]
~~12/2/11~~	~~1111167A(1-4)~~	~~UCOR~~	~~0648~~	~~2hr50m~~	~~RL6~~	~~[illegible]~~
~~12/2/11~~	~~1111140A(1-20)~~	~~Foxfire~~	~~0648~~	~~2hr50m~~	~~RL6~~	~~[illegible]~~
12/2/11	1111167A(1-3)	UCOR	1042	2hr50m	RL6	[illegible]
12/2/11	1111140A(12-20)	Foxfire	1042	2hr50m	RL6	[illegible]
12/2/11	1111140A(1-11)	Foxfire	1419	2hr50m	RL6	KB

RA-228 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11140
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES **Work Order Analysis Notes**	**Oak Ridge Laboratory** **601 Scarboro Rd.** **Oak Ridge, TN 37830** **Voice: 865.481.0683** **www.eberlineservices.com**	Internal Work Order	11-11140
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 09:15	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED- TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/05/11 18:07	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to samples and swirled.
3	12/06/11 17:01	CHEM	TSMITH	Followed steps 12.2 to 12.9 in AP-007 rev. 14 . (Chemical cleanup for Ra 228)
4	12/08/11 10:38	CHEM	TSMITH	Followed steps 12.10 to 12.18 in AP-007 rev. 14 . (Preicpitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated and filtered samples, obtained final weights, covered with aluminum foil, and took to count room)

12-8-11
JM

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11140	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011851S	EDTA	0.25M	TSMITH	12/5/2011
010689D32	Ammonium Sulfide	2%	TSMITH	12/6/2011
011283D02	Lead Carrier	1.5 mg/ml	TSMITH	12/6/2011
011708P	Nitric Acid	Reagent Grade	TSMITH	12/6/2011
011314S	Yttrium Carrier	9 mg/ml	TSMITH	12/6/2011
011660S	Ammonium Oxalate	5%	TSMITH	12/8/2011
011708D02	Nitric Acid	6N	TSMITH	12/8/2011
010411D15	Sodium Hydroxide	10M	TSMITH	12/8/2011
011795S	Sodium Hydroxide	18M	TSMITH	12/8/2011
011382D12	Nitric Acid	1N	TSMITH	12/8/2011

LB 4110 Aqua

Date	Sample #	Client	Load Time	CT Time	Analysis	Tech
12/6/11	1112024AB(1-4)	UCOR	1110	1 hr	LB	KB
12/6/11	1111139RA(13-17)	Foxfire	1118	2 hrs	Ra 8	KB
12/6/11	1111139RA1(19-20)	Foxfire	1215	2 hrs	Ra 8	KB
12/6/11	1112006Pb(1-4,6)	UCOR	1355	2 hrs	Pb 210	KB
12/6/11	1111133TR(1-4)	Teledyne	1503	2 hrs	TOT Ra	KB
12/7/11	BKGDQC	LAB	0510	60 min	LB	—
12/7/11	EFFQC	LAB	0642	30 min	LB	—
	~~Sample~~					
12/7/11	1112007ABU-5	Seneca	0857	2 hr	LB	—
12/7/11	1112601ABU(1-4)	UCOR	0904	2 hr	LB	—
12/7/11	1112006RA(1-4,6)	UCOR	1104	2 hrs	Ra 8	KB
12/8/11	BKGDQC	LAB	0509	60 min	LB	—
12/8/11	EFFQC	LAB	0619	30 min	LB	—
12/8/11	1112026SR(1-4,6)	UCOR	0826	2 hr	SR 90	—
12/8/11	1111119NP(1-3)	UCOR	0905	10 min	NP-237	—
12/8/11	1112025NP(1-3)	UCOR	0953	10 min	NP-237	—
12/9/11	1111140RA(1-9)	Foxfire	1114	2 hrs	Ra 8	KB

LB 4110 Red

DATE	Sample#	Client	Load Time	CT Time	Analysis	Tech
12/06/11	BKGD QC	LAB	0600	60min	LIB	[illegible]
12/06/11	1111170NP(1-30)	UCOR	0801	10min	NP-237	[illegible]
12/06/11	1111087NP(1-4)	UCOR	0801	10min	NP-237	[illegible]
12/6/11	1111139RA(1-12)	Foxfire	1117	2 hrs	Ra8	KB
12/6/11	1111150Pb(1-11)	GeoSyntec	1401	2 hrs	Pb210	KB
12/7/11	EFF QC	LAB	0509	30min	LIB	[illegible]
12/7/11	BKGD QC	LAB	0556	60min	LIB	[illegible]
12/7/11	1112005NP(1-4)	UCOR	0803	10min	NP-237	[illegible]
12/7/11	1112006NP(1-46)	UCOR	0804	10min	NP-237	[illegible]
12/7/11	1111101NP(1-4)	UCOR	0805	10min	NP-237	[illegible]
12/7/11	1112006SR(1-46, 8)	UCOR	0845	2hr	SR 7-7	[illegible]
12/7/11	1112037AB(1-6)	Universal	0852	2hr	LIB	[illegible]
12/7/11	1112006CL(1-3,5,7)	UCOR	1051	30min	CL 36	KB
12/7/11	1111101RA(1-4)	UCOR	1058	2 hrs	Ra8	KB
12/7/11	1111119RA(2-12)	UCOR	1333	2hrs	Ra8	KB
12/7/11	1111119RA1(1)	UCOR	1333	30mins	Ra8	KB
12/8/11	EFF QC	LAB	0504	30min	LIB	[illegible]
12/8/11	BKGD QC	LAB	0545	60min	LIB	[illegible]
12/8/11	1112004AB(1-4)	Secure	0814	2hr	LIB	[illegible]
12/8/11	1112005SR(1-5)	UCOR	0821	2hr	SR 7-7	[illegible]
12/8/11	1111119NP(42)	UCOR	0904	10min	NP-237	[illegible]
12/8/11	1111119NP1(8-21)	UCOR	0946	10min	NP-237	[illegible]
12/8/11	1112005AB(1-5)	UCOR	1042	2hr	LIB	[illegible]
12/8/11	1111140RA(10-20)	Foxfire	1153	2hrs	Ra8	KB

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

11-11140
UUISO
Run 1

Work Order	11-11140
Analysis Code	UUISO
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML U-02 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.356
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB3-6	41	11/18/11 00:00	1.0029E+00
04	DO	IB3-6	41	11/18/11 00:00	1.0121E+00
05	TRG	IB3-7	88	11/18/11 14:26	1.0180E+00
06	TRG	IB3-8	52	11/18/11 00:00	1.0059E+00
07	TRG	IB3-9	60	11/18/11 00:00	1.0025E+00
08	TRG	IB3-6A	50	11/18/11 00:00	1.0190E+00
09	TRG	IB3-6B	44	11/18/11 00:00	1.0060E+00
10	TRG	IB3-6C	54	11/18/11 00:00	1.0035E+00
11	TRG	IB3-6D	47	11/18/11 00:00	1.0333E+00
12	TRG	IB3-6E	35	11/18/11 00:00	1.0051E+00
13	TRG	IB4-1	38	11/18/11 13:44	1.0096E+00
14	TRG	IB4-2	52	11/18/11 13:35	1.0191E+00
15	TRG	IB4-3	47	11/18/11 13:50	1.0205E+00
16	TRG	IB4-4	47	11/18/11 14:00	1.0014E+00
17	TRG	IB4-5	48	11/18/11 13:30	1.0022E+00
18	TRG	BKG-1	53	11/18/11 00:00	1.0076E+00
19	TRG	BKG-2	53	11/18/11 00:00	1.0152E+00
20	TRG	BKG-3	45	11/18/11 13:25	1.0203E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
UUISO
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6120	11.8		0.00								
02	MBL	0.6127	11.9		0.00								
03	DUP	0.6119	11.8		0.00								
04	DO	0.6125	11.9		0.00								
05	TRG	0.6108	11.8		0.00								
06	TRG	0.6113	11.8		0.00								
07	TRG	0.6118	11.8		0.00								
08	TRG	0.6121	11.8		0.00								
09	TRG	0.6122	11.8		0.00								
10	TRG	0.6121	11.8		0.00								
11	TRG	0.6108	11.8		0.00								
12	TRG	0.6103	11.8		0.00								
13	TRG	0.6111	11.8		0.00								
14	TRG	0.6118	11.8		0.00								
15	TRG	0.6109	11.8		0.00								
16	TRG	0.6115	11.8		0.00								
17	TRG	0.6112	11.8		0.00								
18	TRG	0.6100	11.8		0.00								
19	TRG	0.6115	11.8		0.00								
20	TRG	0.6097	11.8		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
UUISO
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 07:46	JBARNARD				
02	MBL			11/23/11 07:46	JBARNARD				
03	DUP			11/23/11 07:46	JBARNARD				
04	DO	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
05	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
06	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
07	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
08	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
09	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
10	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
11	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
12	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
13	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
14	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
15	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
16	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
17	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
18	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
19	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				
20	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:46	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11140-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/g	7.06E+00	9.91E-01	8.34E-02	8.13E+00	86.85	OK		OK	
02	U-234	MBL	BLANK	pCi/g	-1.56E-02	3.86E-02	1.10E-01					OK	OK
03	U-234	DUP	IB3-6	pCi/g	1.35E+00	2.84E-01	9.49E-02				OK	OK	
04	U-234	DO	IB3-6	pCi/g	1.19E+00	2.87E-01	8.76E-02					OK	
05	U-234	TRG	IB3-7	pCi/g	6.16E+00	8.87E-01	7.20E-02					OK	
06	U-234	TRG	IB3-8	pCi/g	5.39E+00	8.03E-01	8.34E-02					OK	
07	U-234	TRG	IB3-9	pCi/g	3.52E+00	6.58E-01	1.02E-01					OK	
08	U-234	TRG	IB3-6A	pCi/g	1.55E+00	3.61E-01	8.45E-02					OK	
09	U-234	TRG	IB3-6B	pCi/g	1.28E+00	2.63E-01	6.75E-02					OK	
10	U-234	TRG	IB3-6C	pCi/g	8.99E-01	2.03E-01	4.69E-02					OK	
11	U-234	TRG	IB3-6D	pCi/g	1.13E+00	2.43E-01	5.07E-02					OK	
12	U-234	TRG	IB3-6E	pCi/g	1.33E+00	3.05E-01	1.07E-01					OK	
13	U-234	TRG	IB4-1	pCi/g	2.40E+00	5.08E-01	7.65E-02					OK	
14	U-234	TRG	IB4-2	pCi/g	7.75E-01	2.45E-01	1.01E-01					OK	
15	U-234	TRG	IB4-3	pCi/g	2.29E+00	5.83E-01	1.88E-01					OK	
16	U-234	TRG	IB4-4	pCi/g	2.72E+00	4.89E-01	7.97E-02					OK	
17	U-234	TRG	IB4-5	pCi/g	4.32E+00	7.74E-01	7.75E-02					OK	
18	U-234	TRG	BKG-1	pCi/g	7.80E-01	2.12E-01	6.05E-02					OK	
19	U-234	TRG	BKG-2	pCi/g	9.21E-01	2.20E-01	6.65E-02					OK	
20	U-234	TRG	BKG-3	pCi/g	2.19E+00	5.59E-01	1.06E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11140-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	11/22/11 00:00	1.00E+00	109.23	0.00	0.00			
02	U-234	MBL	11/22/11 00:00	1.00E+00	69.71	0.00	0.00			
03	U-234	DUP	11/18/11 00:00	1.00E+00	141.14	0.00	0.00			
04	U-234	DO	11/18/11 00:00	1.01E+00	116.98	0.00	0.00			
05	U-234	TRG	11/18/11 14:26	1.02E+00	116.90	0.00	0.00			
06	U-234	TRG	11/18/11 00:00	1.01E+00	123.83	0.00	0.00			
07	U-234	TRG	11/18/11 00:00	1.00E+00	87.82	0.00	0.00			
08	U-234	TRG	11/18/11 00:00	1.02E+00	102.16	0.00	0.00			
09	U-234	TRG	11/18/11 00:00	1.01E+00	133.47	0.00	0.00			
10	U-234	TRG	11/18/11 00:00	1.00E+00	141.02	0.00	0.00			
11	U-234	TRG	11/18/11 00:00	1.03E+00	139.40	0.00	0.00			
12	U-234	TRG	11/18/11 00:00	1.01E+00	115.47	0.00	0.00			
13	U-234	TRG	11/18/11 13:44	1.01E+00	77.70	0.00	0.00			
14	U-234	TRG	11/18/11 13:35	1.02E+00	80.84	0.00	0.00			
15	U-234	TRG	11/18/11 13:50	1.02E+00	57.25	0.00	0.00			
16	U-234	TRG	11/18/11 14:00	1.00E+00	98.76	0.00	0.00			
17	U-234	TRG	11/18/11 13:30	1.00E+00	70.45	0.00	0.00			
18	U-234	TRG	11/18/11 00:00	1.01E+00	107.51	0.00	0.00			
19	U-234	TRG	11/18/11 00:00	1.02E+00	124.02	0.00	0.00			
20	U-234	TRG	11/18/11 13:25	1.02E+00	58.21	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	11/30/11 08:42		A_Spec	Alpha_017	170.02	5.07 E+02	5.00 E-03	17.5
02	U-234	MBL	11/30/11 08:42		A_Spec	Alpha_020	170	-8.50 E-01	5.00 E-03	20.7
03	U-234	DUP	11/30/11 08:42		A_Spec	Alpha_021	170	1.17 E+02	1.40 E-02	16.2
04	U-234	DO	11/30/11 08:42		A_Spec	Alpha_022	170.02	8.60 E+01	6.00 E-03	16.1
05	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_023	170.02	4.48 E+02	3.00 E-03	16.2
06	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_024	170.02	3.87 E+02	5.00 E-03	15.3
07	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_025	170	1.95 E+02	4.00 E-03	16.7
08	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_026	170.02	9.65 E+01	3.00 E-03	15.8
09	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_028	170.02	1.19 E+02	6.00 E-03	18.4
10	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_029	170	9.17 E+01	2.00 E-03	19.1
11	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_030	170	1.07 E+02	2.00 E-03	17.4
12	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_031	170.02	9.70 E+01	1.20 E-02	16.7
13	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_039	170	1.31 E+02	1.00 E-03	18.5
14	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_040	170	4.60 E+01	0.00 E+00	19.1
15	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_041	170	8.93 E+01	1.00 E-02	17.7
16	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_042	170	1.92 E+02	4.00 E-03	19
17	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_043	170	2.33 E+02	1.00 E-03	20.3
18	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_044	170	6.17 E+01	2.00 E-03	19.4
19	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_045	170	8.30 E+01	0.00 E+00	19
20	U-234	TRG	11/30/11 08:42		A_Spec	Alpha_046	170	8.68 E+01	1.00 E-03	17.7

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/g	6.99E+00	9.83E-01	9.85E-02	7.93E+00	88.25	OK		OK	
02	U-238	MBL	BLANK	pCi/g	-1.24E-02	3.79E-02	1.03E-01					OK	OK
03	U-238	DUP	IB3-6	pCi/g	1.44E+00	2.93E-01	7.60E-02				OK	OK	
04	U-238	DO	IB3-6	pCi/g	1.25E+00	2.94E-01	6.62E-02					OK	
05	U-238	TRG	IB3-7	pCi/g	5.41E+00	8.01E-01	5.71E-02					OK	
06	U-238	TRG	IB3-8	pCi/g	5.80E+00	8.49E-01	9.86E-02					OK	
07	U-238	TRG	IB3-9	pCi/g	2.67E+00	5.41E-01	7.49E-02					OK	
08	U-238	TRG	IB3-6A	pCi/g	1.32E+00	3.26E-01	9.62E-02					OK	
09	U-238	TRG	IB3-6B	pCi/g	1.14E+00	2.46E-01	8.95E-02					OK	
10	U-238	TRG	IB3-6C	pCi/g	6.72E-01	1.71E-01	4.07E-02					OK	
11	U-238	TRG	IB3-6D	pCi/g	8.50E-01	2.05E-01	5.54E-02					OK	
12	U-238	TRG	IB3-6E	pCi/g	1.21E+00	2.91E-01	1.39E-01					OK	
13	U-238	TRG	IB4-1	pCi/g	2.48E+00	5.20E-01	1.09E-01					OK	
14	U-238	TRG	IB4-2	pCi/g	9.05E-01	2.67E-01	1.01E-01					OK	
15	U-238	TRG	IB4-3	pCi/g	2.35E+00	5.98E-01	2.48E-01					OK	
16	U-238	TRG	IB4-4	pCi/g	2.89E+00	5.10E-01	9.64E-02					OK	
17	U-238	TRG	IB4-5	pCi/g	4.12E+00	7.45E-01	8.84E-02					OK	
18	U-238	TRG	BKG-1	pCi/g	1.11E+00	2.61E-01	7.55E-02					OK	
19	U-238	TRG	BKG-2	pCi/g	7.25E-01	1.91E-01	5.28E-02					OK	
20	U-238	TRG	BKG-3	pCi/g	2.13E+00	5.47E-01	1.20E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	11/22/11 00:00	1.00E+00	109.23	0.00	0.00			
02	U-238	MBL	11/22/11 00:00	1.00E+00	69.71	0.00	0.00			
03	U-238	DUP	11/18/11 00:00	1.00E+00	141.14	0.00	0.00			
04	U-238	DO	11/18/11 00:00	1.01E+00	116.98	0.00	0.00			
05	U-238	TRG	11/18/11 14:26	1.02E+00	116.90	0.00	0.00			
06	U-238	TRG	11/18/11 00:00	1.01E+00	123.83	0.00	0.00			
07	U-238	TRG	11/18/11 00:00	1.00E+00	87.82	0.00	0.00			
08	U-238	TRG	11/18/11 00:00	1.02E+00	102.16	0.00	0.00			
09	U-238	TRG	11/18/11 00:00	1.01E+00	133.47	0.00	0.00			
10	U-238	TRG	11/18/11 00:00	1.00E+00	141.02	0.00	0.00			
11	U-238	TRG	11/18/11 00:00	1.03E+00	139.40	0.00	0.00			
12	U-238	TRG	11/18/11 00:00	1.01E+00	115.47	0.00	0.00			
13	U-238	TRG	11/18/11 13:44	1.01E+00	77.70	0.00	0.00			
14	U-238	TRG	11/18/11 13:35	1.02E+00	80.84	0.00	0.00			
15	U-238	TRG	11/18/11 13:50	1.02E+00	57.25	0.00	0.00			
16	U-238	TRG	11/18/11 14:00	1.00E+00	98.76	0.00	0.00			
17	U-238	TRG	11/18/11 13:30	1.00E+00	70.45	0.00	0.00			
18	U-238	TRG	11/18/11 00:00	1.01E+00	107.51	0.00	0.00			
19	U-238	TRG	11/18/11 00:00	1.02E+00	124.02	0.00	0.00			
20	U-238	TRG	11/18/11 13:25	1.02E+00	58.21	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	11/30/11 08:42		A_Spec	Alpha_017	170.02	5.04 E+02	9.00 E-03	17.5
02	U-238	MBL	11/30/11 08:42		A_Spec	Alpha_020	170	-6.80 E-01	4.00 E-03	20.7
03	U-238	DUP	11/30/11 08:42		A_Spec	Alpha_021	170	1.25 E+02	7.00 E-03	16.2
04	U-238	DO	11/30/11 08:42		A_Spec	Alpha_022	170.02	9.07 E+01	2.00 E-03	16.1
05	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_023	170.02	3.96 E+02	1.00 E-03	16.2
06	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_024	170.02	4.18 E+02	9.00 E-03	15.3
07	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_025	170	1.49 E+02	1.00 E-03	16.7
08	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_026	170.02	8.20 E+01	0.00 E+00	15.8
09	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_028	170.02	1.06 E+02	1.50 E-02	18.4
10	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_029	170	6.88 E+01	1.00 E-03	19.1
11	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_030	170	8.05 E+01	3.00 E-03	17.4
12	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_031	170.02	8.86 E+01	2.60 E-02	16.7
13	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_039	170	1.36 E+02	0.00 E+00	18.6
14	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_040	170	5.40 E+01	0.00 E+00	19.1
15	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_041	170	9.21 E+01	2.30 E-02	17.7
16	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_042	170	2.06 E+02	8.00 E-03	19
17	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_043	170	2.23 E+02	2.00 E-03	20.3
18	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_044	170	8.80 E+01	0.00 E+00	19.4
19	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_045	170	6.57 E+01	2.00 E-03	19
20	U-238	TRG	11/30/11 08:42		A_Spec	Alpha_046	170	8.47 E+01	2.00 E-03	17.7

Preliminary Data Report & Analytical Calculations

Work Order: 11-11140-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/g	3.89E-01	1.67E-01	8.21E-02					OK	
02	U-235	MBL	BLANK	pCi/g	7.25E-03	4.69E-02	1.28E-01					OK	OK
03	U-235	DUP	IB3-6	pCi/g	1.21E-01	8.53E-02	7.50E-02				NA	OK	
04	U-235	DO	IB3-6	pCi/g	5.14E-02	6.74E-02	1.03E-01					OK	
05	U-235	TRG	IB3-7	pCi/g	3.30E-01	1.53E-01	8.89E-02					OK	
06	U-235	TRG	IB3-8	pCi/g	3.09E-01	1.51E-01	1.03E-01					OK	
07	U-235	TRG	IB3-9	pCi/g	2.45E-01	1.54E-01	1.33E-01					OK	
08	U-235	TRG	IB3-6A	pCi/g	1.31E-02	4.01E-02	9.50E-02					OK	
09	U-235	TRG	IB3-6B	pCi/g	2.19E-02	3.72E-02	6.32E-02					OK	
10	U-235	TRG	IB3-6C	pCi/g	4.84E-02	5.32E-02	7.25E-02					OK	
11	U-235	TRG	IB3-6D	pCi/g	9.15E-02	7.31E-02	7.84E-02					OK	
12	U-235	TRG	IB3-6E	pCi/g	8.47E-02	8.18E-02	1.02E-01					OK	
13	U-235	TRG	IB4-1	pCi/g	2.22E-01	1.43E-01	9.44E-02					OK	
14	U-235	TRG	IB4-2	pCi/g	3.45E-02	5.86E-02	9.93E-02					OK	
15	U-235	TRG	IB4-3	pCi/g	1.84E-01	1.54E-01	1.32E-01					OK	
16	U-235	TRG	IB4-4	pCi/g	1.92E-01	1.20E-01	1.05E-01					OK	
17	U-235	TRG	IB4-5	pCi/g	3.17E-01	1.73E-01	9.56E-02					OK	
18	U-235	TRG	BKG-1	pCi/g	6.24E-02	6.87E-02	9.36E-02					OK	
19	U-235	TRG	BKG-2	pCi/g	6.84E-02	6.61E-02	8.20E-02					OK	
20	U-235	TRG	BKG-3	pCi/g	1.87E-01	1.64E-01	1.86E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	11/22/11 00:00	1.00E+00	109.23	0.00	0.00			
02	U-235	MBL	11/22/11 00:00	1.00E+00	69.71	0.00	0.00			
03	U-235	DUP	11/18/11 00:00	1.00E+00	141.14	0.00	0.00			
04	U-235	DO	11/18/11 00:00	1.01E+00	116.98	0.00	0.00			
05	U-235	TRG	11/18/11 14:26	1.02E+00	116.90	0.00	0.00			
06	U-235	TRG	11/18/11 00:00	1.01E+00	123.83	0.00	0.00			
07	U-235	TRG	11/18/11 00:00	1.00E+00	87.82	0.00	0.00			
08	U-235	TRG	11/18/11 00:00	1.02E+00	102.16	0.00	0.00			
09	U-235	TRG	11/18/11 00:00	1.01E+00	133.47	0.00	0.00			
10	U-235	TRG	11/18/11 00:00	1.00E+00	141.02	0.00	0.00			
11	U-235	TRG	11/18/11 00:00	1.03E+00	139.40	0.00	0.00			
12	U-235	TRG	11/18/11 00:00	1.01E+00	115.47	0.00	0.00			
13	U-235	TRG	11/18/11 13:44	1.01E+00	77.70	0.00	0.00			
14	U-235	TRG	11/18/11 13:35	1.02E+00	80.84	0.00	0.00			
15	U-235	TRG	11/18/11 13:50	1.02E+00	57.25	0.00	0.00			
16	U-235	TRG	11/18/11 14:00	1.00E+00	98.76	0.00	0.00			
17	U-235	TRG	11/18/11 13:30	1.00E+00	70.45	0.00	0.00			
18	U-235	TRG	11/18/11 00:00	1.01E+00	107.51	0.00	0.00			
19	U-235	TRG	11/18/11 00:00	1.02E+00	124.02	0.00	0.00			
20	U-235	TRG	11/18/11 13:25	1.02E+00	58.21	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 11-11140-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	11/30/11 08:42		A_Spec	Alpha_017	170.02	2.27 E+01	2.00 E-03	17.5
02	U-235	MBL	11/30/11 08:42		A_Spec	Alpha_020	170	3.20 E-01	4.00 E-03	20.7
03	U-235	DUP	11/30/11 08:42		A_Spec	Alpha_021	170	8.49 E+00	3.00 E-03	16.2
04	U-235	DO	11/30/11 08:42		A_Spec	Alpha_022	170.02	3.00 E+00	0.00 E+00	16.1
05	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_023	170.02	1.95 E+01	3.00 E-03	16.2
06	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_024	170.02	1.80 E+01	0.00 E+00	15.3
07	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_025	170	1.10 E+01	0.00 E+00	16.7
08	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_026	170.02	6.60 E-01	2.00 E-03	15.8
09	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_028	170.02	1.66 E+00	2.00 E-03	18.4
10	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_029	170	4.00 E+00	0.00 E+00	19.1
11	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_030	170	7.00 E+00	0.00 E+00	17.4
12	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_031	170.02	5.00 E+00	0.00 E+00	16.7
13	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_039	170	9.83 E+00	1.00 E-03	18.5
14	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_040	170	1.66 E+00	2.00 E-03	19.1
15	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_041	170	6.83 E+00	1.00 E-03	17.7
16	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_042	170	1.10 E+01	0.00 E+00	19
17	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_043	170	1.38 E+01	1.00 E-03	20.3
18	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_044	170	4.00 E+00	0.00 E+00	19.4
19	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_045	170	5.00 E+00	0.00 E+00	19
20	U-235	TRG	11/30/11 08:42		A_Spec	Alpha_046	170	6.00 E+00	0.00 E+00	17.7

Count Room Report
Client: Foxfire Scientific, Inc.

11-11140-UUISO-1 (pCi/g) in SO
Tracer ID: U-10a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.6120	11.8459		0.00		
02	MBL	BLANK	11/22/11 00:00	1.0000	0.6127	11.8594		0.00		
03	DUP	IB3-6	11/18/11 00:00	1.0029	0.6119	11.8439		0.00		
04	DO	IB3-6	11/18/11 00:00	1.0121	0.6125	11.8556		0.00		
05	TRG	IB3-7	11/18/11 14:26	1.0180	0.6108	11.8226		0.00		
06	TRG	IB3-8	11/18/11 00:00	1.0059	0.6113	11.8323		0.00		
07	TRG	IB3-9	11/18/11 00:00	1.0025	0.6118	11.8420		0.00		
08	TRG	IB3-6A	11/18/11 00:00	1.0190	0.6121	11.8478		0.00		
09	TRG	IB3-6B	11/18/11 00:00	1.0060	0.6122	11.8497		0.00		
10	TRG	IB3-6C	11/18/11 00:00	1.0035	0.6121	11.8478		0.00		
11	TRG	IB3-6D	11/18/11 00:00	1.0333	0.6108	11.8226		0.00		
12	TRG	IB3-6E	11/18/11 00:00	1.0051	0.6103	11.8130		0.00		
13	TRG	IB4-1	11/18/11 13:44	1.0096	0.6111	11.8285		0.00		
14	TRG	IB4-2	11/18/11 13:35	1.0191	0.6118	11.8420		0.00		
15	TRG	IB4-3	11/18/11 13:50	1.0205	0.6109	11.8246		0.00		
16	TRG	IB4-4	11/18/11 14:00	1.0014	0.6115	11.8362		0.00		
17	TRG	IB4-5	11/18/11 13:30	1.0022	0.6112	11.8304		0.00		
18	TRG	BKG-1	11/18/11 00:00	1.0076	0.6100	11.8072		0.00		
19	TRG	BKG-2	11/18/11 00:00	1.0152	0.6115	11.8362		0.00		
20	TRG	BKG-3	11/18/11 13:25	1.0203	0.6097	11.8014		0.00		

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 7:46 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11140	1	UUISO	11/23/2011 7:46	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
U-234	U-8a	35.240	11/23/2011	0.500	0.5122				8.13	0.293	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	11/23/2011	0.500	0.5122				7.93	0.285	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	U-232	U-10a	19.356	11/23/2011	0.6120	0.6200
02	U-232	U-10a	19.356	11/23/2011	0.6127	0.6200
03	U-232	U-10a	19.356	11/23/2011	0.6119	0.6200
04	U-232	U-10a	19.356	11/23/2011	0.6125	0.6200
05	U-232	U-10a	19.356	11/23/2011	0.6108	0.6200
06	U-232	U-10a	19.356	11/23/2011	0.6113	0.6200
07	U-232	U-10a	19.356	11/23/2011	0.6118	0.6200
08	U-232	U-10a	19.356	11/23/2011	0.6121	0.6200
09	U-232	U-10a	19.356	11/23/2011	0.6122	0.6200
10	U-232	U-10a	19.356	11/23/2011	0.6121	0.6200
11	U-232	U-10a	19.356	11/23/2011	0.6108	0.6200
12	U-232	U-10a	19.356	11/23/2011	0.6103	0.6200
13	U-232	U-10a	19.356	11/23/2011	0.6111	0.6200
14	U-232	U-10a	19.356	11/23/2011	0.6118	0.6200
15	U-232	U-10a	19.356	11/23/2011	0.6109	0.6200
16	U-232	U-10a	19.356	11/23/2011	0.6115	0.6200
17	U-232	U-10a	19.356	11/23/2011	0.6112	0.6200
18	U-232	U-10a	19.356	11/23/2011	0.6100	0.6200
19	U-232	U-10a	19.356	11/23/2011	0.6115	0.6200
20	U-232	U-10a	19.356	11/23/2011	0.6097	0.6200

Balance Printer Tapes

Tracer

0.6120 g
0.6127 g
0.6119 g
0.6125 g
0.6108 g
0.6113 g
0.6118 g
0.6121 g
0.6122 g
0.6121 g
0.6108 g
0.6103 g
0.6111 g
0.6118 g
0.6109 g
0.6115 g
0.6112 g
0.6100 g
0.6115 g
0.6097 g

LCS

0.5122 g

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11140	1	UUISO	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	IB3-6	DUP					1.0029E+00	1.0029E+00				
04	IB3-6	DO					1.0121E+00	1.0121E+00				
05	IB3-7	TRG					1.0180E+00	1.0180E+00				
06	IB3-8	TRG					1.0059E+00	1.0059E+00				
07	IB3-9	TRG					1.0025E+00	1.0025E+00				
08	IB3-6A	TRG					1.0190E+00	1.0190E+00				
09	IB3-6B	TRG					1.0060E+00	1.0060E+00				
10	IB3-6C	TRG					1.0035E+00	1.0035E+00				
11	IB3-6D	TRG					1.0333E+00	1.0333E+00				
12	IB3-6E	TRG					1.0051E+00	1.0051E+00				
13	IB4-1	TRG					1.0096E+00	1.0096E+00				
14	IB4-2	TRG					1.0191E+00	1.0191E+00				
15	IB4-3	TRG					1.0205E+00	1.0205E+00				
16	IB4-4	TRG					1.0014E+00	1.0014E+00				
17	IB4-5	TRG					1.0022E+00	1.0022E+00				
18	BKG-1	TRG					1.0076E+00	1.0076E+00				
19	BKG-2	TRG					1.0152E+00	1.0152E+00				
20	BKG-3	TRG					1.0203E+00	1.0203E+00				

1.0029 g
1.0121 g
1.0180 g
1.0059 g
1.0025 g
1.0190 g
1.0060 g
1.0035 g
1.0333 g
1.0051 g
1.0096 g
1.0191 g
1.0205 g
1.0014 g
1.0022 g
1.0076 g
1.0152 g
1.0203 g

Comments	

Technician: _____ Date: 11/23/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11140	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	IB3-6	13.5500	554.6500	431.7000	541.1000	418.1500	22.72%	77.28%			
05	IB3-7	13.5600	192.0600	128.4900	178.5000	114.9300	35.61%	64.39%			
06	IB3-8	13.5700	249.6000	132.0100	236.0300	118.4400	49.82%	50.18%			
07	IB3-9	13.5400	303.6200	244.9000	290.0800	231.3600	20.24%	79.76%			
08	IB3-6A	13.6000	296.8600	234.4700	283.2600	220.8700	22.03%	77.97%			
09	IB3-6B	13.5300	312.9300	249.7700	299.4000	236.2400	21.10%	78.90%			
10	IB3-6C	13.5700	288.0200	224.2900	274.4500	210.7200	23.22%	76.78%			
11	IB3-6D	13.6500	303.7800	232.3600	290.1300	218.7100	24.62%	75.38%			
12	IB3-6E	13.7000	278.0400	218.9700	264.3400	205.2700	22.35%	77.65%			
13	IB4-1	13.5100	240.8500	190.0300	227.3400	176.5200	22.35%	77.65%			
14	IB4-2	13.4200	215.2900	172.1500	201.8700	158.7300	21.37%	78.63%			
15	IB4-3	13.5200	236.9100	201.6400	223.3900	188.1200	15.79%	84.21%			
16	IB4-4	13.4200	205.7100	149.4700	192.2900	136.0500	29.25%	70.75%			
17	IB4-5	13.5100	213.0000	176.0400	199.4900	162.5300	18.53%	81.47%			
18	BKG-1	13.5400	349.7300	297.4900	336.1900	283.9500	15.54%	84.46%			
19	BKG-2	13.6000	291.8700	253.1300	278.2700	239.5300	13.92%	86.08%			
20	BKG-3	13.6200	182.5900	138.0100	168.9700	124.3900	26.38%	73.62%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Ellis

Date: **Analysis: Rough Prep Logbook**

Analysis: UUISO Page No. 7856

Apex-Alpha™

11/7 vcn

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010797.Cnf
Batch Identification: 1111140A-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_017
Chamber Serial Number:
Detector Serial Number: 17
Env. Background: System Bkgd 9997
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/30/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:17 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6120 mL
Effective Efficiency: 0.1907 +/- 0.0107
Counting Efficiency: 0.1746 +/- 0.0028 on 9/4/2011 10:54:36 AM
Chem. Recovery Factor: 1.0923 +/- 0.0638

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: 0.8603
Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.288	382.00	10.04	0.00	0.00E+000	13.6
U-234		4.736	507.15	8.71	0.85	0.00E+000	42.4
U-235		4.403	22.66	41.53	0.34	0.00E+000	6.2
U-238		4.159	504.47	8.74	1.53	0.00E+000	16.2

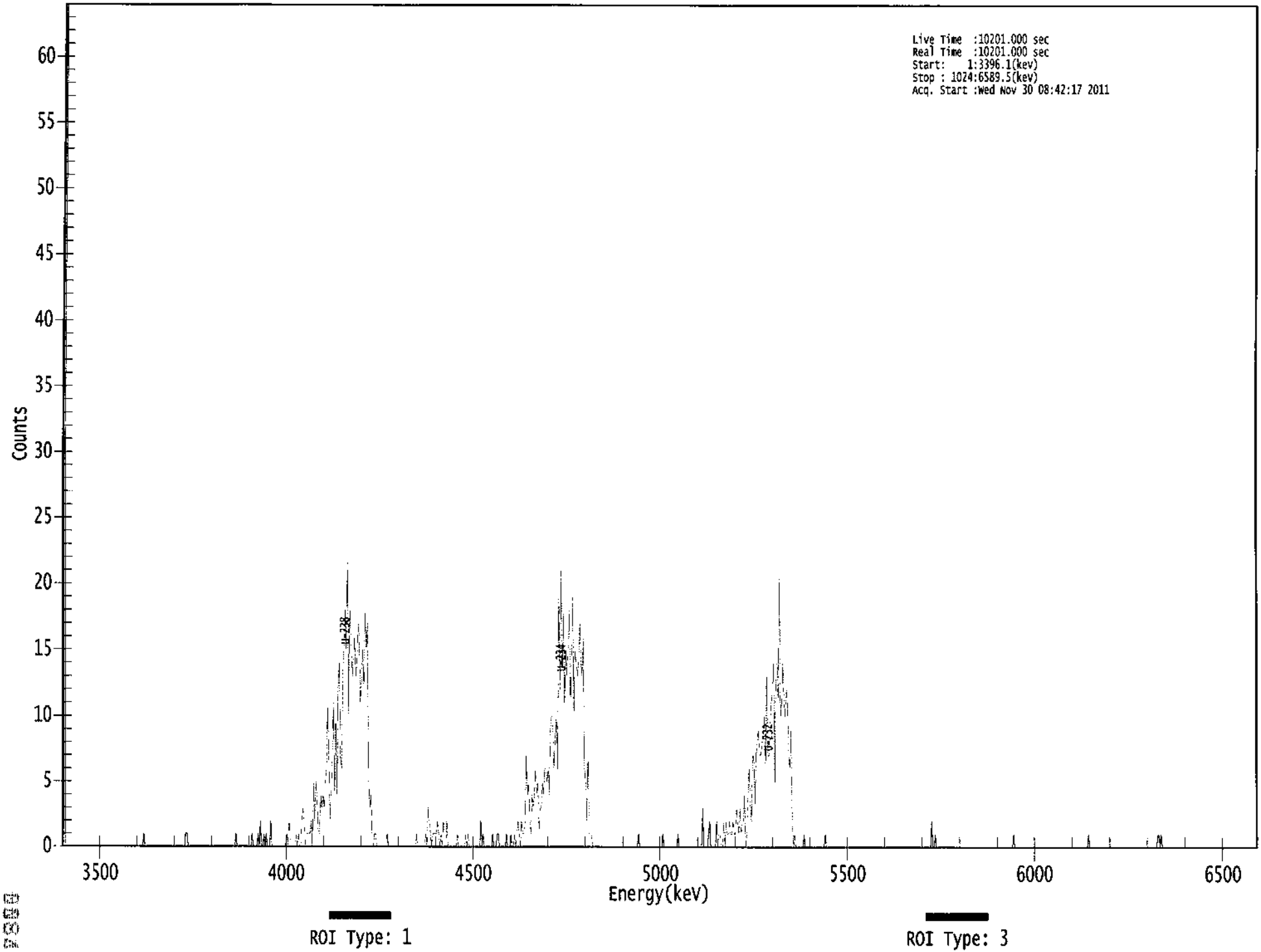
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.996	5302.50*	5.32E+000 +/- 5.86E-001	8.35E-002 +/- 9.19E-003
U-234	0.990	4761.50*	7.06E+000 +/- 9.91E-001	8.34E-002 +/- 9.18E-003
U-235	0.995	4385.50*	3.89E-001 +/- 1.67E-001	8.21E-002 +/- 9.04E-003
U-238	0.990	4184.40*	6.99E+000 +/- 9.83E-001	9.85E-002 +/- 1.08E-002

AG
12/1/11

0000010797.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	1	1	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	1	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	1	0	2	0	0	1	0	1
177:	0	0	0	2	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	1	0	2	0	0	0	0
201:	0	1	0	1	0	0	2	3
209:	2	0	1	1	1	1	2	0
217:	5	2	5	4	1	1	4	3
225:	4	3	5	6	11	7	2	4
233:	7	11	4	10	4	12	14	7
241:	6	13	15	18	15	22	10	18
249:	16	13	14	16	13	14	17	16
257:	11	13	15	12	18	15	17	5
265:	3	4	0	0	1	1	0	0
273:	0	0	0	0	0	0	0	1
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	1	0	0	0	0	0	0	0
313:	1	0	3	2	1	0	1	1
321:	1	1	2	1	0	1	0	2
329:	0	0	2	0	0	0	0	0
337:	0	0	0	1	0	0	0	0
345:	0	0	1	0	1	0	0	0
353:	0	0	0	0	0	0	0	2
361:	0	1	0	0	0	0	0	0

369:	0	1	0	0	0	1	1	0

Sample Title: 01

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	1	0	0	1	0	1	2
393:	1	0	2	1	1	2	7	4
401:	5	2	1	4	3	4	6	4
409:	5	1	3	3	5	4	6	6
417:	5	6	4	9	10	10	6	8
425:	10	6	19	12	21	13	18	11
433:	15	13	15	18	11	15	19	10
441:	15	14	13	14	17	14	13	16
449:	6	5	2	7	1	1	1	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	1	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	1	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	3	0	0
553:	0	0	1	2	0	0	0	0
561:	0	2	0	1	1	0	0	2
569:	0	2	1	1	2	1	1	2
577:	1	1	3	2	1	3	1	2
585:	2	4	0	1	4	6	3	2
593:	7	7	3	7	8	9	7	7
601:	8	9	10	6	13	7	7	9
609:	11	12	14	5	14	14	11	21
617:	10	11	14	11	10	12	11	7
625:	6	9	2	0	1	0	0	0
633:	0	0	0	0	1	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	1	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	2	0	0	1	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	1
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	1	1	0	1	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010845.cnf
Batch Identification: 1111140A-UU
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_020
Chamber Serial Number:
Detector Serial Number: 20
Env. Background: System Bkgd 9999
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/30/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:18 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6127 mL
Effective Efficiency: 0.1445 +/- 0.0091
Counting Efficiency: 0.2073 +/- 0.0033 on 9/4/2011 11:23:25 AM
Chem. Recovery Factor: 0.6971 +/- 0.0454

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.303	289.83	11.52	0.17	0.00E+000	18.3
U-234		4.738	-0.85	246.69	0.85	0.00E+000	0.0
U-235		4.337	0.32	646.93	0.68	0.00E+000	3.3
U-238		4.162	-0.68	304.44	0.68	0.00E+000	0.0

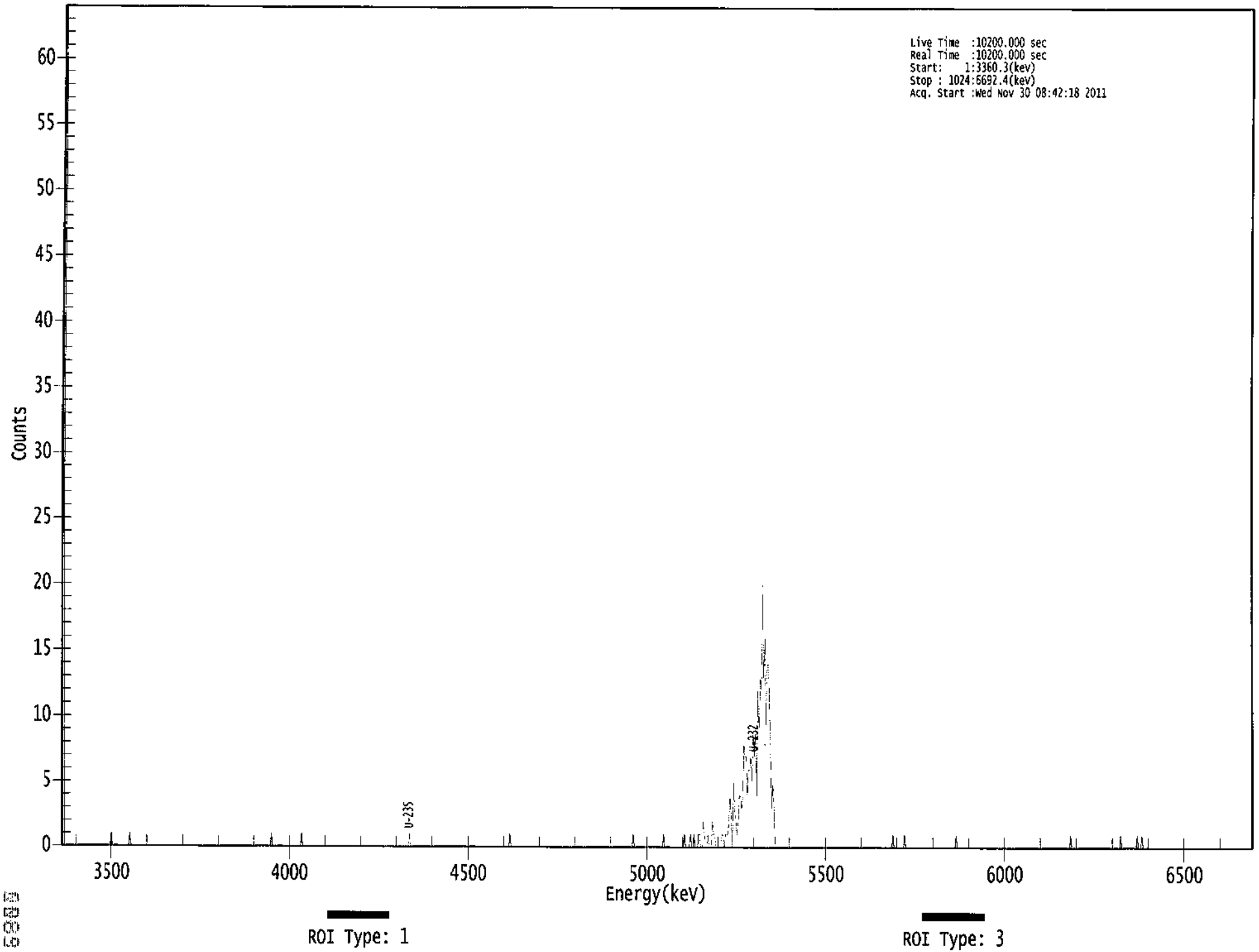
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.33E+000 +/- 6.59E-001	7.67E-002 +/- 9.48E-003
U-234	0.991	4761.50*	-1.56E-002 +/- 3.86E-002	1.10E-001 +/- 1.36E-002
U-235	0.964	4385.50*	7.25E-003 +/- 4.69E-002	1.28E-001 +/- 1.58E-002
U-238	0.992	4184.40*	-1.24E-002 +/- 3.79E-002	1.03E-001 +/- 1.28E-002

AG
12/1/11

0000010845.CNF



00009

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	1
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	1	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	1	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	0	1	0	0
545:	1	0	0	0	1	1	0	0
553:	2	1	0	0	1	0	0	0
561:	2	1	1	0	0	0	0	0
569:	1	1	0	1	1	1	2	4
577:	2	0	5	3	2	1	2	4
585:	4	3	4	8	7	7	4	6
593:	6	7	5	9	7	9	4	12
601:	9	13	12	20	13	16	9	14
609:	14	11	7	3	5	3	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	1	0	0	0	0
721:	0	0	0	0	0	1	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	1	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	1	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	1	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	1	0	0	0
929:	1	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

1/1/2014

Sample Description: IB3-6-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010796.Cnf
Batch Identification: 1111140A-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_021
Chamber Serial Number:
Detector Serial Number: 21
Env. Background: System Bkgd 10000
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:19 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6119 mL
Effective Efficiency: 0.2286 +/- 0.0119
Counting Efficiency: 0.1620 +/- 0.0026 on 9/4/2011 11:24:40 AM
Chem. Recovery Factor: 1.4114 +/- 0.0771

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.289	457.96	9.18	2.04	0.00E+000	34.2
U-234		4.733	116.62	18.37	2.38	0.00E+000	4.4
U-235		4.378	8.49	69.59	0.51	0.00E+000	6.3
U-238		4.159	124.81	17.64	1.19	0.00E+000	10.7

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.30E+000 +/- 5.43E-001	9.02E-002 +/- 9.23E-003
U-234	0.987	4761.50*	1.35E+000 +/- 2.84E-001	9.49E-002 +/- 9.71E-003
U-235	0.999	4385.50*	1.21E-001 +/- 8.53E-002	7.50E-002 +/- 7.67E-003
U-238	0.990	4184.40*	1.44E+000 +/- 2.93E-001	7.60E-002 +/- 7.77E-003

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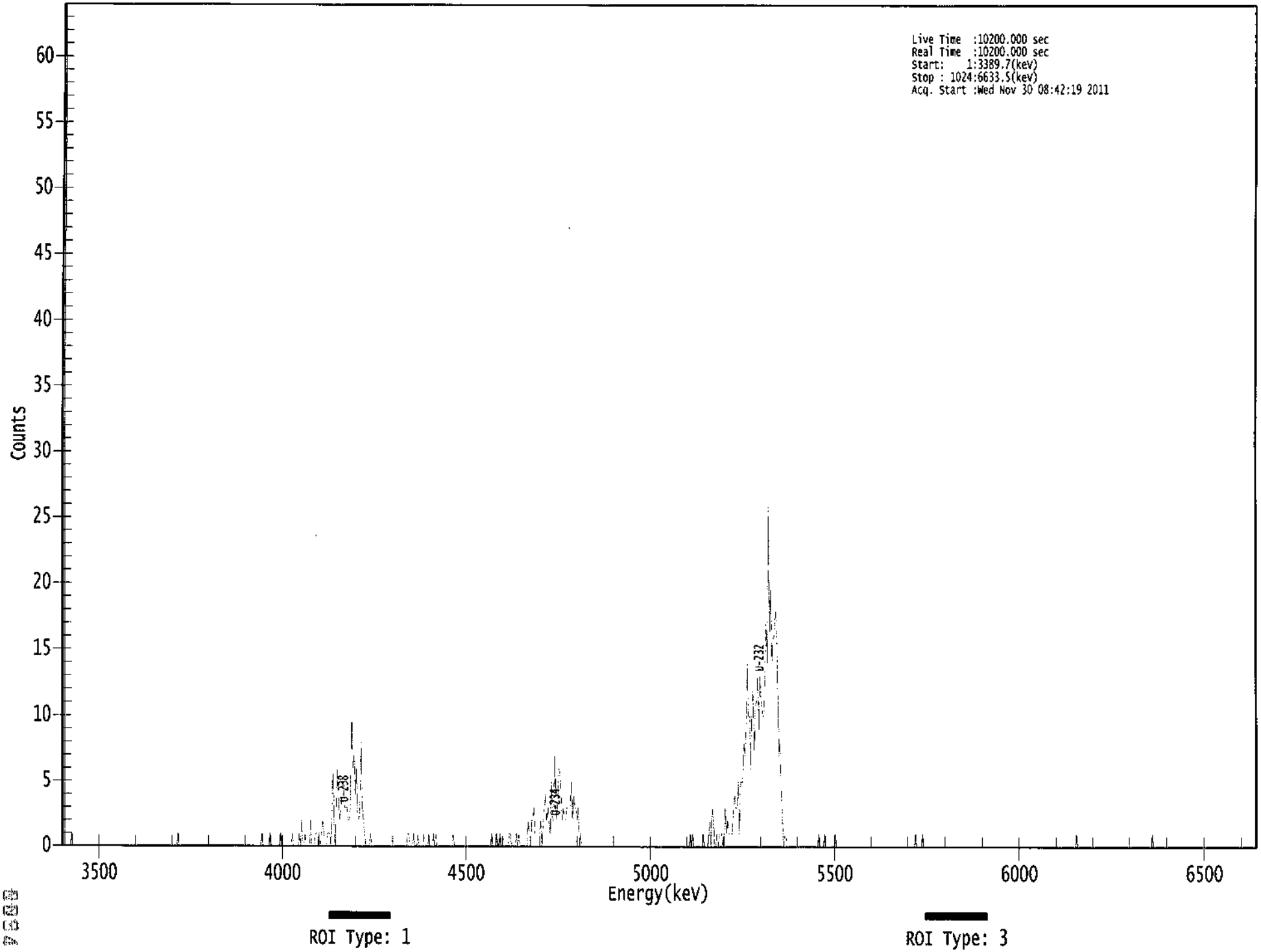
12/1/11

0000010796.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	1	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	1	0	0	0
177:	0	0	0	1	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	0	1	0	2	0
209:	0	1	0	0	0	0	2	0
217:	0	0	1	1	0	1	0	1
225:	2	1	0	0	1	1	1	0
233:	3	6	1	0	4	6	3	2
241:	3	5	5	3	3	3	2	2
249:	3	10	6	7	4	6	2	2
257:	3	8	3	2	1	0	0	0
265:	0	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	1	1	0	0	0	1	0
305:	0	0	1	0	0	0	0	1
313:	0	0	0	1	0	0	0	1
321:	0	1	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	1	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	1	0	0	0	1	0	0

Sample Title: 03

Channel								
377:	1	0	0	0	0	0	0	0
385:	1	1	0	0	0	0	1	0
393:	1	0	0	0	0	0	0	0
401:	2	1	0	2	2	3	1	1
409:	1	1	1	2	0	2	3	4
417:	2	3	2	1	5	2	2	7
425:	2	3	6	6	4	2	3	2
433:	2	3	3	3	3	5	2	4
441:	3	3	2	3	0	1	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	1	0	1	0	0
545:	0	0	0	0	0	0	1	0
553:	0	0	0	1	2	0	3	2
561:	0	0	1	0	1	1	1	0
569:	0	3	1	2	1	1	1	1
577:	3	4	3	3	5	1	5	5
585:	5	8	7	9	14	10	10	6
593:	11	12	7	11	11	13	9	13
601:	11	10	10	13	17	14	26	16
609:	20	14	16	16	18	17	12	7
617:	8	4	2	0	1	1	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	1	0
657:	0	0	0	0	0	0	0	1
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	1	0	0	0
737:	0	0	1	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	1	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	1	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010822.cnf
Batch Identification: 1111140A-UU
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_022
Chamber Serial Number:
Detector Serial Number: 22
Env. Background: System Bkgd 10001
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:20 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6125 mL
Effective Efficiency: 0.1887 +/- 0.0107
Counting Efficiency: 0.1614 +/- 0.0026 on 9/4/2011 11:25:40 AM
Chem. Recovery Factor: 1.1698 +/- 0.0687

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.290	378.47	10.10	1.53	0.00E+000	18.9
U-234		4.738	85.98	21.28	1.02	0.00E+000	6.0
U-235		4.388	3.00	130.67	0.00	0.00E+000	3.1
U-238		4.166	90.66	20.63	0.34	0.00E+000	4.0

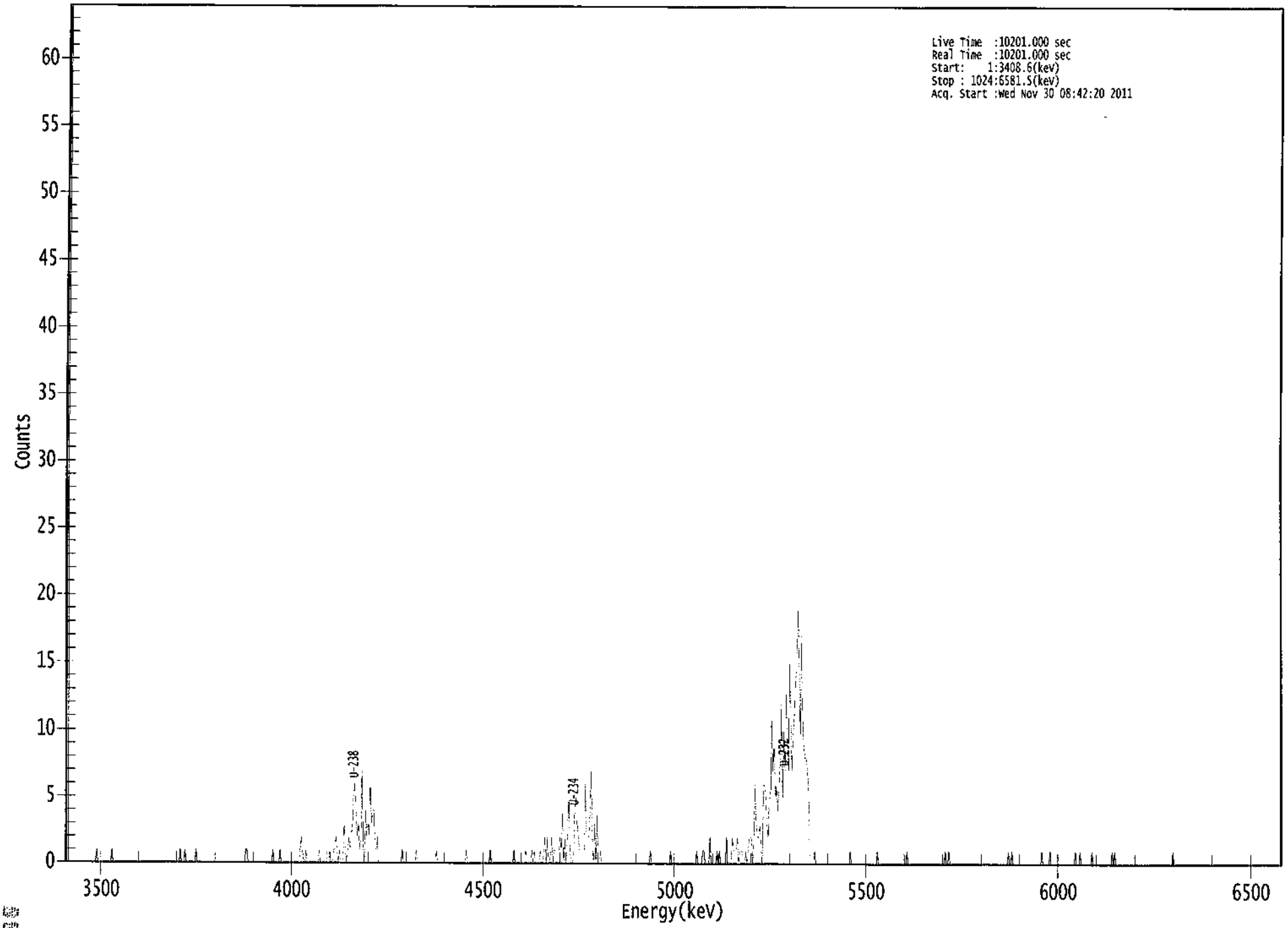
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.26E+000 +/- 5.82E-001	9.88E-002 +/- 1.09E-002
U-234	0.991	4761.50*	1.19E+000 +/- 2.87E-001	8.76E-002 +/- 9.68E-003
U-235	1.000	4385.50*	5.14E-002 +/- 6.74E-002	1.03E-001 +/- 1.14E-002
U-238	0.995	4184.40*	1.25E+000 +/- 2.94E-001	6.62E-002 +/- 7.32E-003

AG
12/1/11

0000010822.CNF



ROI Type: 1

ROI Type: 3

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 04

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	1	0	0	0	0	0
33:	0	0	0	0	0	0	0	1
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	1	0	0
105:	0	0	0	0	0	0	1	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	1	1	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	1
177:	0	0	0	0	0	1	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	1	2
201:	1	0	0	1	0	0	0	0
209:	0	0	0	0	0	0	1	0
217:	0	0	0	0	0	1	1	1
225:	0	0	1	1	2	1	0	1
233:	0	0	0	3	1	0	1	2
241:	1	2	3	5	6	4	2	3
249:	1	2	7	1	0	4	2	3
257:	2	6	3	4	4	1	1	2
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	1	0	0	0
289:	0	0	0	0	0	0	0	0
297:	1	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	1	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	1	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	1	0	0	0
393:	0	1	0	1	0	0	0	0
401:	1	0	0	1	2	0	2	0
409:	0	1	2	0	1	1	1	1
417:	1	2	1	4	0	2	0	2
425:	5	1	0	0	1	4	5	3
433:	2	1	1	1	1	1	6	2
441:	2	2	4	7	2	0	3	0
449:	4	0	0	1	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	1	1	0	0	0	0	2
545:	0	0	0	0	0	1	0	1
553:	0	0	0	0	0	2	0	0
561:	0	0	2	1	1	1	2	0
569:	1	1	1	0	0	1	0	1
577:	2	2	2	0	2	6	3	2
585:	2	3	1	0	6	6	5	3
593:	2	5	5	11	7	9	5	6
601:	4	6	8	12	5	10	7	13
609:	9	7	15	10	7	10	11	14
617:	14	19	16	9	17	11	9	8
625:	8	7	6	0	0	0	0	1
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	1	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	1	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	1	0	0
745:	1	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	1	0	0	1	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	0	0	0	0	0	1	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	1	0	0	0	1	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	1	0	1	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	1	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-7
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010823.cnf
Batch Identification: 1111140A-UU
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_023
Chamber Serial Number:
Detector Serial Number: 23
Env. Background: System Bkgd 10002
Reagent Blank: <not performed>

Sample Size: 1.018E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:21 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6108 mL
Effective Efficiency: 0.1899 +/- 0.0107
Counting Efficiency: 0.1625 +/- 0.0026 on 9/4/2011 12:49:03 AM
Chem. Recovery Factor: 1.1690 +/- 0.0685

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.303	379.81	10.08	1.19	0.00E+000	34.4
U-234		4.757	448.49	9.26	0.51	0.00E+000	12.4
U-235		4.394	19.49	45.07	0.51	0.00E+000	3.1
U-238		4.183	395.83	9.85	0.17	0.00E+000	38.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.22E+000 +/- 5.76E-001	9.05E-002 +/- 9.99E-003
U-234	1.000	4761.50*	6.16E+000 +/- 8.87E-001	7.20E-002 +/- 7.95E-003
U-235	0.999	4385.50*	3.30E-001 +/- 1.53E-001	8.89E-002 +/- 9.81E-003
U-238	1.000	4184.40*	5.41E+000 +/- 8.01E-001	5.71E-002 +/- 6.30E-003

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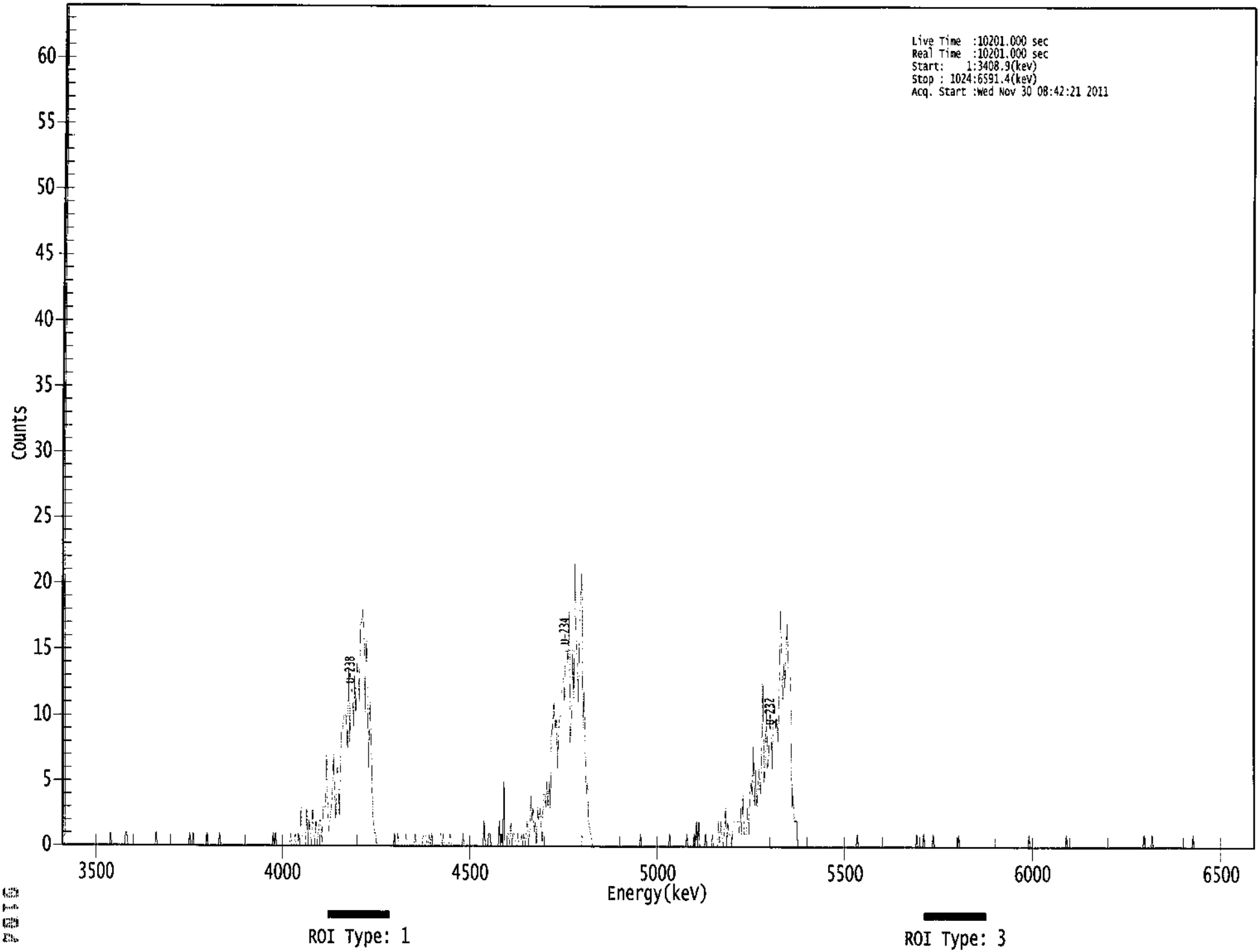
0000010823.CNF



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*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	1	0	0	0	0	0
49:	0	0	0	0	0	0	0	1
57:	1	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	1	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	1	0
113:	0	1	0	0	0	0	0	0
121:	0	0	0	0	0	1	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	1	0
185:	1	0	0	0	0	0	0	0
193:	0	0	0	0	0	1	0	0
201:	0	1	0	0	1	0	3	0
209:	0	0	0	3	0	2	1	0
217:	3	1	0	2	0	1	2	2
225:	0	3	3	3	7	3	1	2
233:	3	4	7	4	2	6	6	2
241:	6	9	9	10	10	10	7	14
249:	8	12	12	9	13	10	14	13
257:	11	17	17	18	16	10	16	12
265:	6	11	9	4	2	1	1	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	1	0	0	0	0	0	0
297:	1	0	0	0	0	0	0	0
305:	1	0	0	0	0	0	0	1
313:	1	1	0	0	1	0	1	1
321:	1	1	1	1	1	1	1	0
329:	1	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	1	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	2	0	0	0	1

369:	1	0	0	0	0	0	0	0

Sample Title: 05

Channel								
377:	2	0	1	0	5	0	0	1
385:	1	0	2	0	1	1	0	0
393:	1	0	0	1	0	1	0	1
401:	2	0	1	4	2	3	1	2
409:	0	3	2	3	2	0	4	4
417:	3	5	3	5	3	9	9	11
425:	9	10	6	9	10	10	13	13
433:	11	15	15	14	18	8	10	15
441:	11	22	16	14	11	17	19	21
449:	9	12	7	4	5	2	1	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	1	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	1	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	0	0	0	0	0	1
545:	0	2	0	2	0	0	0	0
553:	0	1	0	0	0	0	0	1
561:	0	0	0	0	2	0	2	1
569:	0	1	3	0	2	1	1	0
577:	1	2	2	2	2	2	1	3
585:	1	4	1	1	1	3	1	4
593:	5	4	8	3	6	3	5	6
601:	4	8	13	5	6	11	6	7
609:	10	9	6	11	11	9	10	8
617:	11	18	16	11	14	12	15	17
625:	13	13	13	3	4	2	2	2
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	1	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	1	0
737:	0	0	0	0	1	0	0	0
745:	0	0	0	0	1	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	1	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	1	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	1	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	0	0	0	0	1
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-8
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010824.cnf
Batch Identification: 1111140A-UU
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_024
Chamber Serial Number:
Detector Serial Number: 24
Env. Background: System Bkgd 10003
Reagent Blank: <not performed>

Sample Size: 1.006E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:22 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6113 mL
Effective Efficiency: 0.1895 +/- 0.0107
Counting Efficiency: 0.1530 +/- 0.0025 on 9/4/2011 10:44:18 AM
Chem. Recovery Factor: 1.2383 +/- 0.0726

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.301	379.15	10.08	0.85	0.00E+000	30.2
U-234		4.753	387.15	9.97	0.85	0.00E+000	19.8
U-235		4.376	18.00	47.46	0.00	0.00E+000	3.1
U-238		4.180	418.47	9.60	1.53	0.00E+000	23.3

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.28E+000 +/- 5.83E-001	8.34E-002 +/- 9.21E-003
U-234	0.999	4761.50*	5.39E+000 +/- 8.03E-001	8.34E-002 +/- 9.21E-003
U-235	0.999	4385.50*	3.09E-001 +/- 1.51E-001	1.03E-001 +/- 1.14E-002
U-238	1.000	4184.40*	5.80E+000 +/- 8.49E-001	9.86E-002 +/- 1.09E-002

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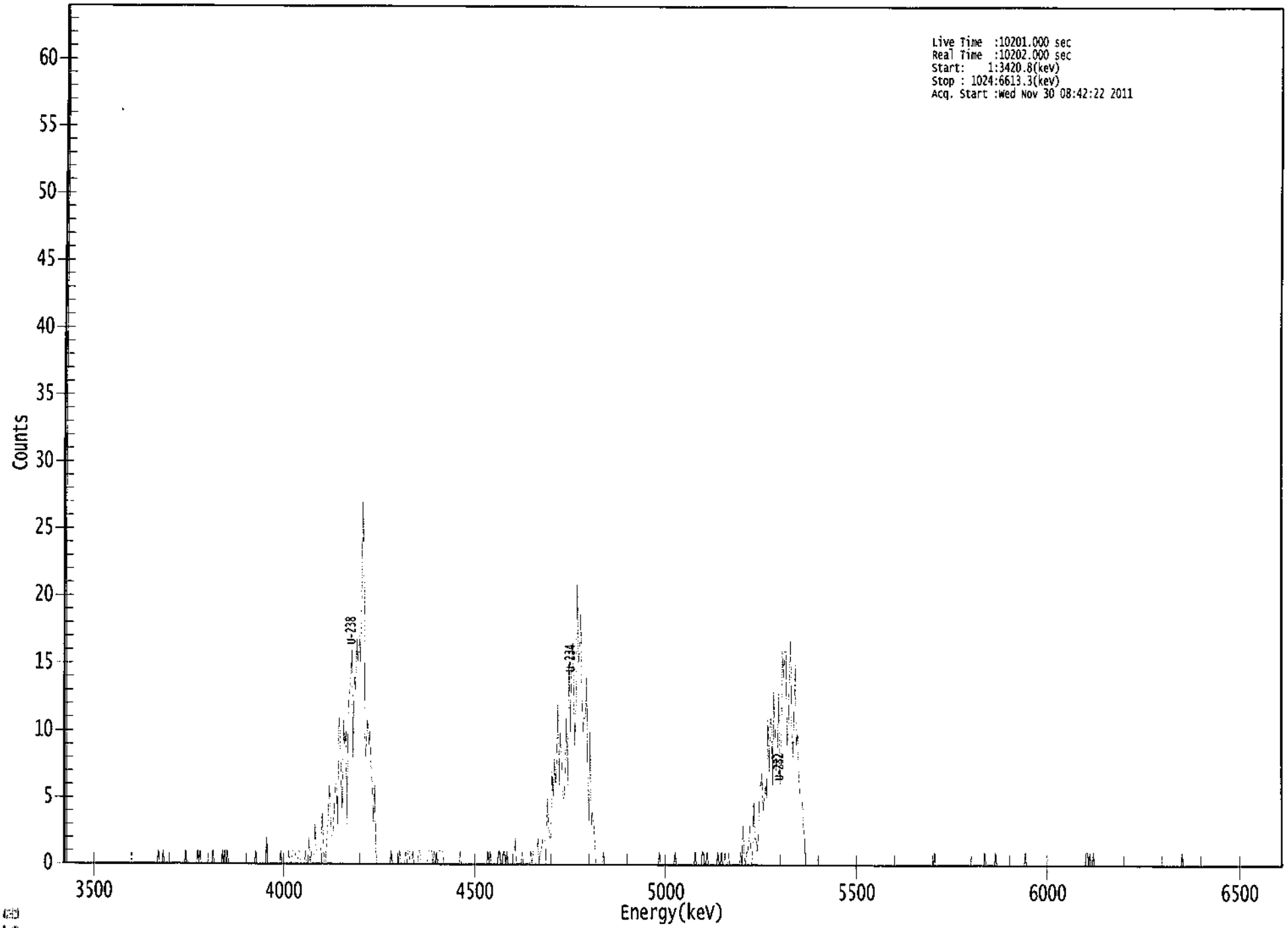
0000010824.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 06

Elapsed Live time: 10201
Elapsed Real Time: 10202

Channel								
1:	10202	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	1	0	0	0	1	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	1
105:	0	0	0	0	0	0	0	0
113:	0	1	0	1	0	0	0	0
121:	0	0	0	0	0	0	1	0
129:	0	0	0	0	0	0	1	0
137:	1	0	1	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	0	0	0	0	0
169:	0	0	0	2	0	0	0	0
177:	0	0	0	0	0	0	0	1
185:	0	0	0	0	0	0	1	0
193:	0	1	1	1	0	0	1	1
201:	0	0	0	0	1	0	0	2
209:	0	1	0	0	3	1	1	1
217:	1	1	4	2	0	0	2	3
225:	6	4	2	2	4	6	6	3
233:	11	10	6	4	11	9	10	3
241:	12	13	14	16	8	14	13	17
249:	15	17	15	21	27	22	8	9
257:	11	9	10	7	6	3	6	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	1	0	0	0
281:	0	0	0	1	0	0	0	0
289:	1	0	1	1	0	0	1	0
297:	0	0	0	1	1	0	0	0
305:	0	0	0	1	1	1	1	0
313:	1	0	1	0	1	1	1	1
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	1	0	1
361:	0	0	0	0	0	0	1	1

369:	0	0	1	1	0	1	0	0

Sample Title: 06

Channel								
377:	0	0	0	0	2	0	0	0
385:	0	0	1	0	0	0	0	0
393:	0	1	0	1	1	1	1	2
401:	0	1	1	2	2	2	0	5
409:	3	2	2	7	5	8	6	8
417:	12	6	10	8	5	5	7	11
425:	6	16	10	14	17	13	9	12
433:	21	15	16	19	13	10	11	11
441:	14	7	3	10	3	4	3	2
449:	0	0	0	0	0	0	1	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	1	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	1	0	0	0	0
537:	0	1	1	0	0	1	0	0
545:	0	0	0	0	0	0	1	0
553:	0	1	0	0	1	0	0	1
561:	0	0	0	0	0	0	0	0
569:	0	1	0	3	1	0	1	1
577:	2	3	0	0	5	2	2	1
585:	2	6	6	7	4	5	6	5
593:	11	7	11	11	6	13	10	7
601:	9	13	6	8	16	14	16	16
609:	9	10	14	17	10	8	12	15
617:	9	10	7	5	5	5	3	2
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	1	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	1	0
777:	0	0	0	0	0	0	0	1
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	1	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	1	1	0	1	0
865:	0	1	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	1	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-9
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010825.cnf
Batch Identification: 1111140A-UU
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_025
Chamber Serial Number:
Detector Serial Number: 25
Env. Background: System Bkgd 10004
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:23 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6118 mL
Effective Efficiency: 0.1469 +/- 0.0092
Counting Efficiency: 0.1672 +/- 0.0027 on 9/4/2011 10:45:06 AM
Chem. Recovery Factor: 0.8782 +/- 0.0569

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.291	294.15	11.45	0.85	0.00E+000	27.0
U-234		4.738	195.32	14.05	0.68	0.00E+000	8.4
U-235		4.383	11.00	61.72	0.00	0.00E+000	3.1
U-238		4.169	148.83	16.08	0.17	0.00E+000	5.2

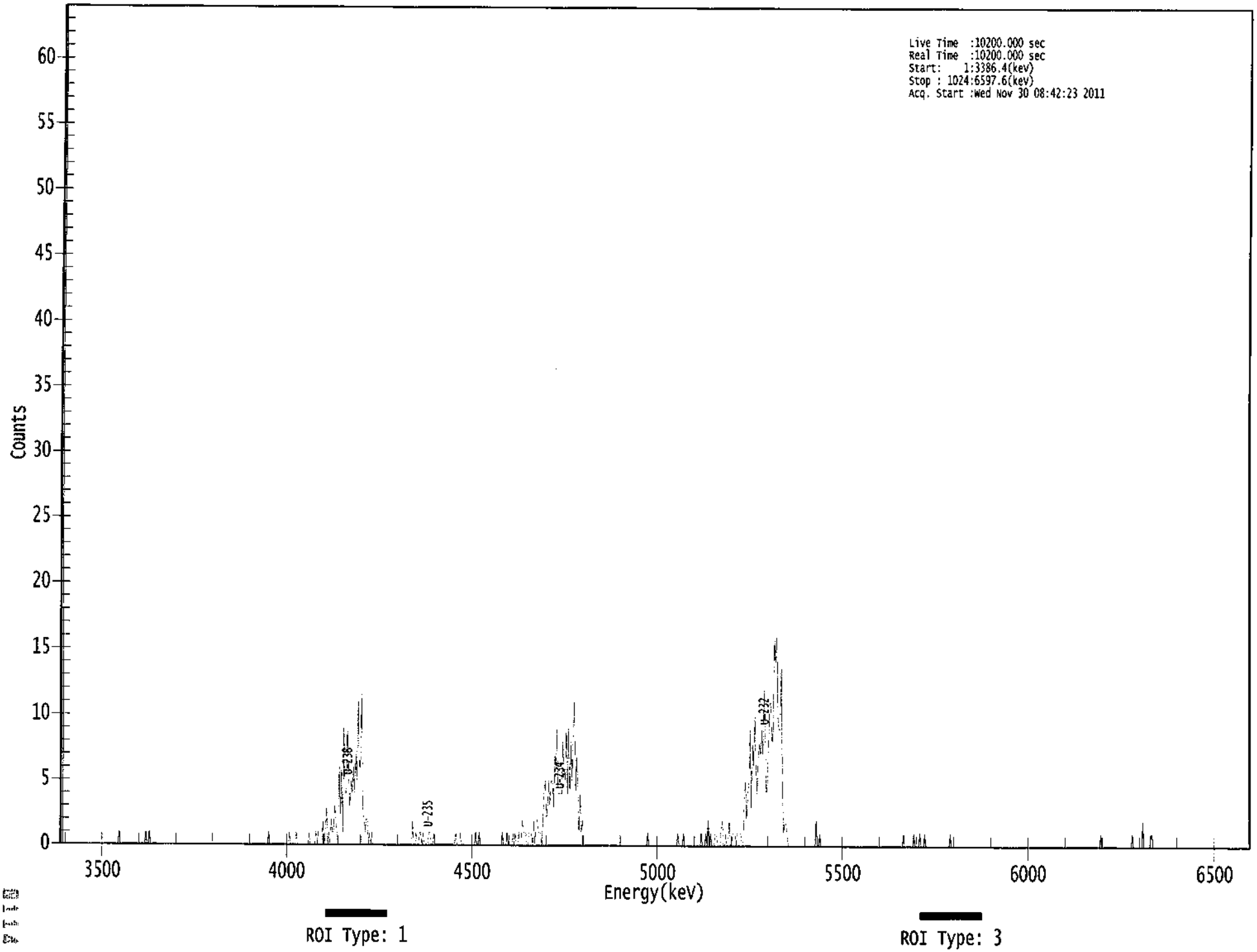
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.998	5302.50*	5.31E+000 +/- 6.53E-001	1.08E-001 +/- 1.33E-002
U-234	0.991	4761.50*	3.52E+000 +/- 6.58E-001	1.02E-001 +/- 1.25E-002
U-235	1.000	4385.50*	2.45E-001 +/- 1.54E-001	1.33E-001 +/- 1.64E-002
U-238	0.996	4184.40*	2.67E+000 +/- 5.41E-001	7.49E-002 +/- 9.22E-003

AG
12/1/11

0000010825.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	1	0	0	1	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	1	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	0	1	0	0	0
209:	0	0	0	0	0	0	0	1
217:	0	0	0	0	0	1	0	1
225:	0	0	0	2	0	1	3	0
233:	1	0	2	1	1	3	2	1
241:	0	6	2	6	1	9	4	4
249:	9	5	3	5	4	6	4	7
257:	5	11	6	6	12	3	2	1
265:	2	2	0	1	0	1	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	2	0	0	1	0	0	1	1
313:	0	1	0	0	0	0	1	1
321:	0	0	1	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	1	0	0
345:	0	1	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	0
361:	0	1	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	1	0	0	0	0	1	0
393:	1	0	0	1	0	0	2	1
401:	1	1	0	0	1	1	1	0
409:	2	0	2	2	1	1	1	0
417:	2	4	5	2	3	5	3	5
425:	5	3	7	6	9	4	4	4
433:	4	8	6	5	9	4	9	4
441:	8	5	9	11	4	7	4	1
449:	4	1	2	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	1	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	1	0	0	0	1	0	2	0
561:	1	0	0	0	1	1	0	0
569:	0	1	2	0	0	1	0	0
577:	2	0	0	1	1	1	0	1
585:	1	1	1	0	0	4	5	2
593:	4	5	9	3	8	6	10	7
601:	4	7	8	7	9	7	12	9
609:	4	5	8	11	11	8	9	16
617:	14	16	10	9	9	14	4	1
625:	2	2	1	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	2	0	0	1	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	1
737:	0	0	0	0	1	0	0	0
745:	1	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	1	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	1
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	1	0	0	0	0	0
929:	0	0	0	2	0	0	0	0
937:	0	0	1	1	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6A
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010826.cnf
Batch Identification: 1111140A-UU
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_026
Chamber Serial Number:
Detector Serial Number: 26
Env. Background: System Bkgd 10005
Reagent Blank: <not performed>

Sample Size: 1.019E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:24 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6121 mL
Effective Efficiency: 0.1618 +/- 0.0097
Counting Efficiency: 0.1583 +/- 0.0026 on 9/4/2011 10:46:49 AM
Chem. Recovery Factor: 1.0216 +/- 0.0637

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	324.15	10.90	0.85	0.00E+000	52.5
U-234		4.731	96.49	20.01	0.51	0.00E+000	4.7
U-235		4.378	0.66	305.45	0.34	0.00E+000	3.2
U-238		4.155	82.00	21.78	0.00	0.00E+000	4.8

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.22E+000 +/- 6.16E-001	9.65E-002 +/- 1.14E-002
U-234	0.985	4761.50*	1.55E+000 +/- 3.61E-001	8.45E-002 +/- 9.97E-003
U-235	0.999	4385.50*	1.31E-002 +/- 4.01E-002	9.50E-002 +/- 1.12E-002
U-238	0.986	4184.40*	1.32E+000 +/- 3.26E-001	9.62E-002 +/- 1.13E-002

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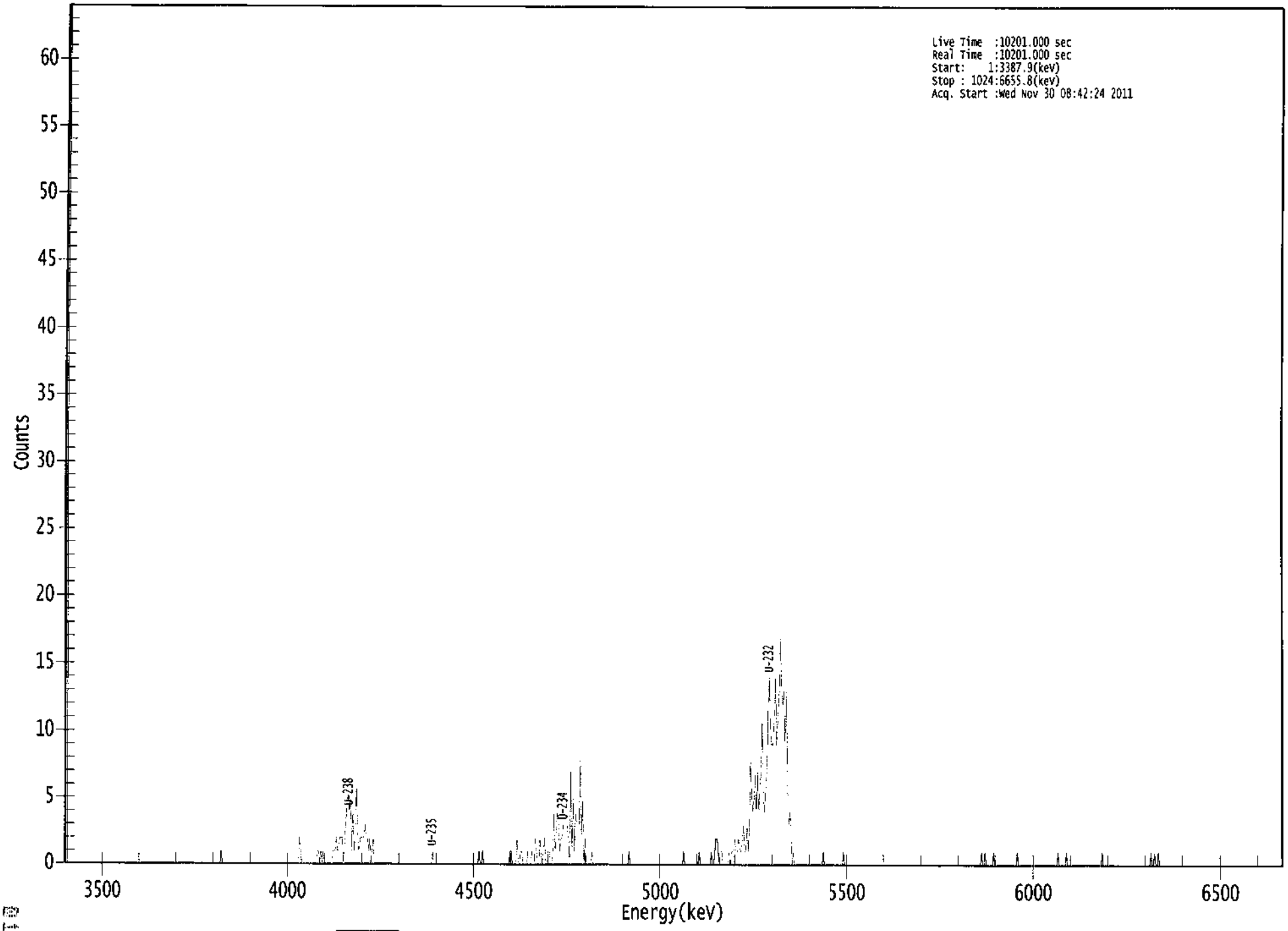
12/1/11

0000010826.CNF



ROI Type: 1

ROI Type: 3

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 08

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	2	1
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	1	1	0
217:	1	0	1	0	0	0	0	0
225:	0	0	1	1	1	2	1	1
233:	2	2	2	0	2	3	5	5
241:	4	5	1	4	1	2	6	2
249:	1	2	2	2	2	3	2	2
257:	1	2	0	1	2	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	1	0	0
353:	1	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 08

Channel								
377:	1	0	0	0	0	2	0	0
385:	1	1	0	0	0	0	1	0
393:	0	1	0	0	2	1	0	0
401:	2	1	0	1	2	0	0	1
409:	1	0	0	1	4	1	3	4
417:	3	1	2	2	3	3	3	3
425:	2	0	7	1	5	1	4	3
433:	3	3	8	2	5	0	2	0
441:	0	0	0	0	1	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	0	0
545:	1	0	0	1	2	2	1	0
553:	1	1	0	0	0	0	0	1
561:	0	1	1	1	2	1	1	2
569:	1	1	2	3	1	1	3	1
577:	3	8	5	4	5	7	4	7
585:	4	6	7	11	5	4	6	7
593:	12	14	10	9	9	11	14	9
601:	11	13	17	13	12	13	9	13
609:	7	3	4	3	0	1	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	1
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	1	0	0	1	0
777:	0	0	0	0	0	1	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	1	0	0	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	1	0	0	0	0
841:	0	0	1	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	1	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	1	0	0	1	0	0	1
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6B
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010827.cnf
Batch Identification: 1111140A-UU
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_028
Chamber Serial Number:
Detector Serial Number: 28
Env. Background: System Bkgd 10007
Reagent Blank: <not performed>

Sample Size: 1.006E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:25 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6122 mL
Effective Efficiency: 0.2462 +/- 0.0125
Counting Efficiency: 0.1845 +/- 0.0034 on 11/6/2011 1:01:18 PM
Chem. Recovery Factor: 1.3347 +/- 0.0719

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.287	493.49	8.83	0.51	0.00E+000	34.5
U-234		4.743	118.98	18.06	1.02	0.00E+000	6.7
U-235		4.408	1.66	169.38	0.34	0.00E+000	3.1
U-238		4.166	106.45	19.26	2.55	0.00E+000	3.8

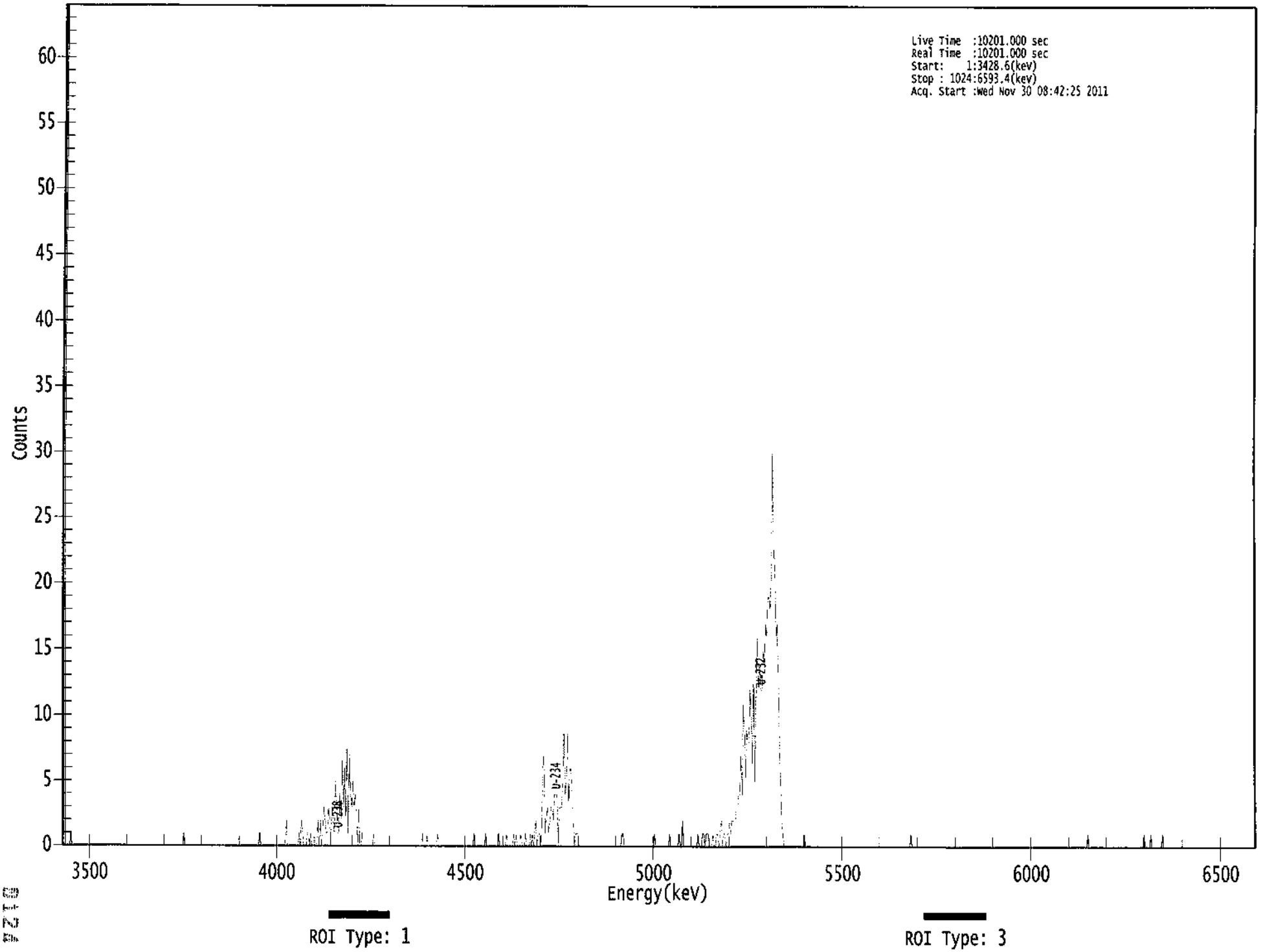
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.996	5302.50*	5.29E+000 +/- 5.25E-001	5.63E-002 +/- 5.58E-003
U-234	0.994	4761.50*	1.28E+000 +/- 2.63E-001	6.75E-002 +/- 6.69E-003
U-235	0.992	4385.50*	2.19E-002 +/- 3.72E-002	6.32E-002 +/- 6.27E-003
U-238	0.994	4184.40*	1.14E+000 +/- 2.46E-001	8.95E-002 +/- 8.88E-003

AG
12/1/11

0000010827.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 09

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	1
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	1	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	1	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	2	0	0	0	0	0	0
201:	0	0	0	0	1	0	2	1
209:	0	0	0	1	1	0	1	0
217:	0	0	0	0	2	0	2	0
225:	1	3	2	1	1	3	2	0
233:	3	2	1	5	3	1	1	4
241:	2	7	3	6	2	8	1	7
249:	4	3	5	3	4	3	0	3
257:	0	0	1	0	0	0	0	0
265:	0	0	0	0	1	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	1	0	0	0	0	0
361:	0	0	0	0	1	0	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 09

Channel								
377:	0	0	0	0	0	0	1	0
385:	0	0	0	0	1	0	1	0
393:	0	0	1	0	0	0	1	0
401:	0	0	1	0	1	0	1	2
409:	0	1	1	0	1	6	7	1
417:	2	3	1	2	3	3	2	4
425:	4	4	0	3	3	3	5	9
433:	4	5	9	3	6	6	4	2
441:	0	1	1	1	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	1	1	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	1	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	1	0	0	0	0	0
529:	0	0	1	0	0	2	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	1	0	0	0	1	1
553:	0	1	1	1	0	0	0	1
561:	0	0	1	1	0	1	2	0
569:	1	1	0	1	1	2	1	2
577:	2	2	2	3	3	4	4	7
585:	4	11	9	5	9	8	8	12
593:	10	6	13	5	11	16	12	14
601:	12	12	15	14	17	16	19	19
609:	18	21	30	22	22	16	17	13
617:	8	5	2	1	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	1	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	1	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 09

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	1	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	1	0	0	0	0	0	1	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010828.cnf
Batch Identification: 1111140A-UU
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_029
Chamber Serial Number:
Detector Serial Number: 29
Env. Background: System Bkgd 10008
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:26 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6121 mL
Effective Efficiency: 0.2698 +/- 0.0132
Counting Efficiency: 0.1913 +/- 0.0037 on 10/23/2011 12:20:56 PM
Chem. Recovery Factor: 1.4102 +/- 0.0740

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.304	540.66	8.43	0.34	0.00E+000	21.2
U-234		4.750	91.66	20.52	0.34	0.00E+000	7.1
U-235		4.402	4.00	109.57	0.00	0.00E+000	3.1
U-238		4.181	68.83	23.66	0.17	0.00E+000	7.0

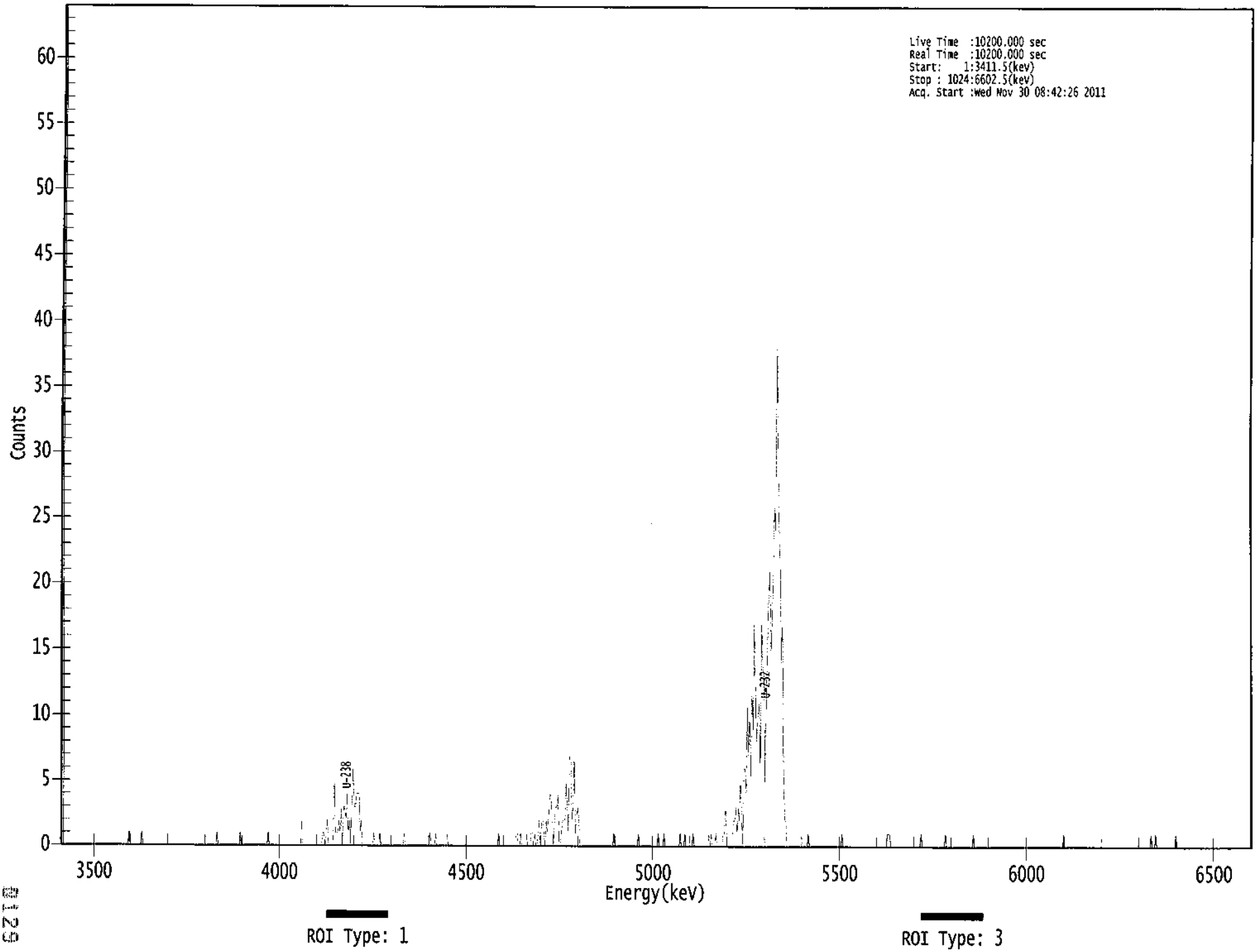
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.30E+000 +/- 5.07E-001	4.69E-002 +/- 4.48E-003
U-234	0.998	4761.50*	8.99E-001 +/- 2.03E-001	4.69E-002 +/- 4.48E-003
U-235	0.996	4385.50*	4.84E-002 +/- 5.32E-002	7.25E-002 +/- 6.94E-003
U-238	1.000	4184.40*	6.72E-001 +/- 1.71E-001	4.07E-002 +/- 3.90E-003

NG
12/1/11

0000010828.CNF



8129

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	1
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	1	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	1	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	2	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	1	1	0	1	2	0
233:	0	0	0	0	5	1	1	1
241:	2	1	3	0	3	3	2	4
249:	1	2	0	4	6	3	3	4
257:	4	4	1	2	0	0	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	1	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	1	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	1	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
377:	0	1	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	1	1	0	0	1	0	0	0
401:	0	1	0	0	0	1	1	0
409:	1	0	0	1	2	0	2	2
417:	1	0	2	1	2	4	4	2
425:	0	2	3	3	4	0	0	1
433:	2	2	2	5	3	1	7	7
441:	2	3	7	1	2	3	2	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	1	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	1
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	1	0	0
537:	0	1	0	0	0	0	0	0
545:	1	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	1	0
561:	1	0	0	0	1	0	0	0
569:	0	0	1	1	3	1	1	1
577:	1	1	1	2	2	3	1	3
585:	2	5	2	0	6	6	4	11
593:	7	10	5	12	9	17	11	8
601:	10	11	6	17	14	13	5	11
609:	15	19	21	15	17	21	26	24
617:	38	31	25	21	14	17	6	2
625:	2	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	1	1	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	1	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	1	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	1	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	1	0	0	0	1	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	1	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6D
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010829.cnf
Batch Identification: 1111140A-UU
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_030
Chamber Serial Number:
Detector Serial Number: 30
Env. Background: System Bkgd 10009
Reagent Blank: <not performed>

Sample Size: 1.033E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:28 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6108 mL
Effective Efficiency: 0.2424 +/- 0.0123
Counting Efficiency: 0.1739 +/- 0.0033 on 10/22/2011 1:05:39 PM
Chem. Recovery Factor: 1.3940 +/- 0.0757

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.279	484.66	8.91	0.34	0.00E+000	26.8
U-234		4.728	106.66	19.01	0.34	0.00E+000	21.7
U-235		4.364	7.00	79.20	0.00	0.00E+000	6.3
U-238		4.150	80.49	21.93	0.51	0.00E+000	8.2

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.991	5302.50*	5.14E+000 +/- 5.13E-001	5.07E-002 +/- 5.06E-003
U-234	0.982	4761.50*	1.13E+000 +/- 2.43E-001	5.07E-002 +/- 5.06E-003
U-235	0.993	4385.50*	9.15E-002 +/- 7.31E-002	7.84E-002 +/- 7.83E-003
U-238	0.981	4184.40*	8.50E-001 +/- 2.05E-001	5.54E-002 +/- 5.53E-003

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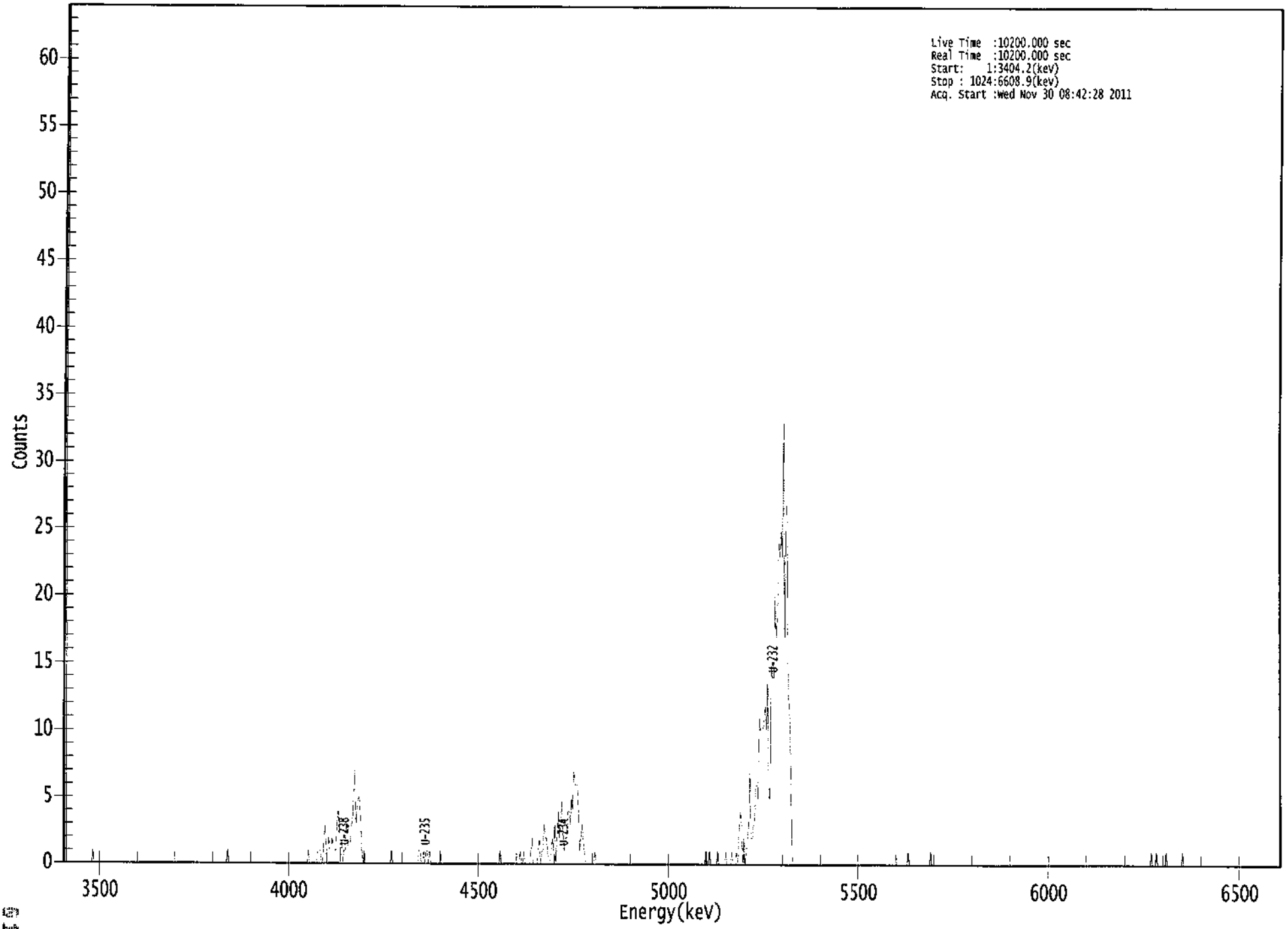
12/1/11

0000010829.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	1	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	1	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	1
209:	0	0	0	0	0	0	0	1
217:	1	1	0	0	2	3	1	1
225:	2	1	1	2	1	1	1	3
233:	4	3	0	2	0	1	1	3
241:	2	1	1	3	3	5	7	3
249:	4	5	5	3	1	0	1	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	1	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	1	1	0	0
305:	1	0	1	1	0	1	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	1	0	0	0	0	0	0	0

Sample Title: 11

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	1	0	0	1	0	0	0
393:	0	0	1	2	0	0	0	0
401:	1	2	0	1	1	3	2	2
409:	1	0	0	1	2	1	3	0
417:	2	4	2	3	5	2	1	2
425:	2	4	4	3	5	4	7	6
433:	6	6	4	1	2	3	2	1
441:	0	0	0	0	0	0	0	0
449:	1	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	1	0	0
545:	1	0	0	0	0	0	0	1
553:	0	0	0	0	0	0	1	0
561:	0	0	0	1	0	0	0	1
569:	0	2	4	3	0	2	0	1
577:	2	3	7	2	2	3	3	6
585:	6	5	11	10	10	10	11	12
593:	10	14	5	5	15	14	14	20
601:	17	19	24	23	25	23	33	16
609:	26	27	13	12	9	3	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 11

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	1	0	0	0	1
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	1	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010830.cnf
Batch Identification: 1111140A-UU
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_031
Chamber Serial Number:
Detector Serial Number: 31
Env. Background: System Bkgd 10010
Reagent Blank: <not performed>

Sample Size: 1.005E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:29 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6103 mL
Effective Efficiency: 0.1924 +/- 0.0108
Counting Efficiency: 0.1667 +/- 0.0031 on 10/22/2011 1:05:44 PM
Chem. Recovery Factor: 1.1547 +/- 0.0682

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.294	384.49	10.00	0.51	0.00E+000	20.5
U-234		4.746	96.96	20.15	2.04	0.00E+000	4.2
U-235		4.388	5.00	96.02	0.00	0.00E+000	3.1
U-238		4.164	88.58	21.42	4.42	0.00E+000	18.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.999	5302.50*	5.28E+000 +/- 5.79E-001	7.20E-002 +/- 7.91E-003
U-234	0.996	4761.50*	1.33E+000 +/- 3.05E-001	1.07E-001 +/- 1.17E-002
U-235	1.000	4385.50*	8.47E-002 +/- 8.18E-002	1.02E-001 +/- 1.11E-002
U-238	0.993	4184.40*	1.21E+000 +/- 2.91E-001	1.39E-001 +/- 1.53E-002

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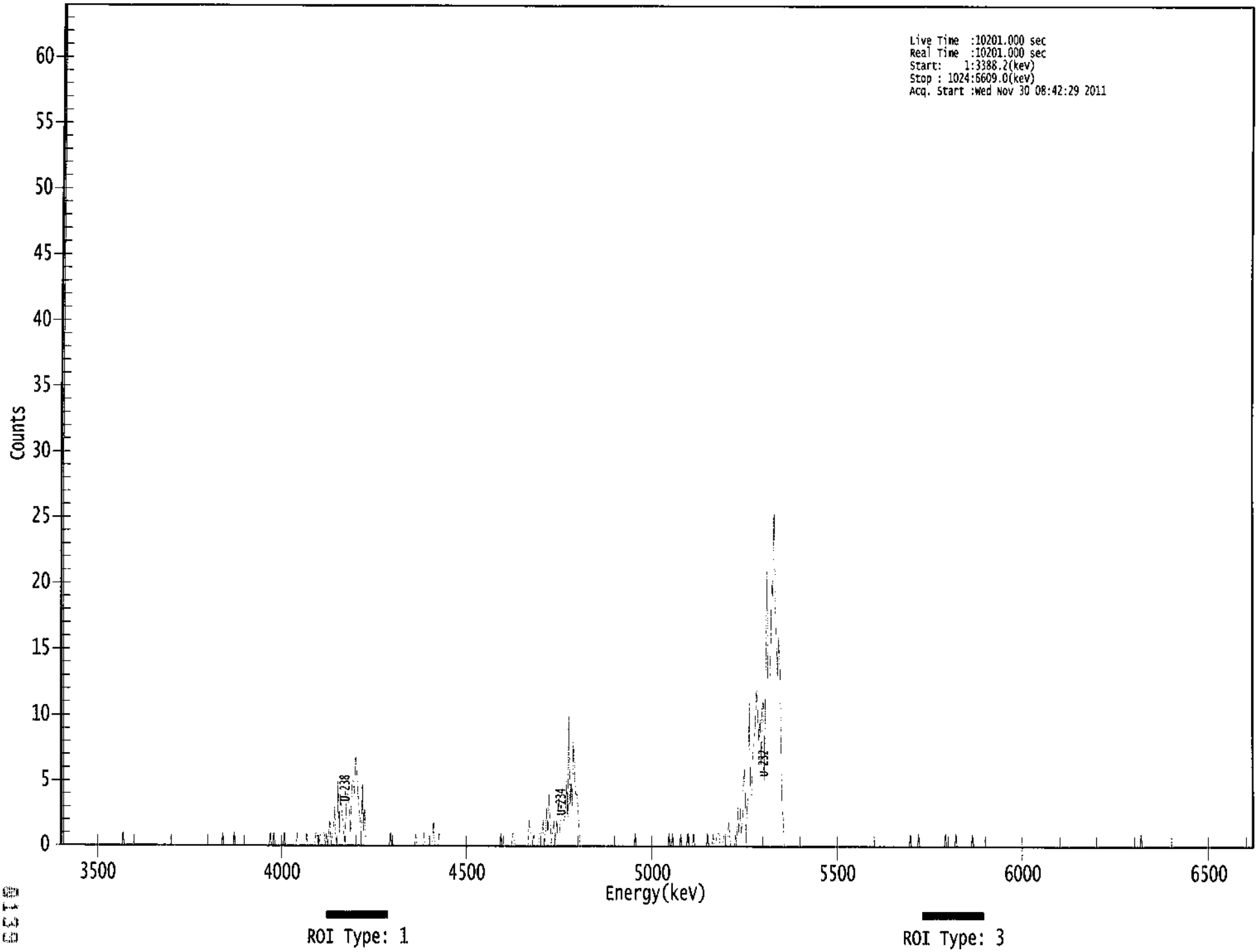
0000010830.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 12

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	1	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	1	0	0	0
145:	0	0	0	0	0	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	1	0	0	0	0	0	0	0
193:	0	1	0	0	0	0	0	0
201:	0	0	0	0	1	0	0	0
209:	0	0	0	0	1	0	0	0
217:	0	0	0	0	1	1	0	0
225:	1	1	1	1	0	1	0	1
233:	2	0	1	1	3	1	0	5
241:	1	4	3	2	1	0	3	4
249:	4	2	1	5	5	4	7	6
257:	4	3	2	0	5	1	3	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	1	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	0
313:	0	1	0	0	0	0	0	0
321:	0	2	0	0	0	0	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
377:	0	0	0	1	0	0	0	0
385:	0	0	0	0	0	1	1	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	2	1	1	0	1
409:	0	0	0	0	1	1	1	2
417:	0	1	3	1	4	2	0	1
425:	2	0	2	1	4	1	2	2
433:	2	2	3	5	2	10	3	5
441:	3	8	6	4	4	3	1	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	1	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	1	0
529:	0	0	0	0	0	1	0	0
537:	0	0	0	1	0	0	0	0
545:	1	0	0	0	0	0	0	0
553:	0	0	0	0	1	0	0	0
561:	0	1	0	0	1	1	1	0
569:	0	0	1	1	0	0	2	1
577:	0	0	0	0	1	0	3	1
585:	3	1	2	5	6	0	3	4
593:	11	4	4	7	8	9	12	11
601:	8	10	6	11	11	5	14	21
609:	12	12	14	20	19	26	19	16
617:	13	16	14	9	3	2	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	1	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	1	0	0	0	0	0	0	0
769:	0	1	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	1
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB4-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010831.cnf
Batch Identification: 1111140A-UU
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10017
Reagent Blank: <not performed>

Sample Size: 1.010E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:47 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6111 mL
Effective Efficiency: 0.1435 +/- 0.0091
Counting Efficiency: 0.1847 +/- 0.0030 on 8/30/2011 7:34:47 PM
Chem. Recovery Factor: 0.7770 +/- 0.0508

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.307	287.00	11.59	0.00	0.00E+000	13.8
U-234		4.753	130.83	17.15	0.17	0.00E+000	11.9
U-235		4.389	9.83	63.14	0.17	0.00E+000	3.0
U-238		4.172	136.00	16.87	0.00	0.00E+000	8.3

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.26E+000 +/- 6.54E-001	1.10E-001 +/- 1.37E-002
U-234	0.999	4761.50*	2.40E+000 +/- 5.08E-001	7.65E-002 +/- 9.51E-003
U-235	1.000	4385.50*	2.22E-001 +/- 1.43E-001	9.44E-002 +/- 1.17E-002
U-238	0.998	4184.40*	2.48E+000 +/- 5.20E-001	1.09E-001 +/- 1.36E-002

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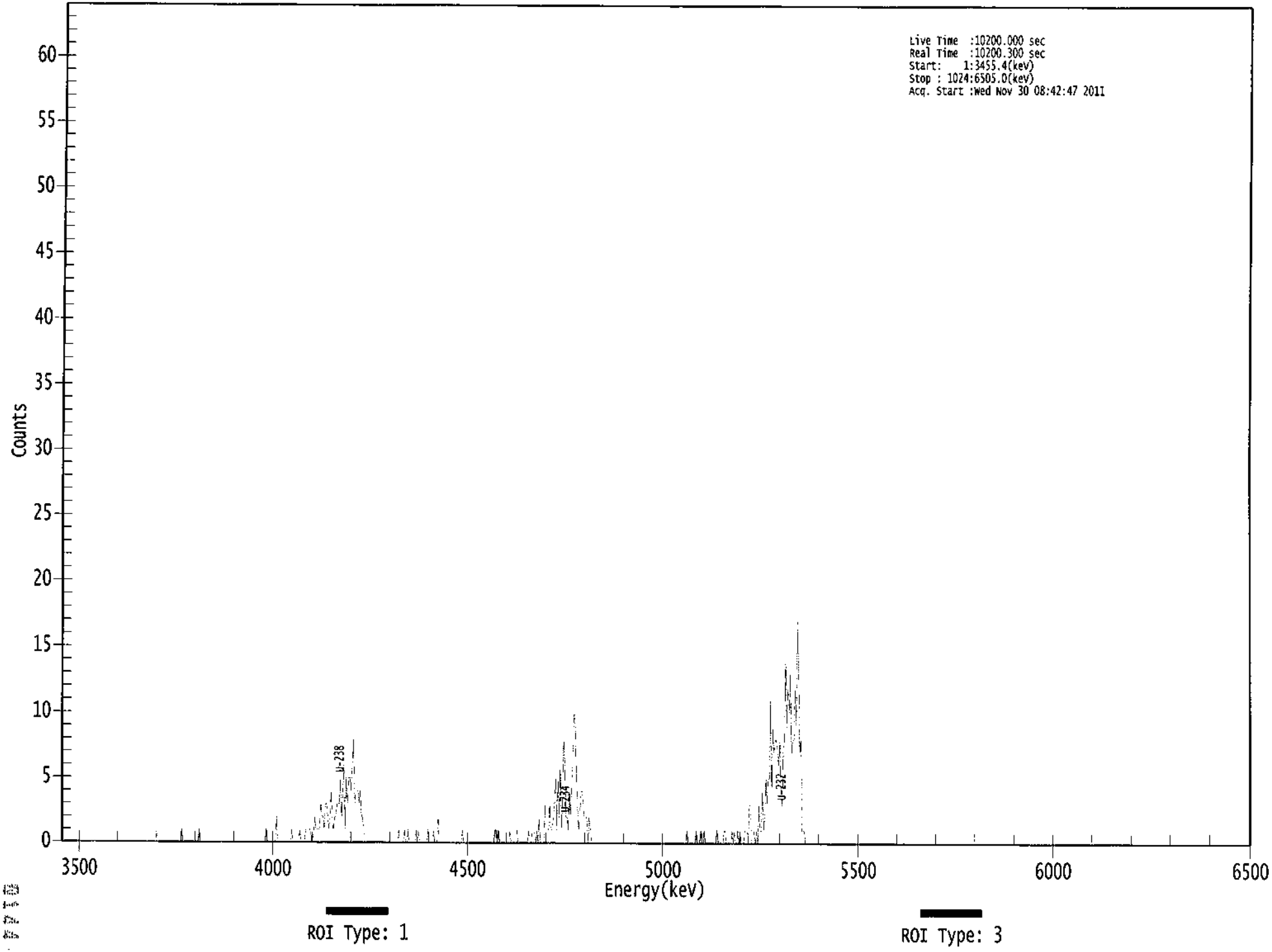
0000010831.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 13

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	1	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	1
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	1	0	0	0	0	0	0
185:	0	0	2	0	0	0	0	0
193:	0	0	0	0	0	0	0	1
201:	0	0	0	0	0	0	1	0
209:	0	0	0	1	1	1	1	1
217:	0	0	1	2	1	1	1	1
225:	3	2	2	1	3	3	2	1
233:	2	4	2	1	2	2	3	3
241:	3	5	2	4	6	1	5	3
249:	5	5	4	6	8	3	4	4
257:	4	3	4	2	2	1	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	0	0	0
297:	1	0	0	1	0	0	0	0
305:	0	0	1	0	1	0	0	0
313:	0	0	0	0	1	0	0	0
321:	0	1	0	0	0	2	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	1	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	1	1

Sample Title: 13

Channel								
377:	0	1	0	0	0	0	0	0
385:	0	0	0	1	0	0	0	0
393:	0	1	0	0	0	0	0	0
401:	0	0	0	1	0	0	1	1
409:	1	0	1	0	2	0	0	0
417:	0	3	0	0	0	3	1	1
425:	2	3	5	1	5	2	6	1
433:	3	8	6	2	2	1	4	2
441:	5	6	10	9	5	3	1	2
449:	4	4	3	2	2	2	0	2
457:	1	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	0	1	0	0	0	1
553:	0	0	1	0	0	0	0	0
561:	0	0	0	0	0	1	0	0
569:	0	0	0	1	1	0	0	0
577:	0	0	1	0	1	0	0	1
585:	0	1	0	0	0	1	1	1
593:	0	3	3	0	0	1	0	1
601:	0	3	1	1	4	1	2	5
609:	3	5	5	11	4	9	7	8
617:	8	7	6	8	4	3	7	8
625:	14	9	12	10	13	7	8	8
633:	12	9	17	13	7	8	1	1
641:	1	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB4-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010832.cnf
Batch Identification: 1111140A-UU
Sample Identification: 14
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10018
Reagent Blank: <not performed>

Sample Size: 1.019E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:48 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6118 mL
Effective Efficiency: 0.1547 +/- 0.0095
Counting Efficiency: 0.1914 +/- 0.0031 on 8/30/2011 7:34:46 PM
Chem. Recovery Factor: 0.8084 +/- 0.0512

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.287	309.83	11.14	0.17	0.00E+000	6.3
U-234		4.738	46.00	29.21	0.00	0.00E+000	4.5
U-235		4.354	1.66	169.38	0.34	0.00E+000	3.0
U-238		4.163	54.00	26.92	0.00	0.00E+000	24.6

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.996	5302.50*	5.22E+000 +/- 6.27E-001	7.03E-002 +/- 8.45E-003
U-234	0.992	4761.50*	7.75E-001 +/- 2.45E-001	1.01E-001 +/- 1.21E-002
U-235	0.984	4385.50*	3.45E-002 +/- 5.86E-002	9.93E-002 +/- 1.19E-002
U-238	0.993	4184.40*	9.05E-001 +/- 2.67E-001	1.01E-001 +/- 1.21E-002

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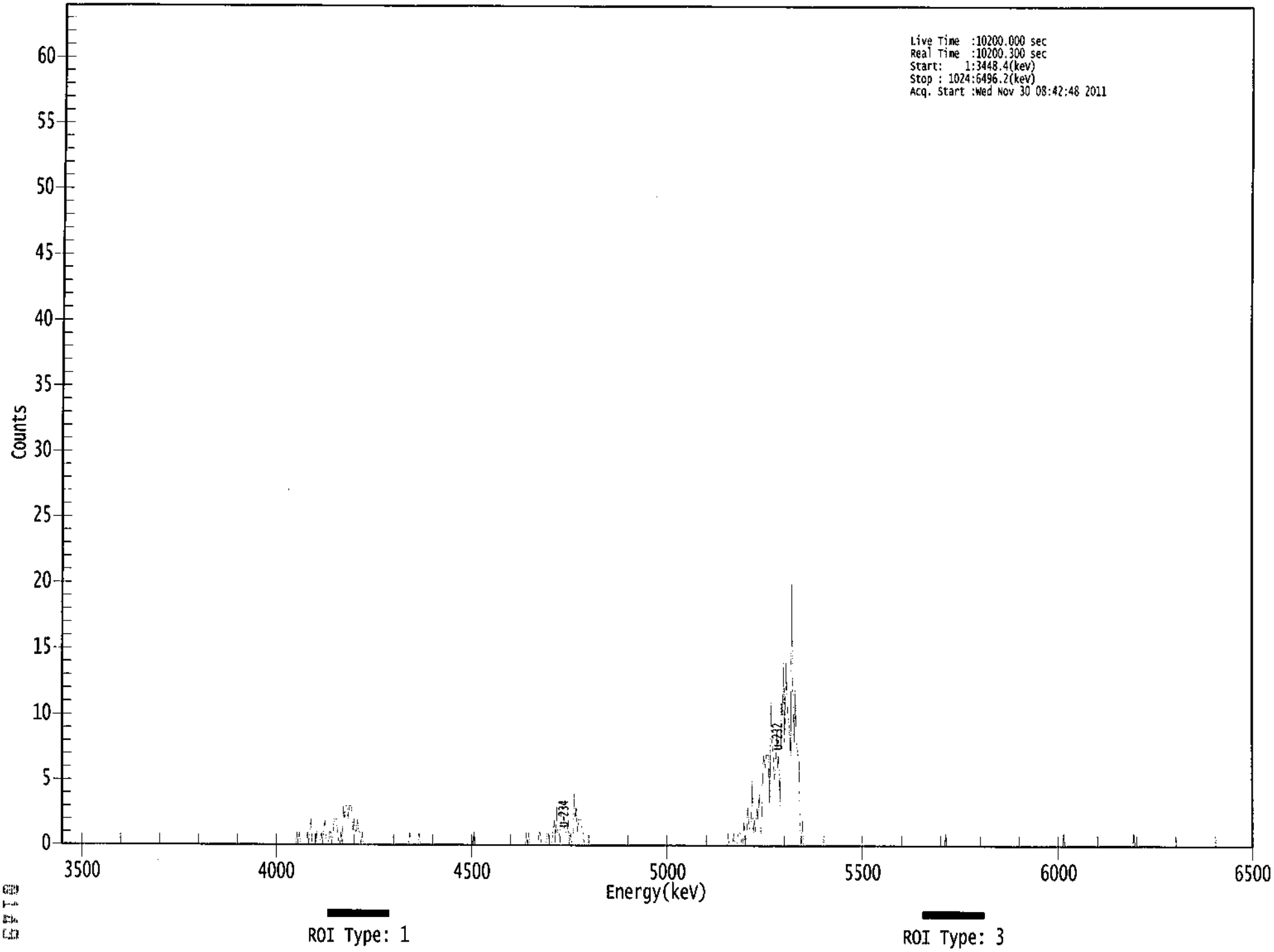
0000010832.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 14

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	1	0	1	0	0
209:	0	0	0	0	1	0	1	2
217:	0	0	0	0	1	0	0	0
225:	1	0	1	2	0	0	0	1
233:	1	0	1	2	2	2	1	0
241:	0	1	0	3	2	3	3	2
249:	3	3	3	1	2	1	1	2
257:	1	1	0	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	1	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 14

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	1	0	1	0	0	0	0	0
409:	0	0	0	1	1	0	0	0
417:	0	0	1	1	0	0	0	1
425:	2	0	3	1	1	0	3	3
433:	2	1	1	1	2	0	1	0
441:	0	4	2	3	1	2	2	2
449:	1	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	1	0	0
577:	0	0	1	0	0	0	1	1
585:	1	0	0	2	0	0	3	2
593:	1	1	5	1	2	1	3	2
601:	4	1	1	6	7	6	7	7
609:	7	3	11	8	7	5	6	9
617:	6	7	3	11	10	14	8	14
625:	11	10	9	7	20	11	8	12
633:	8	7	7	2	0	2	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	1	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 14

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	1	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	1	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB4-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010833.cnf
Batch Identification: 1111140A-UU
Sample Identification: 15
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 10019
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:57 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6109 mL
Effective Efficiency: 0.1016 +/- 0.0075
Counting Efficiency: 0.1774 +/- 0.0028 on 8/30/2011 7:34:44 PM
Chem. Recovery Factor: 0.5725 +/- 0.0434

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.280	203.15	13.79	0.85	0.00E+000	6.6
U-234		4.728	89.30	20.97	1.70	0.00E+000	7.2
U-235		4.389	5.83	82.55	0.17	0.00E+000	3.0
U-238		4.153	92.09	20.93	3.91	0.00E+000	8.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.20E+000 +/- 7.55E-001	1.53E-001 +/- 2.22E-002
U-234	0.982	4761.50*	2.29E+000 +/- 5.83E-001	1.88E-001 +/- 2.73E-002
U-235	1.000	4385.50*	1.84E-001 +/- 1.54E-001	1.32E-001 +/- 1.91E-002
U-238	0.985	4184.40*	2.35E+000 +/- 5.98E-001	2.48E-001 +/- 3.60E-002

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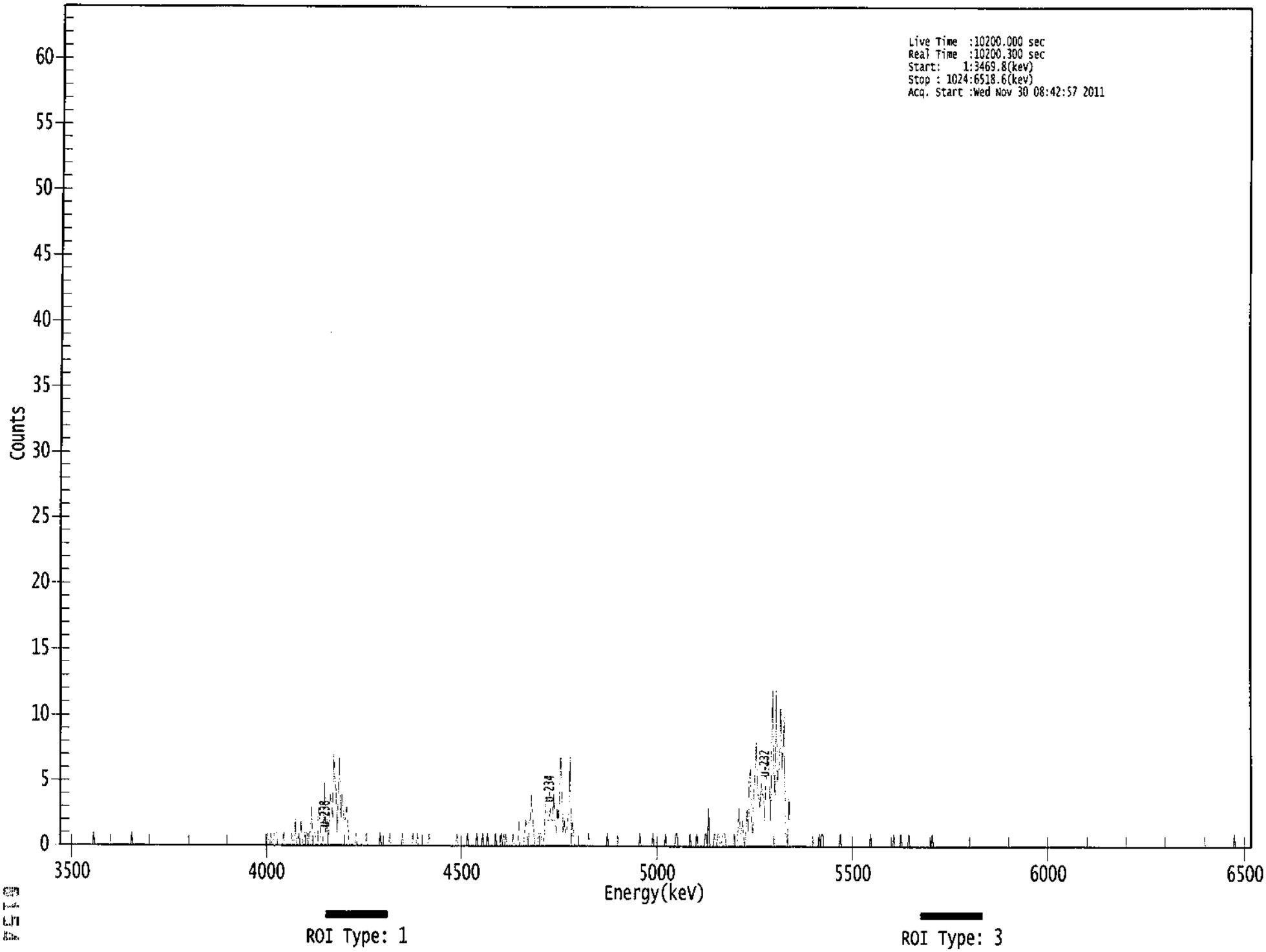
0000010833.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 15

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	1	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	1	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	1	1	0	0	1	0
185:	0	1	1	1	0	0	0	0
193:	0	1	0	0	0	0	0	0
201:	1	0	0	2	0	0	1	0
209:	2	0	0	1	1	1	0	1
217:	1	3	0	1	1	0	0	3
225:	2	0	0	1	5	1	2	0
233:	2	4	3	2	7	5	4	1
241:	4	7	2	4	3	2	2	3
249:	2	0	0	0	0	0	0	1
257:	0	0	0	0	0	0	0	0
265:	1	0	0	0	0	0	0	0
273:	0	0	0	0	1	0	0	0
281:	0	0	0	0	1	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	0	0
305:	1	0	0	0	1	0	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	1
353:	0	0	0	0	0	0	0	1
361:	0	0	0	0	1	0	0	0

369:	1	0	0	0	0	0	0	1

Sample Title: 15

Channel								
377:	0	0	0	0	1	0	1	0
385:	1	0	0	0	0	0	1	0
393:	0	0	0	2	0	0	0	0
401:	1	2	1	0	2	2	4	2
409:	1	0	0	0	1	1	1	0
417:	0	1	3	4	2	2	3	2
425:	2	4	2	1	3	2	4	7
433:	4	1	2	1	1	2	3	7
441:	0	2	1	0	0	0	0	0
449:	0	0	0	0	0	0	0	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	1
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	0	1	1	0	0	0	0
537:	0	0	0	0	0	0	1	0
545:	0	0	0	0	1	0	0	0
553:	0	0	0	1	1	0	3	0
561:	0	0	0	1	1	0	1	1
569:	0	0	1	1	1	0	0	0
577:	0	0	0	0	1	0	0	1
585:	3	1	1	2	1	0	1	3
593:	1	5	6	2	1	4	6	8
601:	4	4	3	5	4	4	2	5
609:	7	6	6	2	7	12	6	4
617:	12	5	6	6	11	6	7	10
625:	1	1	0	4	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	1	0	1
657:	1	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	1
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	1	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	1	0	0
721:	0	0	0	1	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	1	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 15

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	1	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB4-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010843.cnf
Batch Identification: 1111140A-UU
Sample Identification: 16
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 10020
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:58 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6115 mL
Effective Efficiency: 0.1877 +/- 0.0106
Counting Efficiency: 0.1900 +/- 0.0030 on 8/30/2011 7:35:05 PM
Chem. Recovery Factor: 0.9876 +/- 0.0580

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.287	375.66	10.12	0.34	0.00E+000	38.0
U-234		4.743	192.32	14.16	0.68	0.00E+000	15.9
U-235		4.367	11.00	61.72	0.00	0.00E+000	3.0
U-238		4.157	205.64	13.72	1.36	0.00E+000	36.7

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.996	5302.50*	5.31E+000 +/- 5.88E-001	6.76E-002 +/- 7.48E-003
U-234	0.994	4761.50*	2.72E+000 +/- 4.89E-001	7.97E-002 +/- 8.83E-003
U-235	0.995	4385.50*	1.92E-001 +/- 1.20E-001	1.05E-001 +/- 1.16E-002
U-238	0.988	4184.40*	2.89E+000 +/- 5.10E-001	9.64E-002 +/- 1.07E-002

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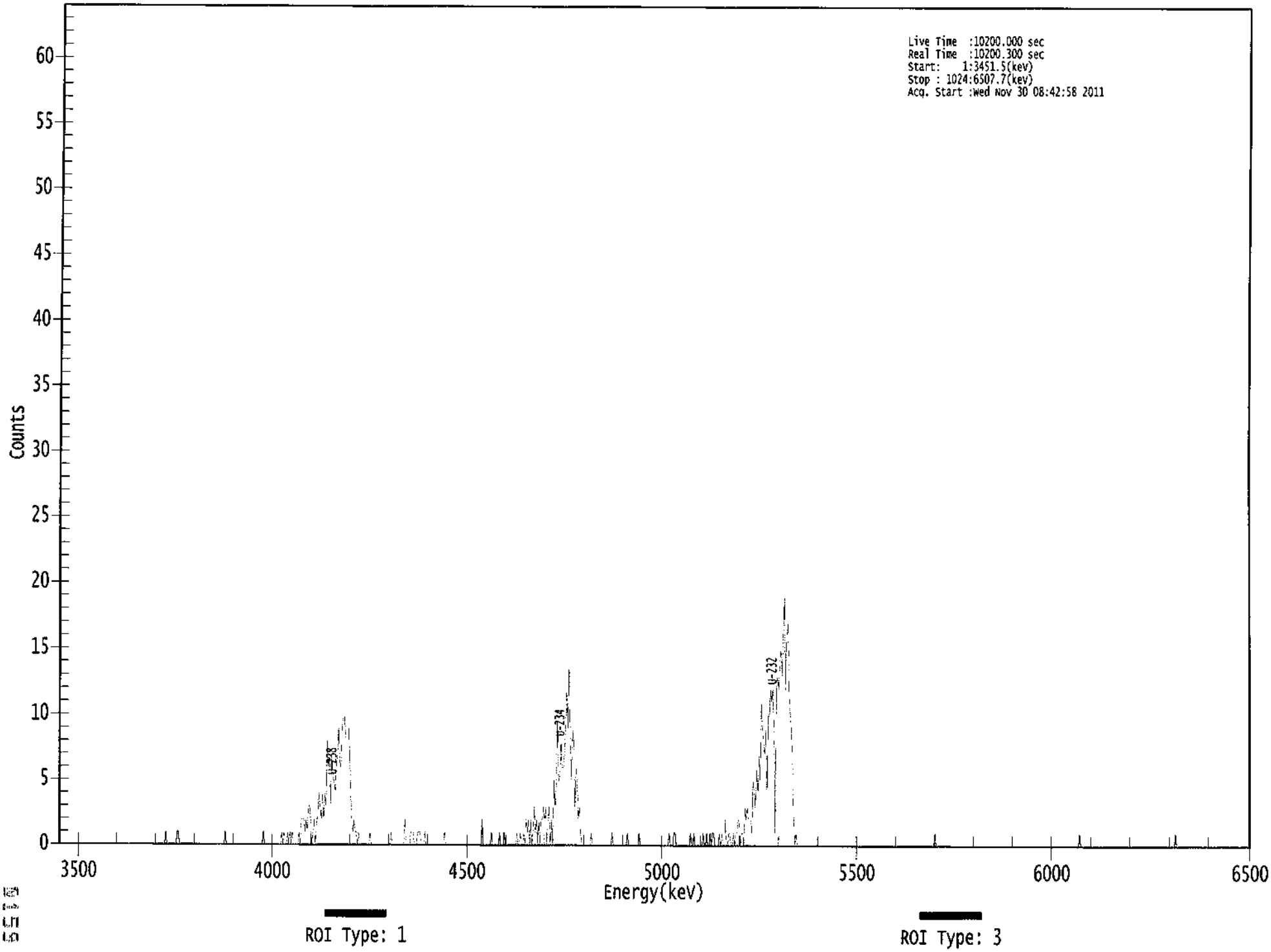
12/1/11

0000010843.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 16

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	1	0	0	0
97:	0	0	0	0	0	0	1	1
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	1
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	1	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	1	0	1	0	0	1	0	1
201:	0	1	0	0	0	0	0	1
209:	0	2	2	2	1	2	1	3
217:	3	2	0	1	2	0	2	2
225:	4	3	2	4	2	4	3	8
233:	6	7	3	7	5	5	4	6
241:	7	9	6	6	9	10	10	8
249:	8	8	9	4	2	1	2	1
257:	1	0	1	0	0	0	0	0
265:	0	0	0	0	1	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	0	0	0	0	0	0	0
297:	0	0	2	0	0	0	0	1
305:	1	1	0	0	0	1	1	1
313:	0	0	0	1	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	1	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	2	0	0	0

369:	0	0	0	0	1	0	0	0

Sample Title: 16

Channel								
377:	0	0	0	1	0	0	0	1
385:	0	0	0	0	0	0	0	0
393:	0	0	1	0	0	1	0	0
401:	1	0	2	1	2	0	2	0
409:	1	3	1	2	0	2	0	2
417:	2	3	2	3	0	2	3	0
425:	2	0	5	3	5	10	5	5
433:	8	6	6	7	9	12	9	14
441:	8	5	9	8	3	6	5	2
449:	3	1	0	0	0	0	0	0
457:	0	0	1	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	1	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	1	0	0
529:	0	1	1	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	1	0	0	0	0	0
553:	0	0	1	0	0	1	0	0
561:	1	0	1	1	0	0	0	0
569:	1	0	1	0	0	2	0	0
577:	1	1	0	0	1	0	1	1
585:	2	2	0	1	1	0	3	2
593:	3	2	2	2	1	5	4	3
601:	6	4	7	5	11	9	8	7
609:	9	4	10	10	12	11	12	9
617:	1	12	13	12	14	15	13	16
625:	19	12	16	17	12	10	9	6
633:	2	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 16

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	1	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	1
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010844.cnf
Batch Identification: 1111140A-UU
Sample Identification: 17
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 10021
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:50 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6112 mL
Effective Efficiency: 0.1427 +/- 0.0091
Counting Efficiency: 0.2025 +/- 0.0032 on 8/30/2011 7:35:03 PM
Chem. Recovery Factor: 0.7045 +/- 0.0462

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.278	285.49	11.61	0.51	0.00E+000	5.2
U-234		4.733	232.83	12.85	0.17	0.00E+000	7.1
U-235		4.372	13.83	53.08	0.17	0.00E+000	4.5
U-238		4.149	222.66	13.15	0.34	0.00E+000	9.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.990	5302.50*	5.30E+000 +/- 6.61E-001	9.75E-002 +/- 1.21E-002
U-234	0.987	4761.50*	4.32E+000 +/- 7.74E-001	7.75E-002 +/- 9.65E-003
U-235	0.997	4385.50*	3.17E-001 +/- 1.73E-001	9.56E-002 +/- 1.19E-002
U-238	0.980	4184.40*	4.12E+000 +/- 7.45E-001	8.84E-002 +/- 1.10E-002

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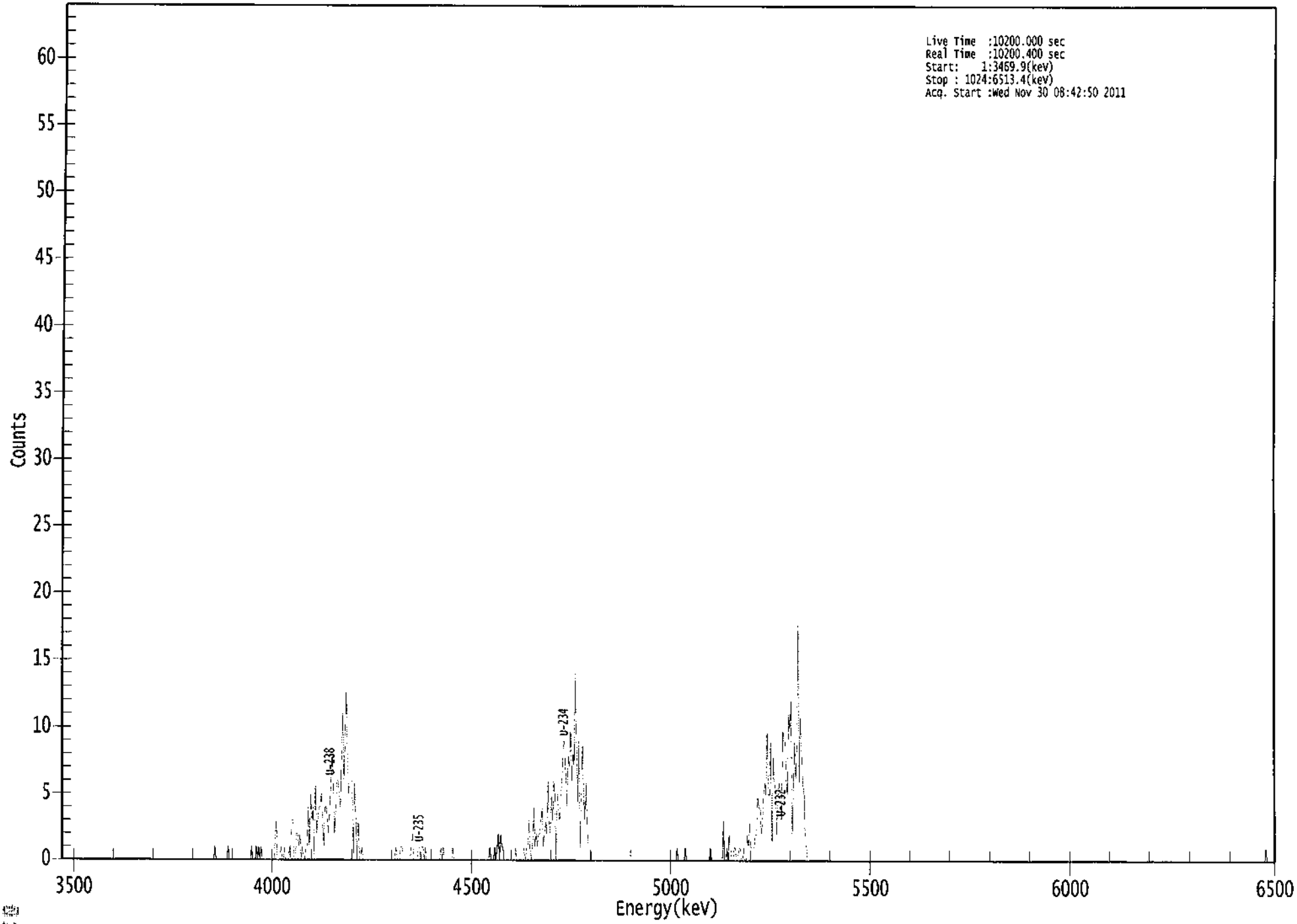
0000010844.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 17

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	1	0	0	0	1	0	1
169:	0	1	0	0	0	0	0	0
177:	0	0	0	0	0	2	3	0
185:	0	0	1	0	0	1	0	0
193:	0	1	0	3	3	0	0	2
201:	2	1	2	0	1	0	0	1
209:	1	4	1	5	3	4	0	6
217:	2	3	4	4	5	3	1	4
225:	4	3	2	4	6	8	5	2
233:	4	6	6	5	4	8	11	6
241:	9	13	8	5	6	6	6	0
249:	6	3	0	3	0	0	1	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	1	0	0	0	1
289:	1	0	0	0	0	0	0	0
297:	1	2	0	0	0	0	1	1
305:	0	1	1	0	1	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	1	0	1	0	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	1	0	0	0	1	0

369:	1	2	0	2	1	1	0	0

Sample Title: 17

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	1
393:	0	1	1	3	1	0	1	4
401:	1	2	1	2	2	3	4	1
409:	2	3	2	6	3	2	5	3
417:	6	5	0	5	4	3	5	6
425:	9	9	6	4	8	7	10	6
433:	8	7	14	9	4	9	1	4
441:	9	5	3	6	3	1	1	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	1	0	0	0	0	0	0	1
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	0	0	0	0	0	0	0	3
561:	0	0	1	0	2	1	0	0
569:	1	1	0	0	1	1	0	0
577:	1	0	0	2	1	3	1	1
585:	1	1	2	2	5	4	4	2
593:	3	5	6	5	10	5	5	9
601:	1	8	6	5	2	5	6	5
609:	3	10	9	9	6	5	11	10
617:	12	2	5	9	6	9	18	6
625:	11	8	6	5	2	1	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 17

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	1
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010811.cnf
Batch Identification: 1111140A-UU
Sample Identification: 18
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 10022
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:52 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6100 mL
Effective Efficiency: 0.2082 +/- 0.0113
Counting Efficiency: 0.1937 +/- 0.0031 on 8/30/2011 7:35:02 PM
Chem. Recovery Factor: 1.0751 +/- 0.0607

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.284	415.83	9.61	0.17	0.00E+000	12.2
U-234		4.742	61.66	25.04	0.34	0.00E+000	3.0
U-235		4.424	4.00	109.57	0.00	0.00E+000	3.0
U-238		4.156	88.00	21.01	0.00	0.00E+000	6.7

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.26E+000 +/- 5.59E-001	5.28E-002 +/- 5.61E-003
U-234	0.994	4761.50*	7.80E-001 +/- 2.12E-001	6.05E-002 +/- 6.42E-003
U-235	0.977	4385.50*	6.24E-002 +/- 6.87E-002	9.36E-002 +/- 9.94E-003
U-238	0.987	4184.40*	1.11E+000 +/- 2.61E-001	7.55E-002 +/- 8.02E-003

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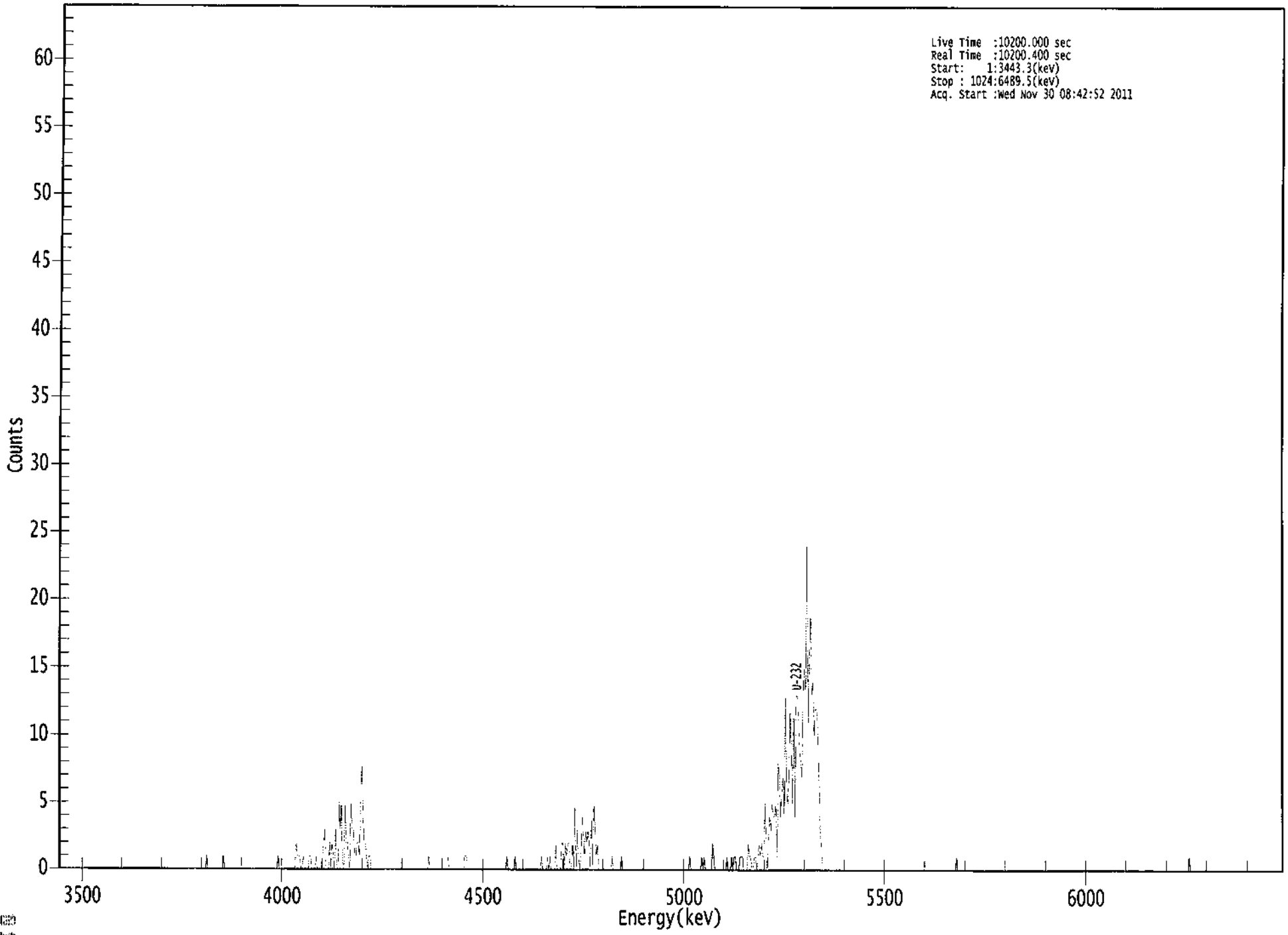
0000010811.CNF



ROI Type: 1

ROI Type: 3

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 18

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	1	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	2
201:	1	1	1	0	0	1	0	0
209:	0	0	1	1	0	0	0	0
217:	1	0	0	0	0	1	2	3
225:	0	0	0	2	0	2	1	0
233:	3	0	0	5	3	5	0	0
241:	5	2	2	1	0	5	3	3
249:	1	1	2	2	1	5	8	4
257:	2	2	1	0	1	1	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	1	1	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 18

Channel								
377:	0	0	0	0	0	0	1	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	1	0	0	0
409:	0	1	0	1	0	0	0	0
417:	2	0	0	0	0	2	2	0
425:	2	1	2	2	0	0	2	0
433:	5	0	3	1	0	1	4	3
441:	1	3	2	3	2	0	4	0
449:	5	3	1	2	0	0	0	0
457:	0	0	0	0	0	0	0	1
465:	0	0	0	0	0	0	0	1
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	0	0	0	0	0
537:	0	0	1	0	1	0	0	0
545:	0	0	0	2	1	0	0	0
553:	0	0	0	0	0	0	0	1
561:	0	0	0	1	0	1	1	0
569:	0	0	1	1	1	0	0	0
577:	0	2	1	1	0	0	1	1
585:	0	1	2	1	2	1	1	5
593:	2	0	3	4	3	5	4	4
601:	5	1	8	7	4	6	7	4
609:	13	6	5	7	12	9	5	12
617:	4	13	13	11	9	8	7	14
625:	15	13	25	11	15	19	13	14
633:	10	12	12	11	7	3	2	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	1
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 18

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	1	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

C 12/12/11

Sample Description: BKG-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010810.Cnf
Batch Identification: 1111140A-UU
Sample Identification: 19
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 10023
Reagent Blank: <not performed>

Sample Size: 1.015E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:54 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6115 mL
Effective Efficiency: 0.2358 +/- 0.0121
Counting Efficiency: 0.1901 +/- 0.0030 on 8/30/2011 7:35:01 PM
Chem. Recovery Factor: 1.2402 +/- 0.0669

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.290	472.00	9.03	0.00	0.00E+000	17.6
U-234		4.735	83.00	21.64	0.00	0.00E+000	9.2
U-235		4.399	5.00	96.02	0.00	0.00E+000	3.0
U-238		4.173	65.66	24.26	0.34	0.00E+000	5.2

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.998	5302.50*	5.24E+000 +/- 5.29E-001	6.65E-002 +/- 6.72E-003
U-234	0.989	4761.50*	9.21E-001 +/- 2.20E-001	6.65E-002 +/- 6.71E-003
U-235	0.997	4385.50*	6.84E-002 +/- 6.61E-002	8.20E-002 +/- 8.28E-003
U-238	0.998	4184.40*	7.25E-001 +/- 1.91E-001	5.28E-002 +/- 5.33E-003

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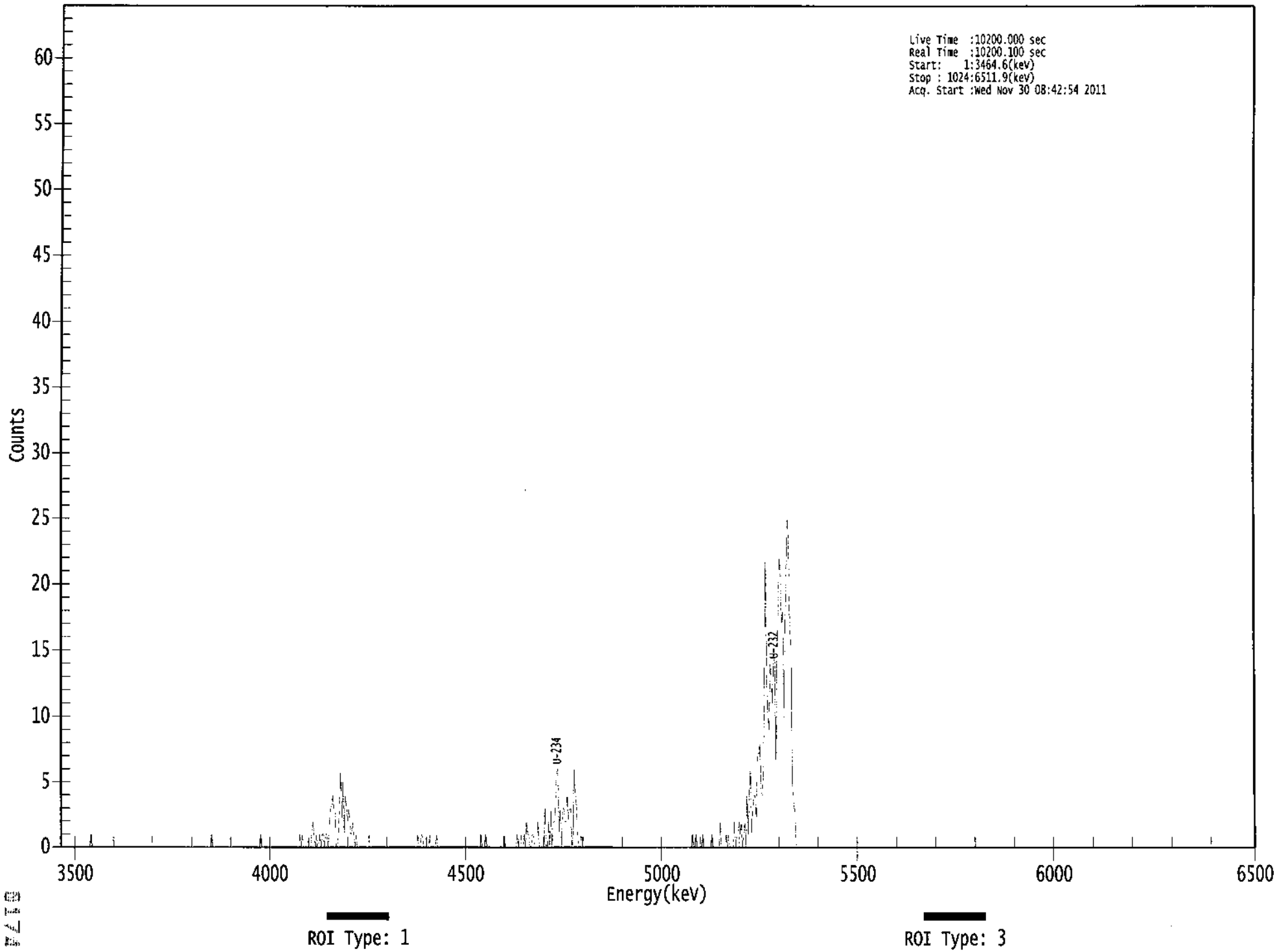
0000010810.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 19

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	1	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	1	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	1	0
209:	1	0	0	0	0	0	0	0
217:	1	2	1	0	1	0	0	1
225:	0	1	1	0	1	1	0	1
233:	3	3	4	3	3	0	0	1
241:	3	6	2	5	1	4	3	2
249:	3	1	1	2	1	0	1	0
257:	0	0	0	0	0	0	0	0
265:	0	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	1	0	0	1	1
313:	0	0	0	0	0	1	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	1	0	0	0	1	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 19

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	1	0	1	1	0	0	1	0
401:	2	1	1	0	0	1	1	0
409:	0	0	2	0	0	0	0	0
417:	3	0	0	2	0	3	0	2
425:	2	4	6	6	1	3	0	3
433:	3	2	2	4	2	3	3	0
441:	1	6	4	3	1	0	0	1
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	1	0
545:	0	1	0	0	0	0	0	1
553:	0	0	0	0	0	0	0	1
561:	0	0	0	0	0	0	2	0
569:	0	0	0	1	0	1	0	0
577:	0	0	2	0	1	1	2	1
585:	2	0	1	2	0	4	1	4
593:	6	1	3	4	4	2	7	7
601:	8	4	4	6	13	22	13	10
609:	9	14	13	11	15	14	6	15
617:	18	22	21	17	18	10	17	21
625:	25	24	17	15	5	3	3	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 19

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

11/30/11

Sample Description: BKG-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010809.Cnf
Batch Identification: 1111140A-UU
Sample Identification: 20
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 10024
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 8:32:35 AM
Acquisition Date/Time: 11/30/2011 8:42:55 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6097 mL
Effective Efficiency: 0.1032 +/- 0.0076
Counting Efficiency: 0.1773 +/- 0.0035 on 10/23/2011 12:17:07 PM
Chem. Recovery Factor: 0.5821 +/- 0.0443

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.282	206.00	13.69	0.00	0.00E+000	16.7
U-234		4.736	86.83	21.06	0.17	0.00E+000	5.0
U-235		4.367	6.00	86.43	0.00	0.00E+000	3.0
U-238		4.159	84.66	21.35	0.34	0.00E+000	3.6

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.993	5302.50*	5.20E+000 +/- 7.49E-001	1.51E-001 +/- 2.18E-002
U-234	0.990	4761.50*	2.19E+000 +/- 5.59E-001	1.05E-001 +/- 1.52E-002
U-235	0.995	4385.50*	1.87E-001 +/- 1.64E-001	1.86E-001 +/- 2.69E-002
U-238	0.990	4184.40*	2.13E+000 +/- 5.47E-001	1.20E-001 +/- 1.73E-002

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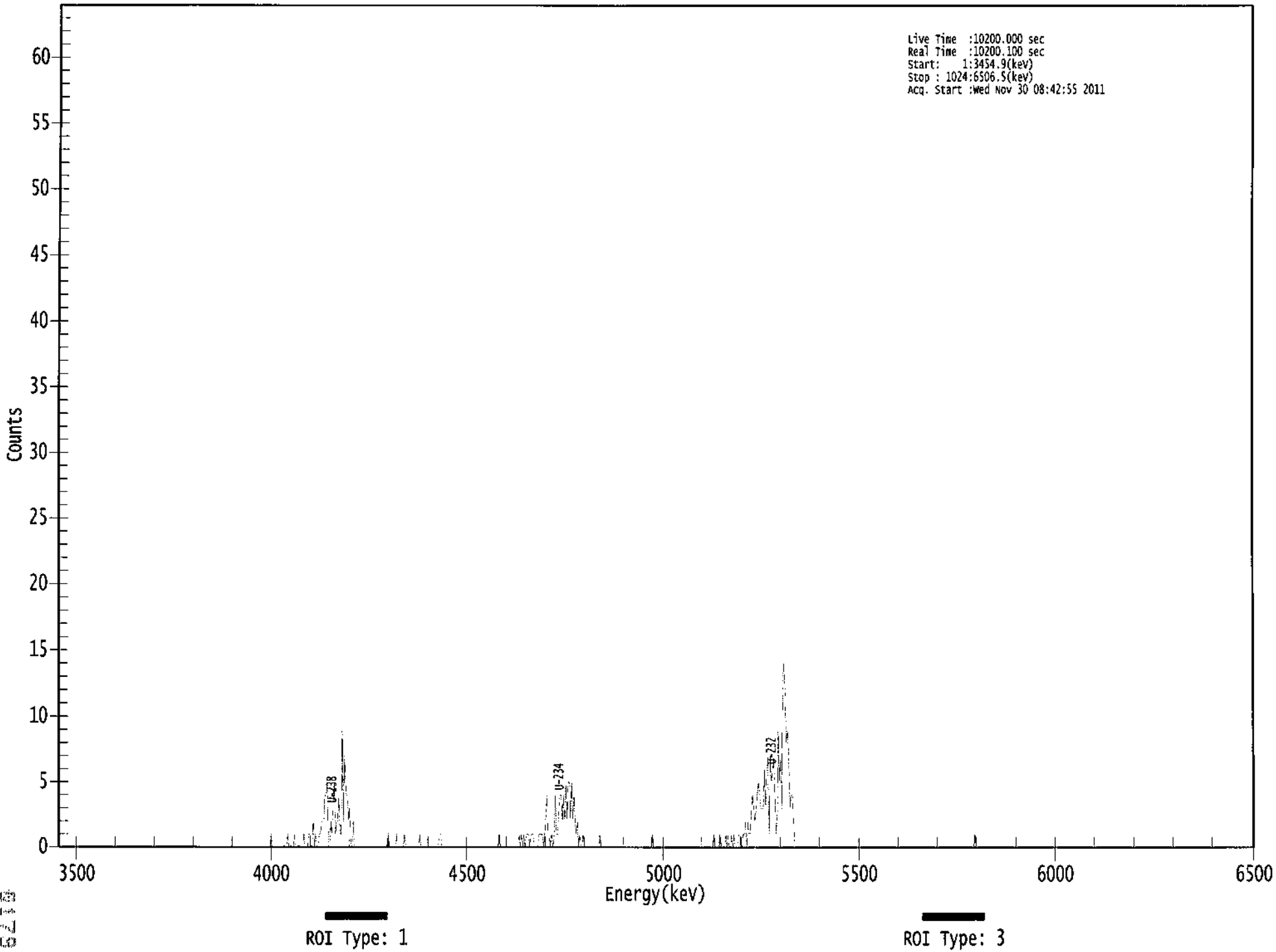
0000010809.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 20

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	1
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	1	0	0
201:	0	0	0	1	0	0	0	0
209:	0	0	0	1	0	0	0	1
217:	1	0	0	2	0	1	0	0
225:	1	1	2	2	2	4	4	5
233:	0	0	2	1	3	5	1	2
241:	2	4	1	1	9	2	7	4
249:	4	2	3	0	0	2	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	1	0	0	0	0
289:	0	0	1	0	0	0	0	0
297:	0	1	0	0	0	0	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	1
329:	1	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 20

Channel								
377:	0	0	1	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	1	0	1	0	1
401:	0	1	1	1	0	1	1	1
409:	0	0	0	0	1	1	1	1
417:	0	1	2	4	1	1	0	1
425:	0	1	4	1	1	3	4	4
433:	2	4	2	5	2	5	5	2
441:	5	2	4	2	1	2	0	1
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	1	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	1	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	1	0	0	0	0	1
569:	0	0	0	0	1	0	1	0
577:	0	1	0	1	0	0	0	1
585:	1	0	0	1	1	2	0	2
593:	1	1	3	4	3	2	3	4
601:	5	4	3	3	3	6	3	6
609:	7	1	7	5	6	7	4	1
617:	2	9	5	7	3	13	14	12
625:	8	9	7	3	4	4	2	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 20

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 5:31:18 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	11/30/2011 5:16:52 AM
Alpha_010	AIM21F	ALL	Passed	11/30/2011 5:16:53 AM
Alpha_011	AIM21F	ALL	Passed	11/30/2011 5:16:54 AM
Alpha_012	AIM21F	ALL	Passed	11/30/2011 5:16:55 AM
Alpha_013	AIM21F	ALL	Passed	11/30/2011 5:16:56 AM
Alpha_014	AIM21F	ALL	Passed	11/30/2011 5:16:56 AM
Alpha_015	AIM21F	ALL	Passed	11/30/2011 5:16:57 AM
Alpha_017	AIM730	ALL	Passed	11/30/2011 5:16:58 AM
Alpha_020	AIM730	Peak FWHM	Action	11/30/2011 5:16:59 AM
Alpha_021	AIM730	Peak FWHM	Action	11/30/2011 5:17:00 AM
Alpha_022	AIM730	ALL	Passed	11/30/2011 5:17:01 AM
Alpha_023	AIM730	Peak FWHM	Action	11/30/2011 5:17:01 AM
Alpha_024	AIM730	Peak FWHM	Action	11/30/2011 5:17:02 AM
Alpha_025	AIM730	ALL	Passed	11/30/2011 5:17:03 AM
Alpha_026	AIM730	ALL	Passed	11/30/2011 5:17:04 AM
Alpha_028	AIM730	Peak FWHM	Action	11/30/2011 5:17:05 AM
Alpha_029	AIM730	ALL	Passed	11/30/2011 5:17:06 AM
Alpha_030	AIM730	Peak Energy	Action	11/30/2011 5:17:06 AM
Alpha_030	AIM730	Peak FWHM	Action	11/30/2011 5:17:06 AM
Alpha_031	AIM730	ALL	Passed	11/30/2011 5:17:07 AM
Alpha_033	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:08 AM
Alpha_034	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:10 AM
Alpha_035	Alpha Analyst100DC	ALL	Not Done	
Alpha_036	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:13 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:14 AM
Alpha_038	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:16 AM
Alpha_039	Alpha Analyst100DC	ALL	Not Done	
Alpha_040	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:18 AM
Alpha_041	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:20 AM
Alpha_042	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:21 AM
Alpha_043	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:23 AM
Alpha_044	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:25 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:26 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:28 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:29 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:31 AM

APPROVED BY: _____

11/30/11

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 5:57:54 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_035	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:47:10 AM
Alpha_039	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:47:12 AM

APPROVED BY: _____

APPROVAL DATE: 1/1/2011

11/30/2011 8:05:34 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 8:05:34 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_017	AIM730	ALL	Passed	11/30/2011 7:54:14 AM
Alpha_020	AIM730	ALL	Passed	11/30/2011 7:54:15 AM
Alpha_021	AIM730	ALL	Passed	11/30/2011 7:54:15 AM
Alpha_022	AIM730	ALL	Passed	11/30/2011 7:54:16 AM
Alpha_023	AIM730	ALL	Passed	11/30/2011 7:54:17 AM
Alpha_024	AIM730	ALL	Passed	11/30/2011 7:54:18 AM
Alpha_025	AIM730	ALL	Passed	11/30/2011 7:54:19 AM
Alpha_026	AIM730	ALL	Passed	11/30/2011 7:54:19 AM
Alpha_028	AIM730	ALL	Passed	11/30/2011 7:54:20 AM
Alpha_029	AIM730	ALL	Passed	11/30/2011 7:54:21 AM
Alpha_030	AIM730	ALL	Passed	11/30/2011 7:54:22 AM
Alpha_031	AIM730	ALL	Passed	11/30/2011 7:54:23 AM

APPROVED BY: _____

APPROVAL DATE: 11/30/11

SECTION IX

ANALYTICAL DATA (RADIUM-226)

11-11140
Ra226
Run 1

Work Order	11-11140
Analysis Code	Ra226
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB3-6	41	11/18/11 00:00	1.0153E+00
04	DO	IB3-6	41	11/18/11 00:00	1.0024E+00
05	TRG	IB3-7	88	11/18/11 14:26	1.0208E+00
06	TRG	IB3-8	52	11/18/11 00:00	1.0409E+00
07	TRG	IB3-9	60	11/18/11 00:00	1.0167E+00
08	TRG	IB3-6A	50	11/18/11 00:00	1.0530E+00
09	TRG	IB3-6B	44	11/18/11 00:00	1.0287E+00
10	TRG	IB3-6C	54	11/18/11 00:00	1.0428E+00
11	TRG	IB3-6D	47	11/18/11 00:00	1.0017E+00
12	TRG	IB3-6E	35	11/18/11 00:00	1.0015E+00
13	TRG	IB4-1	38	11/18/11 13:44	1.0214E+00
14	TRG	IB4-2	52	11/18/11 13:35	1.0119E+00
15	TRG	IB4-3	47	11/18/11 13:50	1.0258E+00
16	TRG	IB4-4	47	11/18/11 14:00	1.0079E+00
17	TRG	IB4-5	48	11/18/11 13:30	1.0041E+00
18	TRG	BKG-1	53	11/18/11 00:00	1.0039E+00
19	TRG	BKG-2	53	11/18/11 00:00	1.0381E+00
20	TRG	BKG-3	45	11/18/11 13:25	1.0576E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9106	1009.4	466.9	102.69		0.0229	0.0294	0.0065		102.69	2.34	1.00
02	MBL	0.9088	1007.4	494.8	109.04		0.0229	0.0292	0.0063		109.04	2.27	1.00
03	DUP	0.9086	1007.2	444.8	98.04		0.0229	0.0312	0.0083		98.04	2.84	1.00
04	DO	0.9074	1005.8	453.8	100.16		0.0232	0.0308	0.0076		100.16	2.66	1.00
05	TRG	0.9083	1006.8	382.0	84.23		0.0228	0.0297	0.0069		84.23	2.47	1.00
06	TRG	0.9069	1005.3	376.0	83.03		0.0227	0.0295	0.0068		83.03	2.44	1.00
07	TRG	0.9081	1006.6	403.8	89.06		0.0235	0.0303	0.0068		89.06	2.44	1.00
08	TRG	0.9074	1005.8	468.8	103.47		0.0231	0.0311	0.0080		103.47	2.77	1.00
09	TRG	0.9070	1005.4	433.6	95.74		0.0228	0.0310	0.0082		95.74	2.82	1.00
10	TRG	0.9062	1004.5	471.3	104.16		0.0229	0.0309	0.0080		104.16	2.77	1.00
11	TRG	0.9080	1006.5	429.0	94.62		0.0231	0.0307	0.0076		94.62	2.66	1.00
12	TRG	0.9059	1004.2	447.6	98.95		0.0226	0.0310	0.0084		98.95	2.87	1.00
13	TRG	0.9066	1004.9	423.2	93.49		0.0229	0.0309	0.0080		93.49	2.77	1.00
14	TRG	0.9049	1003.1	441.5	97.71		0.0227	0.0311	0.0084		97.71	2.87	1.00
15	TRG	0.9058	1004.1	434.3	96.03		0.0226	0.0298	0.0072		96.03	2.55	1.00
16	TRG	0.9050	1003.2	383.3	84.82		0.0231	0.0302	0.0071		84.82	2.53	1.00
17	TRG	0.9050	1003.2	406.0	89.85		0.0229	0.0302	0.0073		89.85	2.58	1.00
18	TRG	0.9060	1004.3	433.5	95.83		0.0225	0.0311	0.0086		95.83	2.91	1.00
19	TRG	0.9056	1003.8	471.4	104.25		0.0227	0.0317	0.0090		104.25	3.01	1.00
20	TRG	0.9058	1004.1	437.8	96.80		0.0211	0.0297	0.0086		96.80	2.91	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
02	MBL			11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
03	DUP			11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
04	DO	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
05	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
06	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
07	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
08	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
09	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
10	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
11	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
12	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
13	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
14	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
15	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
16	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
17	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
18	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
19	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		
20	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:42	JBARNARD	11/30/11 10:34	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11140-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/g	1.06E+01	1.25E+00	2.13E-01	1.02E+01	103.69	OK		OK	
02	RA-226	MBL	BLANK	pCi/g	1.86E-02	8.49E-02	1.99E-01					OK	OK
03	RA-226	DUP	IB3-6	pCi/g	2.84E+00	7.40E-01	4.25E-01				OK	OK	
04	RA-226	DO	IB3-6	pCi/g	2.34E+00	6.39E-01	2.99E-01					OK	
05	RA-226	TRG	IB3-7	pCi/g	1.26E+01	1.56E+00	3.09E-01					OK	
06	RA-226	TRG	IB3-8	pCi/g	1.41E+01	1.69E+00	3.22E-01					OK	
07	RA-226	TRG	IB3-9	pCi/g	5.22E+00	9.43E-01	2.41E-01					OK	
08	RA-226	TRG	IB3-6A	pCi/g	2.29E+00	6.33E-01	2.77E-01					OK	
09	RA-226	TRG	IB3-6B	pCi/g	1.79E+00	5.46E-01	2.92E-01					OK	
10	RA-226	TRG	IB3-6C	pCi/g	1.79E+00	5.10E-01	1.76E-01					OK	
11	RA-226	TRG	IB3-6D	pCi/g	2.55E+00	6.56E-01	2.04E-01					OK	
12	RA-226	TRG	IB3-6E	pCi/g	2.15E+00	6.14E-01	2.90E-01					OK	
13	RA-226	TRG	IB4-1	pCi/g	2.84E+00	6.49E-01	2.54E-01					OK	
14	RA-226	TRG	IB4-2	pCi/g	2.13E+00	6.52E-01	4.32E-01					OK	
15	RA-226	TRG	IB4-3	pCi/g	2.92E+00	7.04E-01	2.91E-01					OK	
16	RA-226	TRG	IB4-4	pCi/g	4.53E+00	9.34E-01	3.18E-01					OK	
17	RA-226	TRG	IB4-5	pCi/g	6.43E+00	1.13E+00	3.26E-01					OK	
18	RA-226	TRG	BKG-1	pCi/g	1.69E+00	5.67E-01	2.70E-01					OK	
19	RA-226	TRG	BKG-2	pCi/g	2.18E+00	6.50E-01	3.06E-01					OK	
20	RA-226	TRG	BKG-3	pCi/g	3.04E+00	7.07E-01	2.90E-01					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	11/22/11 00:00	1.00E+00	100.00	0.00	102.69		11/30/2011 10:34	
02	RA-226	MBL	11/22/11 00:00	1.00E+00	100.00	0.00	109.04		11/30/2011 10:34	
03	RA-226	DUP	11/18/11 00:00	1.02E+00	98.04	0.00	98.04		11/30/2011 10:34	
04	RA-226	DO	11/18/11 00:00	1.00E+00	100.00	0.00	100.16		11/30/2011 10:34	
05	RA-226	TRG	11/18/11 14:26	1.02E+00	84.23	0.00	84.23		11/30/2011 10:34	
06	RA-226	TRG	11/18/11 00:00	1.04E+00	83.03	0.00	83.03		11/30/2011 10:34	
07	RA-226	TRG	11/18/11 00:00	1.02E+00	89.06	0.00	89.06		11/30/2011 10:34	
08	RA-226	TRG	11/18/11 00:00	1.05E+00	100.00	0.00	103.47		11/30/2011 10:34	
09	RA-226	TRG	11/18/11 00:00	1.03E+00	95.74	0.00	95.74		11/30/2011 10:34	
10	RA-226	TRG	11/18/11 00:00	1.04E+00	100.00	0.00	104.16		11/30/2011 10:34	
11	RA-226	TRG	11/18/11 00:00	1.00E+00	94.62	0.00	94.62		11/30/2011 10:34	
12	RA-226	TRG	11/18/11 00:00	1.00E+00	98.95	0.00	98.95		11/30/2011 10:34	
13	RA-226	TRG	11/18/11 13:44	1.02E+00	93.49	0.00	93.49		11/30/2011 10:34	
14	RA-226	TRG	11/18/11 13:35	1.01E+00	97.71	0.00	97.71		11/30/2011 10:34	
15	RA-226	TRG	11/18/11 13:50	1.03E+00	96.03	0.00	96.03		11/30/2011 10:34	
16	RA-226	TRG	11/18/11 14:00	1.01E+00	84.82	0.00	84.82		11/30/2011 10:34	
17	RA-226	TRG	11/18/11 13:30	1.00E+00	89.85	0.00	89.85		11/30/2011 10:34	
18	RA-226	TRG	11/18/11 00:00	1.00E+00	95.83	0.00	95.83		11/30/2011 10:34	
19	RA-226	TRG	11/18/11 00:00	1.04E+00	100.00	0.00	104.25		11/30/2011 10:34	
20	RA-226	TRG	11/18/11 13:25	1.06E+00	96.80	0.00	96.80		11/30/2011 10:34	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11140
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	12/02/11 14:19		A_Spec	Alpha_017	170	2.99 E+02	5.00 E-03	17.5
02	RA-226	MBL	12/02/11 14:19		A_Spec	Alpha_020	170.02	6.40 E-01	8.00 E-03	20.7
03	RA-226	DUP	12/02/11 14:19		A_Spec	Alpha_021	170.02	6.08 E+01	1.90 E-02	16.2
04	RA-226	DO	12/02/11 14:19		A_Spec	Alpha_022	170.02	5.36 E+01	8.00 E-03	16.1
05	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_023	170	2.70 E+02	7.00 E-03	16.2
06	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_024	170	2.88 E+02	7.00 E-03	15.3
07	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_025	170.02	1.22 E+02	4.00 E-03	16.7
08	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_026	170	5.20 E+01	6.00 E-03	15.8
09	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_028	170.02	4.35 E+01	9.00 E-03	18.4
10	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_029	170	4.87 E+01	2.00 E-03	19.1
11	RA-226	TRG	12/02/11 14:19		A_Spec	Alpha_030	170	5.97 E+01	2.00 E-03	17.4
12	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_017	170	4.88 E+01	7.00 E-03	17.5
13	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_020	170.02	7.66 E+01	8.00 E-03	20.7
14	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_021	170.02	4.48 E+01	1.90 E-02	16.2
15	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_022	170	6.86 E+01	8.00 E-03	16.1
16	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_023	170.02	9.38 E+01	7.00 E-03	16.2
17	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_024	170.02	1.30 E+02	7.00 E-03	15.3
18	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_025	170	3.53 E+01	4.00 E-03	16.7
19	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_026	170.02	4.50 E+01	6.00 E-03	15.8
20	RA-226	TRG	12/02/11 10:42		A_Spec	Alpha_028	170.02	7.45 E+01	9.00 E-03	18.4

Count Room Report
Client: Foxfire Scientific, Inc.

11-11140-Ra226-1 (pCi/g) in SO
Tracer ID: Ba-6a

25

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9106	1009.3755	466.9000	102.69	2.34	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9088	1007.3803	494.8000	109.04	2.27	1.00
03	DUP	IB3-6	11/18/11 00:00	1.0153	0.9086	1007.1586	444.8000	98.04	2.84	1.00
04	DO	IB3-6	11/18/11 00:00	1.0024	0.9074	1005.8284	453.8000	100.16	2.66	1.00
05	TRG	IB3-7	11/18/11 14:26	1.0208	0.9083	1006.8260	382.0000	84.23	2.47	1.00
06	TRG	IB3-8	11/18/11 00:00	1.0409	0.9069	1005.2742	376.0000	83.03	2.44	1.00
07	TRG	IB3-9	11/18/11 00:00	1.0167	0.9081	1006.6043	403.8000	89.06	2.44	1.00
08	TRG	IB3-6A	11/18/11 00:00	1.0530	0.9074	1005.8284	468.8000	103.47	2.77	1.00
09	TRG	IB3-6B	11/18/11 00:00	1.0287	0.9070	1005.3850	433.6000	95.74	2.82	1.00
10	TRG	IB3-6C	11/18/11 00:00	1.0428	0.9062	1004.4982	471.3000	104.16	2.77	1.00
11	TRG	IB3-6D	11/18/11 00:00	1.0017	0.9080	1006.4935	429.0000	94.62	2.66	1.00
12	TRG	IB3-6E	11/18/11 00:00	1.0015	0.9059	1004.1657	447.6000	98.95	2.87	1.00
13	TRG	IB4-1	11/18/11 13:44	1.0214	0.9066	1004.9416	423.2000	93.49	2.77	1.00
14	TRG	IB4-2	11/18/11 13:35	1.0119	0.9049	1003.0572	441.5000	97.71	2.87	1.00
15	TRG	IB4-3	11/18/11 13:50	1.0258	0.9058	1004.0548	434.3000	96.03	2.55	1.00
16	TRG	IB4-4	11/18/11 14:00	1.0079	0.9050	1003.1681	383.3000	84.82	2.53	1.00
17	TRG	IB4-5	11/18/11 13:30	1.0041	0.9050	1003.1681	406.0000	89.85	2.58	1.00
18	TRG	BKG-1	11/18/11 00:00	1.0039	0.9060	1004.2765	433.5000	95.83	2.91	1.00
19	TRG	BKG-2	11/18/11 00:00	1.0381	0.9056	1003.8331	471.4000	104.25	3.01	1.00
20	TRG	BKG-3	11/18/11 13:25	1.0576	0.9058	1004.0548	437.8000	96.80	2.91	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 7:42 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11140	1	Ra226	11/23/2011 6:54	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-226	Ra-5b	44.098	11/23/2011	0.500	0.5159				10.25	0.471	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9106	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9088	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9086	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9074	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9083	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9069	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9081	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9074	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9070	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.9062	0.9100
11	Ba-133	Ba-6a	1108.473	11/23/2011	0.9080	0.9100
12	Ba-133	Ba-6a	1108.473	11/23/2011	0.9059	0.9100
13	Ba-133	Ba-6a	1108.473	11/23/2011	0.9066	0.9100
14	Ba-133	Ba-6a	1108.473	11/23/2011	0.9049	0.9100
15	Ba-133	Ba-6a	1108.473	11/23/2011	0.9058	0.9100
16	Ba-133	Ba-6a	1108.473	11/23/2011	0.9050	0.9100
17	Ba-133	Ba-6a	1108.473	11/23/2011	0.9050	0.9100
18	Ba-133	Ba-6a	1108.473	11/23/2011	0.9060	0.9100
19	Ba-133	Ba-6a	1108.473	11/23/2011	0.9056	0.9100
20	Ba-133	Ba-6a	1108.473	11/23/2011	0.9058	0.9100

Balance Printer Tapes

Tracer	LCS
0.9106 g	0.5159 g
0.9088 g	0.4101 g
0.9086 g	
0.9074 g	
0.9083 g	
0.9069 g	
0.9081 g	
0.9074 g	
0.9070 g	
0.9062 g	
0.9080 g	
0.9059 g	
0.9066 g	
0.9049 g	
0.9058 g	
0.9050 g	
0.9050 g	
0.9060 g	
0.9056 g	
0.9058 g	

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11140	1	Ra226	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	IB3-6	DUP					1.0153E+00	1.0153E+00				
04	IB3-6	DO					1.0024E+00	1.0024E+00				
05	IB3-7	TRG					1.0208E+00	1.0208E+00				
06	IB3-8	TRG					1.0409E+00	1.0409E+00			1.0153 g	
07	IB3-9	TRG					1.0167E+00	1.0167E+00			1.0024 g	
08	IB3-6A	TRG					1.0530E+00	1.0530E+00			1.0208 g	
09	IB3-6B	TRG					1.0287E+00	1.0287E+00			1.0409 g	
10	IB3-6C	TRG					1.0428E+00	1.0428E+00			1.0167 g	
11	IB3-6D	TRG					1.0017E+00	1.0017E+00			1.0530 g	
12	IB3-6E	TRG					1.0015E+00	1.0015E+00			1.0287 g	
13	IB4-1	TRG					1.0214E+00	1.0214E+00			1.0428 g	
14	IB4-2	TRG					1.0119E+00	1.0119E+00			1.0017 g	
15	IB4-3	TRG					1.0258E+00	1.0258E+00			1.0015 g	
16	IB4-4	TRG					1.0079E+00	1.0079E+00			1.0214 g	
17	IB4-5	TRG					1.0041E+00	1.0041E+00			1.0119 g	
18	BKG-1	TRG					1.0039E+00	1.0039E+00			1.0258 g	
19	BKG-2	TRG					1.0381E+00	1.0381E+00			1.0079 g	
20	BKG-3	TRG					1.0576E+00	1.0576E+00			1.0041 g	
											1.0039 g	
											1.0381 g	
											1.0576 g	

Comments	

Technician: _____ Date: 11/23/11

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11140	1	Ra226			TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS		0.0229	0.0294	0.0065	
02	BLANK	MBL		0.0229	0.0292	0.0063	
03	DUP	DUP		0.0229	0.0312	0.0083	
04	IB3-6	DO		0.0232	0.0308	0.0076	
05	IB3-7	TRG		0.0228	0.0297	0.0069	
06	IB3-8	TRG		0.0227	0.0295	0.0068	
07	IB3-9	TRG		0.0235	0.0303	0.0068	
08	IB3-6A	TRG		0.0231	0.0311	0.0080	
09	IB3-6B	TRG		0.0228	0.0310	0.0082	
10	IB3-6C	TRG		0.0229	0.0309	0.0080	
11	IB3-6D	TRG		0.0231	0.0307	0.0076	
12	IB3-6E	TRG		0.0226	0.0310	0.0084	
13	IB4-1	TRG		0.0229	0.0309	0.0080	
14	IB4-2	TRG		0.0227	0.0311	0.0084	
15	IB4-3	TRG		0.0226	0.0298	0.0072	
16	IB4-4	TRG		0.0231	0.0302	0.0071	
17	IB4-5	TRG		0.0229	0.0302	0.0073	
18	BKG-1	TRG		0.0225	0.0311	0.0086	
19	BKG-2	TRG		0.0227	0.0317	0.0090	
20	BKG-3	TRG		0.0211	0.0297	0.0086	

Technician: [illegible] Date: 11/30/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11140	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	IB3-6	13.5500	554.6500	431.7000	541.1000	418.1500	22.72%	77.28%			
05	IB3-7	13.5600	192.0600	128.4900	178.5000	114.9300	35.61%	64.39%			
06	IB3-8	13.5700	249.6000	132.0100	236.0300	118.4400	49.82%	50.18%			
07	IB3-9	13.5400	303.6200	244.9000	290.0800	231.3600	20.24%	79.76%			
08	IB3-6A	13.6000	296.8600	234.4700	283.2600	220.8700	22.03%	77.97%			
09	IB3-6B	13.5300	312.9300	249.7700	299.4000	236.2400	21.10%	78.90%			
10	IB3-6C	13.5700	288.0200	224.2900	274.4500	210.7200	23.22%	76.78%			
11	IB3-6D	13.6500	303.7800	232.3600	290.1300	218.7100	24.62%	75.38%			
12	IB3-6E	13.7000	278.0400	218.9700	264.3400	205.2700	22.35%	77.65%			
13	IB4-1	13.5100	240.8500	190.0300	227.3400	176.5200	22.35%	77.65%			
14	IB4-2	13.4200	215.2900	172.1500	201.8700	158.7300	21.37%	78.63%			
15	IB4-3	13.5200	236.9100	201.6400	223.3900	188.1200	15.79%	84.21%			
16	IB4-4	13.4200	205.7100	149.4700	192.2900	136.0500	29.25%	70.75%			
17	IB4-5	13.5100	213.0000	176.0400	199.4900	162.5300	18.53%	81.47%			
18	BKG-1	13.5400	349.7300	297.4900	336.1900	283.9500	15.54%	84.46%			
19	BKG-2	13.6000	291.8700	253.1300	278.2700	239.5300	13.92%	86.08%			
20	BKG-3	13.6200	182.5900	138.0100	168.9700	124.3900	26.38%	73.62%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

Analysis: Ra226 Page No. 7856

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011270.cnf
Batch Identification: 1111140A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_017
Chamber Serial Number:
Detector Serial Number: 17
Env. Background: System Bkgd 9997
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/2/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:45 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1746 +/- 0.0028 on 9/4/2011 10:54:36 AM
Effective Efficiency: 0.1746 +/- 0.0028

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: 0.0074
Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

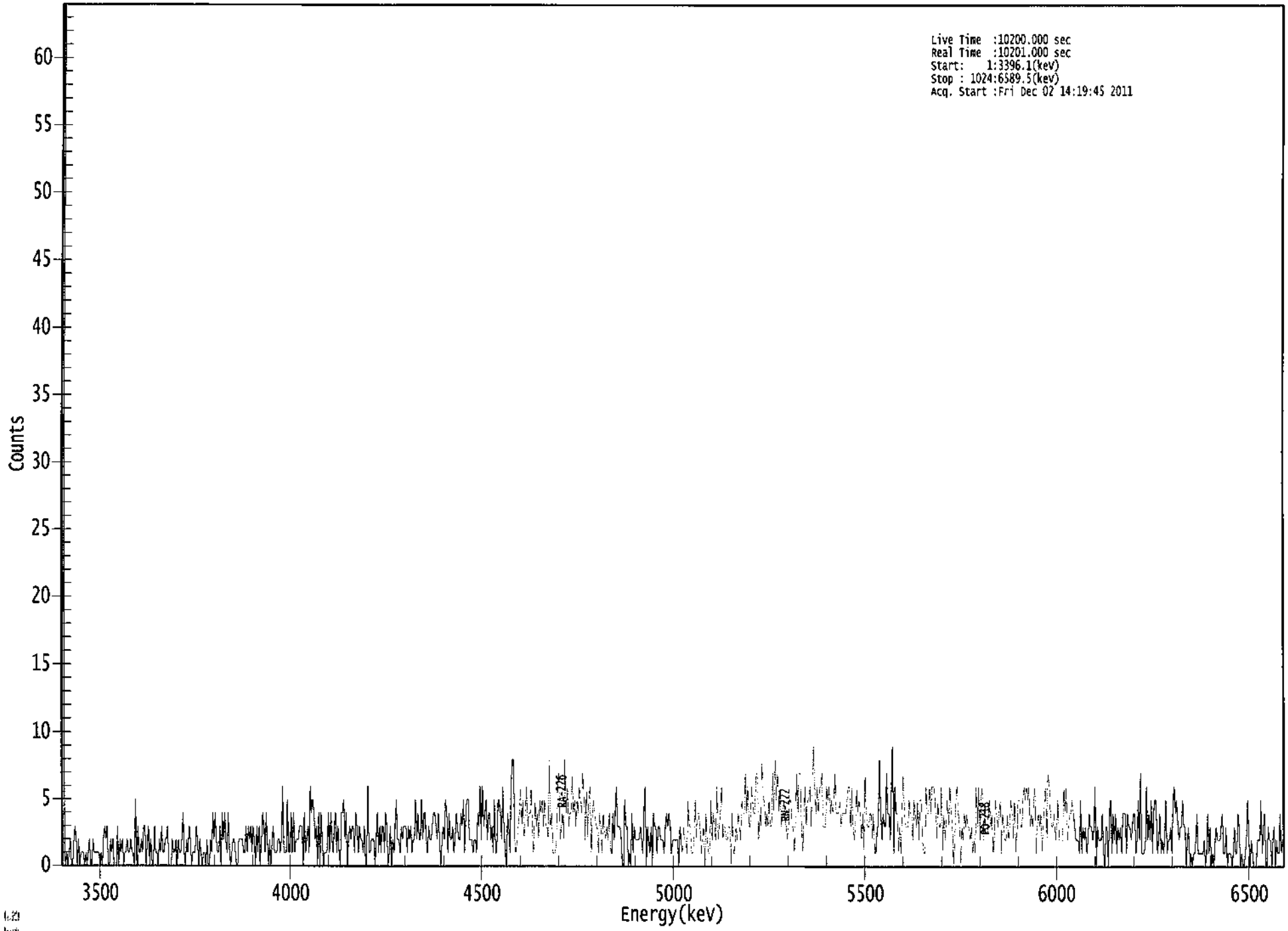
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.813	530.09	8.55	3.91	0.00E+000	8.3
RN-222	5.292	625.94	7.86	3.06	0.00E+000	10.1
RA-226	4.707	299.15	11.35	0.85	0.00E+000	4.6

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	1.88E+001 +/- 1.72E+000	3.46E-001 +/- 1.09E-002
RN-222	0.975	5490.00*	2.23E+001 +/- 1.88E+000	3.18E-001 +/- 1.00E-002
RA-226	0.996	4785.00*	1.06E+001 +/- 1.25E+000	2.13E-001 +/- 6.72E-003

AG
12/3/11

0000011270.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10201

Channel								
1:	10201	10200	1	0	1	0	1	2
9:	0	0	2	3	2	0	2	0
17:	1	1	1	0	1	0	1	2
25:	0	0	2	1	1	1	1	1
33:	0	1	0	2	3	2	3	0
41:	0	2	1	2	0	0	0	3
49:	0	2	1	2	0	1	1	2
57:	1	1	2	1	1	0	5	0
65:	3	1	1	2	1	3	3	0
73:	2	3	0	2	0	0	3	1
81:	1	0	2	1	3	1	1	2
89:	2	3	0	0	0	2	1	1
97:	2	0	2	1	1	2	4	1
105:	0	2	1	3	2	0	1	1
113:	1	3	2	0	2	1	0	1
121:	1	0	2	0	0	2	1	4
129:	2	4	2	1	1	3	0	4
137:	2	4	2	1	4	1	0	1
145:	2	2	1	0	0	2	2	2
153:	2	1	1	3	1	3	2	3
161:	1	3	2	0	3	1	3	0
169:	2	4	3	1	4	2	0	2
177:	0	2	3	1	1	1	2	2
185:	1	2	6	1	1	1	5	1
193:	1	4	1	4	1	2	2	2
201:	3	3	3	0	4	1	2	3
209:	1	6	4	5	4	2	3	0
217:	4	0	4	2	0	1	1	1
225:	4	1	4	2	1	3	4	1
233:	3	1	0	4	4	5	2	4
241:	0	2	3	2	3	3	1	4
249:	3	1	3	2	2	1	3	0
257:	1	6	1	1	2	2	2	0
265:	2	4	1	3	1	3	3	1
273:	4	3	0	1	3	0	2	1
281:	3	5	2	2	1	3	2	3
289:	3	3	1	3	2	3	1	2
297:	2	5	2	4	2	2	5	2
305:	4	4	2	1	3	2	2	3
313:	4	4	3	2	4	2	0	2
321:	3	2	5	4	1	4	2	2
329:	3	1	2	4	3	2	2	4
337:	3	5	1	4	5	5	2	2
345:	2	1	2	2	1	4	3	6
353:	2	6	3	4	5	2	4	4
361:	2	3	1	5	1	1	5	5

369:	4	2	6	3	1	0	4	3

Sample Title: 01

Channel								
377:	1	6	8	8	2	1	2	3
385:	4	6	3	5	2	4	6	3
393:	4	4	6	2	1	5	3	4
401:	2	5	4	5	3	5	3	3
409:	2	8	3	4	1	1	1	2
417:	6	7	2	3	4	2	8	4
425:	6	3	4	4	7	4	5	3
433:	5	4	6	5	4	7	5	2
441:	6	2	5	6	1	4	5	4
449:	3	3	1	4	3	1	4	3
457:	2	3	2	4	1	1	4	2
465:	4	6	3	3	3	2	0	0
473:	5	3	3	0	1	0	4	1
481:	3	2	2	2	2	3	2	1
489:	4	6	0	3	2	1	3	0
497:	4	3	3	1	3	3	2	2
505:	2	1	3	4	3	4	3	1
513:	2	2	2	2	2	0	3	2
521:	1	3	2	2	1	5	3	3
529:	1	1	2	5	2	4	4	3
537:	1	2	3	0	4	2	1	1
545:	5	2	4	3	2	6	2	3
553:	4	6	2	3	3	2	2	3
561:	3	0	4	1	1	3	2	4
569:	3	2	5	4	4	7	4	6
577:	3	3	6	5	4	4	7	7
585:	2	4	3	8	5	5	3	4
593:	3	5	3	3	7	4	8	5
601:	7	4	6	3	4	5	4	3
609:	2	3	5	5	3	3	1	4
617:	7	4	7	7	3	1	4	6
625:	3	5	5	6	3	6	9	6
633:	4	6	4	6	6	7	3	3
641:	3	6	5	6	4	5	4	5
649:	7	4	4	4	5	3	4	4
657:	4	4	5	6	6	3	6	3
665:	2	3	6	4	5	4	2	4
673:	1	7	4	3	3	4	4	2
681:	4	1	1	3	3	8	4	2
689:	4	3	3	7	4	4	2	6
697:	9	1	6	4	4	1	3	1
705:	4	7	4	3	3	3	5	4
713:	4	2	5	4	3	5	2	5
721:	5	2	1	1	6	4	4	6
729:	4	6	6	6	4	2	5	3
737:	3	6	1	4	2	4	5	3
745:	6	4	3	0	2	5	6	4
753:	3	0	3	2	4	3	4	3
761:	3	2	3	1	2	1	6	3
769:	6	2	5	6	2	5	2	2
777:	4	5	3	4	1	2	5	4
785:	3	4	5	1	4	3	2	2
793:	4	2	3	5	4	2	5	1

801:	3	5	5	3	3	5	6	5

Sample Title: 01

Channel								
809:	6	5	6	3	4	3	5	6
817:	1	3	4	3	4	1	3	5
825:	6	2	7	6	4	3	3	4
833:	2	3	5	2	2	2	2	6
841:	4	6	2	3	4	4	5	4
849:	3	2	2	2	1	5	1	3
857:	2	3	1	2	4	3	3	2
865:	3	6	0	3	2	2	2	4
873:	1	0	3	3	0	4	5	1
881:	4	2	4	1	3	2	3	1
889:	4	4	4	1	4	3	3	2
897:	3	4	4	1	2	5	2	7
905:	1	1	1	2	6	2	4	2
913:	5	1	4	5	5	1	2	4
921:	1	2	1	2	5	1	2	2
929:	3	1	5	6	4	5	3	2
937:	3	3	5	3	3	0	2	3
945:	0	1	0	1	1	2	4	1
953:	1	1	1	1	2	0	1	4
961:	1	3	0	1	0	2	3	2
969:	2	2	3	4	1	1	3	0
977:	1	1	1	0	1	3	1	1
985:	4	3	0	1	0	0	1	2
993:	5	2	0	2	1	0	0	0
1001:	2	2	2	5	1	3	4	0
1009:	0	3	2	2	0	2	3	0
1017:	2	1	1	4	1	2	1	2

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011180.cnf
Batch Identification: 1111140A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_020
Chamber Serial Number:
Detector Serial Number: 20
Env. Background: System Bkgd 9999
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.270E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/2/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:46 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.2073 +/- 0.0033 on 9/4/2011 11:23:25 AM
Effective Efficiency: 0.2073 +/- 0.0033

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

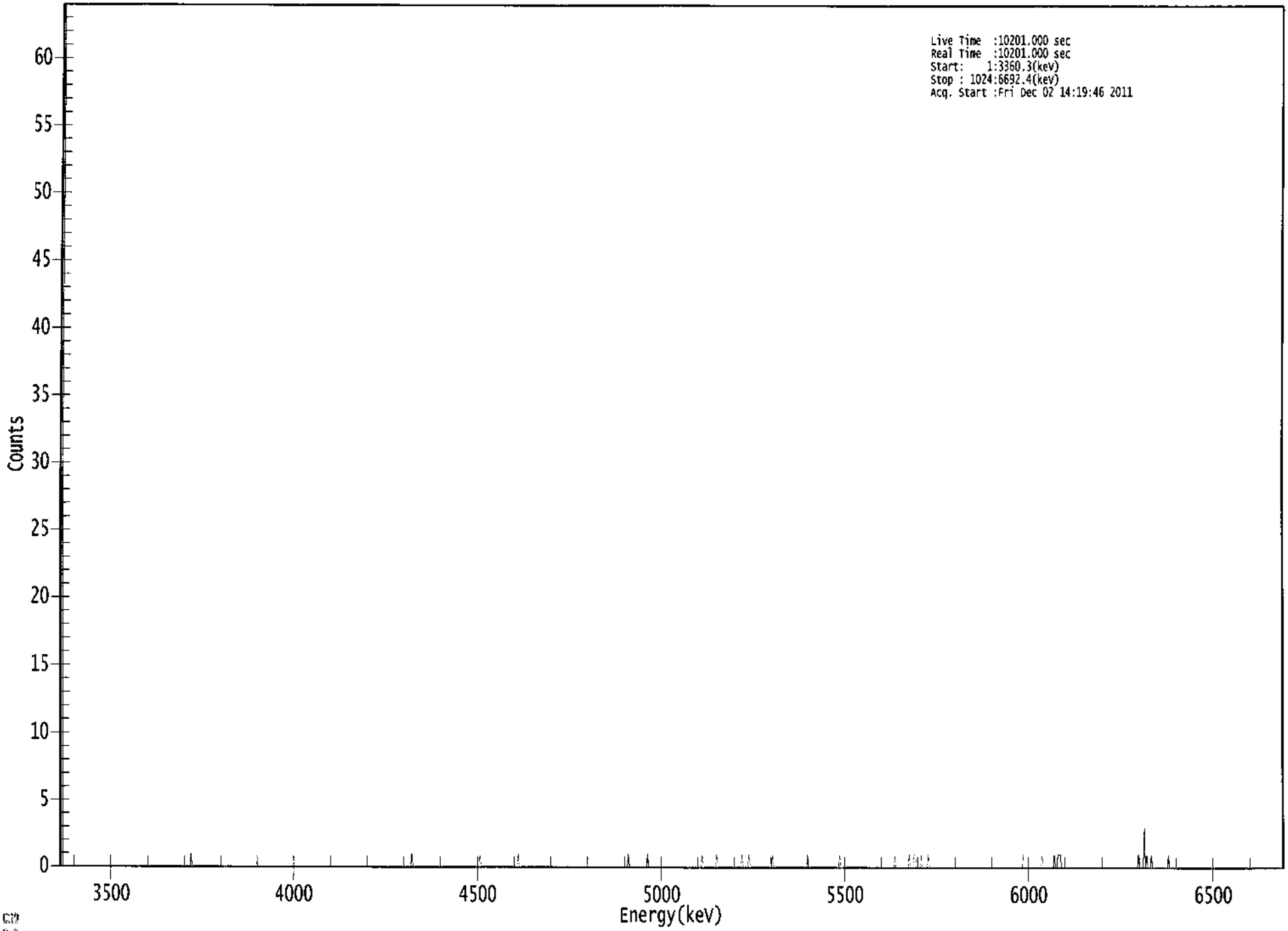
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.769	6.98	80.28	1.02	0.00E+000	3.3
RN-222	5.274	6.66	78.18	0.34	0.00E+000	3.3
RA-226	4.559	0.64	457.55	1.36	0.00E+000	3.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.966	6003.00*	2.03E-001 +/- 1.63E-001	1.83E-001 +/- 5.71E-003
RN-222	0.970	5490.00*	1.93E-001 +/- 1.51E-001	1.39E-001 +/- 4.34E-003
RA-226	0.968	4785.00*	1.86E-002 +/- 8.49E-002	1.99E-001 +/- 6.22E-003

AG
12/3/11

0000011180.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	1	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	0	0	0	0	0
545:	0	0	0	0	0	0	1	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	1	0	0	0	0
577:	0	1	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	1	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	1	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	1	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	0	0	0	1	1	0	0	0
721:	0	1	0	0	0	0	0	1
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	1	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	0	0	0	0	0	0	0	0
833:	1	0	0	1	1	1	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	1	0
905:	0	0	0	3	0	1	0	0
913:	0	1	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: IB3-6-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011183.cnf
Batch Identification: 1111140A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_021
Chamber Serial Number:
Detector Serial Number: 21
Env. Background: System Bkgd 10000
Reagent Blank: <not performed>

Sample Size: 1.015E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.840E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:47 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9804 +/- 0.0000
Counting Efficiency: 0.1620 +/- 0.0026 on 9/4/2011 11:24:40 AM
Effective Efficiency: 0.1588 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

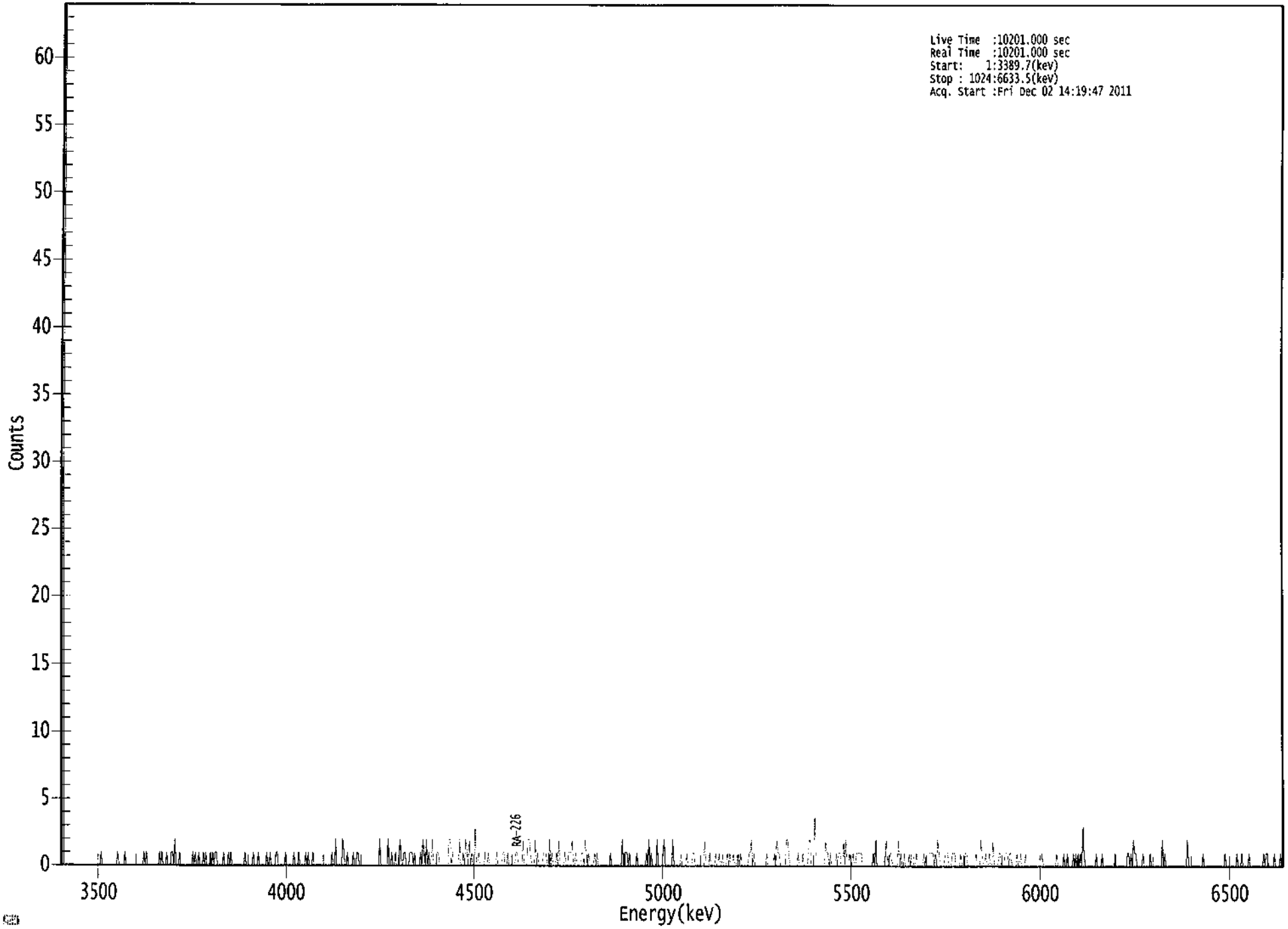
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.768	49.94	28.71	3.06	0.00E+000	3.2
RN-222	5.316	56.92	27.05	4.08	0.00E+000	3.2
RA-226	4.603	60.77	25.91	3.23	0.00E+000	3.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.965	6003.00*	2.33E+000 +/- 6.73E-001	4.17E-001 +/- 1.32E-002
RN-222	0.981	5490.00*	2.66E+000 +/- 7.24E-001	4.62E-001 +/- 1.46E-002
RA-226	0.979	4785.00*	2.84E+000 +/- 7.40E-001	4.25E-001 +/- 1.34E-002

AG
12/3/11

0000011183.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	1	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	1	0	0	0	0	0	1	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	1	0	0	0	0	0	0	0
81:	0	0	0	1	0	1	0	0
89:	0	1	0	0	0	1	1	0
97:	2	0	0	0	1	0	0	0
105:	0	0	0	0	0	0	0	1
113:	0	1	0	0	1	0	0	0
121:	1	0	1	0	0	0	1	0
129:	1	0	1	1	0	0	0	0
137:	0	1	0	0	0	1	0	1
145:	0	0	0	0	0	0	0	0
153:	0	0	0	1	0	0	0	0
161:	0	0	1	0	0	0	1	0
169:	0	0	0	0	0	1	0	0
177:	1	0	0	0	0	1	1	0
185:	0	0	0	0	0	1	0	0
193:	0	0	0	0	1	0	0	0
201:	1	0	0	0	0	0	1	0
209:	1	0	0	0	1	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	1	0	0	2
233:	0	0	0	0	0	2	1	0
241:	0	1	0	0	0	0	1	0
249:	0	1	1	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	2	0	0	0
273:	0	0	0	2	0	0	1	0
281:	0	1	0	0	1	2	0	0
289:	1	1	0	0	0	1	1	1
297:	0	1	0	0	0	0	1	0
305:	2	1	0	2	0	1	0	0
313:	2	0	0	0	1	1	0	0
321:	0	0	0	0	0	0	2	2
329:	0	1	0	0	0	0	0	2
337:	0	0	1	0	2	1	0	2
345:	0	1	0	0	3	0	0	1
353:	0	0	0	0	1	0	0	1
361:	0	0	0	0	0	0	1	0

369:	0	0	0	1	1	0	0	1

Sample Title: 03

Channel								
377:	0	0	0	0	0	0	1	1
385:	0	0	0	0	2	0	0	0
393:	2	2	1	0	0	0	2	0
401:	1	0	0	0	0	1	1	1
409:	0	0	2	0	1	0	0	0
417:	1	0	2	0	0	0	0	1
425:	0	0	1	1	1	2	0	0
433:	1	0	0	0	0	1	1	0
441:	2	1	0	1	0	0	0	0
449:	1	0	1	0	0	0	0	0
457:	0	0	0	0	0	1	0	0
465:	0	0	0	0	0	0	0	2
473:	0	1	1	1	0	1	0	0
481:	0	0	0	1	0	0	0	0
489:	0	0	0	1	0	2	0	1
497:	0	0	0	0	2	0	0	0
505:	0	1	2	0	0	0	0	0
513:	0	2	0	0	0	0	0	0
521:	1	0	0	0	0	1	0	0
529:	0	0	1	1	0	0	0	0
537:	0	0	0	0	2	0	0	0
545:	1	0	0	0	0	1	0	0
553:	1	0	0	1	0	0	0	1
561:	0	1	0	0	1	0	0	1
569:	1	0	1	0	0	0	0	0
577:	0	1	1	2	0	1	0	0
585:	0	0	0	0	0	0	0	0
593:	1	0	0	0	0	0	1	0
601:	2	1	1	0	0	0	0	0
609:	2	2	1	0	0	0	0	0
617:	0	0	1	0	0	0	1	0
625:	0	0	0	2	2	0	0	0
633:	4	0	0	0	0	0	0	0
641:	0	2	1	1	0	1	0	0
649:	0	0	1	0	1	1	0	0
657:	2	0	2	0	0	1	0	0
665:	1	0	0	1	1	1	1	1
673:	0	0	0	0	0	0	0	0
681:	0	1	0	2	0	0	0	0
689:	0	0	0	1	2	0	0	1
697:	1	0	0	0	0	0	2	0
705:	1	0	0	1	0	0	0	1
713:	0	1	1	0	0	1	0	0
721:	0	0	0	1	0	1	1	1
729:	1	1	1	1	0	1	0	2
737:	1	0	0	0	0	1	1	1
745:	0	0	0	1	1	1	0	0
753:	0	0	1	0	0	0	1	1
761:	0	0	0	0	0	0	0	1
769:	0	0	0	2	1	0	0	1
777:	0	0	1	0	0	2	0	0
785:	0	0	1	1	0	0	0	1
793:	1	1	0	1	1	0	0	0

801:	0	1	0	0	1	0	0	0

Sample Title: 03

Channel								
809:	1	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	0	0	0	0	0	0	0	0
833:	0	0	1	0	0	0	0	0
841:	1	0	0	1	0	0	0	0
849:	1	0	1	0	1	0	1	0
857:	3	1	0	0	0	0	0	0
865:	0	0	0	1	0	0	0	0
873:	1	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	0	0	0	0	1	1	0
897:	1	0	2	1	1	0	0	0
905:	0	0	1	0	0	0	0	0
913:	1	0	0	0	0	0	0	0
921:	0	0	2	0	1	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	2
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	1	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	1	0
977:	0	0	0	0	0	0	0	0
985:	1	0	0	0	1	0	0	0
993:	0	0	1	0	0	0	0	0
1001:	0	0	0	0	0	0	1	0
1009:	1	1	0	0	0	0	0	1
1017:	0	0	0	0	1	0	0	0

Apex-Alpha™

Sample Description: IB3-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011182.Cnf
Batch Identification: 1111140A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_022
Chamber Serial Number:
Detector Serial Number: 22
Env. Background: System Bkgd 10001
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.660E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:48 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1614 +/- 0.0026 on 9/4/2011 11:25:40 AM
Effective Efficiency: 0.1614 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.797	41.75	32.09	4.25	0.00E+000	3.1
RN-222	5.269	45.94	30.02	3.06	0.00E+000	3.9
RA-226	4.597	53.64	27.16	1.36	0.00E+000	4.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.973	6003.00*	1.82E+000 +/- 5.87E-001	4.38E-001 +/- 1.38E-002
RN-222	0.969	5490.00*	2.00E+000 +/- 6.05E-001	3.89E-001 +/- 1.23E-002
RA-226	0.978	4785.00*	2.34E+000 +/- 6.39E-001	2.99E-001 +/- 9.45E-003

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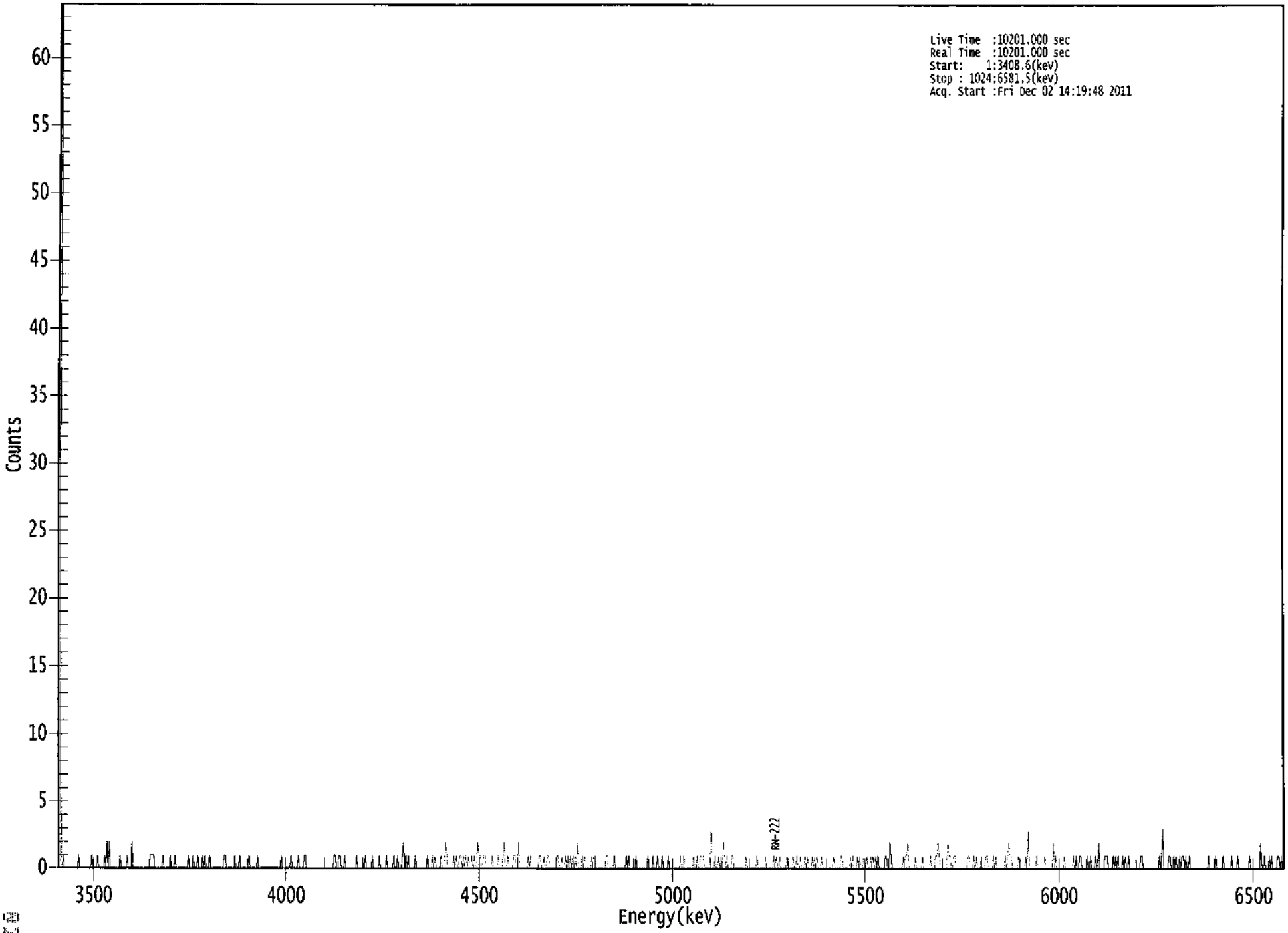
0000011182.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	1	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	1	0	0	0	0	0	0
25:	0	0	0	0	1	0	0	0
33:	0	1	0	0	0	0	0	1
41:	0	2	0	2	0	0	0	0
49:	0	0	0	0	1	0	0	0
57:	0	0	1	0	0	0	2	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	1	1	1
81:	1	0	0	0	0	0	0	0
89:	1	0	0	0	0	0	1	0
97:	0	0	1	0	0	0	0	0
105:	0	0	0	0	0	1	0	0
113:	0	1	0	0	0	1	0	0
121:	0	1	0	1	0	0	0	1
129:	0	0	0	0	0	0	0	0
137:	0	0	0	1	1	0	0	0
145:	0	0	0	0	1	0	0	0
153:	1	0	0	0	0	0	0	0
161:	1	0	0	0	0	0	0	1
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	1	0	0	0	0
193:	0	0	0	1	0	0	0	0
201:	0	1	0	0	0	0	1	1
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	1
233:	1	0	0	1	1	0	0	0
241:	1	0	0	0	0	0	0	0
249:	0	0	1	0	0	0	0	0
257:	0	1	0	0	0	0	0	1
265:	0	0	0	0	0	1	0	0
273:	0	0	0	1	0	0	0	0
281:	0	1	0	0	1	0	0	0
289:	1	2	0	1	0	1	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	0	1	0	0
313:	0	1	0	1	0	0	0	0
321:	1	0	0	0	2	1	0	0
329:	0	0	0	1	0	1	0	0
337:	1	1	0	1	0	1	0	1
345:	0	0	1	0	1	0	0	2
353:	1	1	0	0	1	1	0	0
361:	0	0	0	1	0	0	0	0

369:	1	0	0	0	1	2	0	0

Sample Title: 04

Channel								
377:	1	0	0	0	0	1	1	0
385:	0	2	0	0	0	0	0	0
393:	0	1	0	1	0	0	0	0
401:	0	0	1	1	0	0	1	0
409:	0	1	1	0	0	0	0	0
417:	0	1	1	0	0	1	0	0
425:	1	0	1	0	1	0	1	0
433:	1	0	2	0	0	0	1	0
441:	1	0	0	0	0	0	1	0
449:	1	1	0	0	0	0	0	0
457:	0	0	1	1	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	0	0	0	1	0	1	0	0
481:	0	0	0	1	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	0	1	0	0	0	1	0	0
505:	0	1	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	1	0	0	1	0	0	0	0
529:	0	0	0	1	0	0	1	0
537:	0	1	1	1	0	0	0	0
545:	0	1	3	0	0	1	0	0
553:	1	0	1	0	2	1	0	1
561:	0	0	0	1	1	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	0
585:	1	0	0	0	0	0	0	1
593:	0	0	0	0	0	0	1	0
601:	1	0	0	1	0	0	0	0
609:	0	1	0	0	0	0	1	0
617:	0	1	0	0	1	0	0	0
625:	1	0	1	0	0	0	1	0
633:	1	0	1	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	1	0	0	0	0	0	1	1
657:	0	0	0	0	0	0	1	0
665:	1	0	0	0	1	0	1	0
673:	0	1	1	0	1	0	0	1
681:	0	1	0	1	0	1	0	0
689:	0	0	0	1	1	0	0	2
697:	1	0	0	0	0	0	0	0
705:	0	0	1	0	1	1	2	0
713:	0	0	0	0	1	0	0	0
721:	0	0	1	0	0	0	0	0
729:	0	1	0	0	0	1	1	2
737:	1	0	0	0	0	0	0	2
745:	1	1	0	0	1	1	0	0
753:	0	0	0	0	0	0	0	0
761:	1	1	0	0	0	1	0	1
769:	0	0	0	1	0	0	0	1
777:	1	0	0	0	0	1	0	1
785:	0	0	0	0	0	0	0	1
793:	0	1	2	1	1	0	0	0

801:	0	0	1	0	0	0	0	0

Sample Title: 04

Channel								
809:	1	0	3	0	0	0	0	0
817:	0	1	0	0	0	0	0	0
825:	1	0	0	0	0	0	0	2
833:	0	1	0	0	0	0	0	0
841:	1	0	0	0	0	0	0	0
849:	1	0	1	0	0	1	1	0
857:	0	0	0	1	0	0	1	0
865:	0	0	1	0	0	2	0	0
873:	0	0	1	1	1	0	0	0
881:	0	1	0	1	0	1	0	0
889:	0	1	0	1	0	0	1	0
897:	0	0	0	0	0	0	0	0
905:	1	1	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	1
921:	0	1	3	0	0	0	0	1
929:	1	0	0	1	0	1	0	0
937:	1	0	1	1	0	1	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	1	0	0	0	0	0	1	0
969:	0	0	0	0	1	0	0	0
977:	0	0	0	1	0	0	0	0
985:	1	0	0	0	0	0	0	0
993:	0	0	1	0	0	0	0	0
1001:	0	0	0	2	0	0	1	0
1009:	0	0	1	0	1	0	0	0
1017:	0	1	1	0	1	0	0	0

Apex-Alpha™

Sample Description: IB3-7
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011184.cnf
Batch Identification: 1111140A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_023
Chamber Serial Number:
Detector Serial Number: 23
Env. Background: System Bkgd 10002
Reagent Blank: <not performed>

Sample Size: 1.021E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.470E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:49 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8423 +/- 0.0000
Counting Efficiency: 0.1625 +/- 0.0026 on 9/4/2011 12:49:03 AM
Effective Efficiency: 0.1369 +/- 0.0022

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.799	409.75	9.74	4.25	0.00E+000	5.2
RN-222	5.296	410.45	9.71	2.55	0.00E+000	11.9
RA-226	4.630	269.81	11.96	1.19	0.00E+000	4.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	1.92E+001 +/- 1.97E+000	4.71E-001 +/- 1.49E-002
RN-222	0.976	5490.00*	1.92E+001 +/- 1.97E+000	3.93E-001 +/- 1.25E-002
RA-226	0.985	4785.00*	1.26E+001 +/- 1.56E+000	3.09E-001 +/- 9.77E-003

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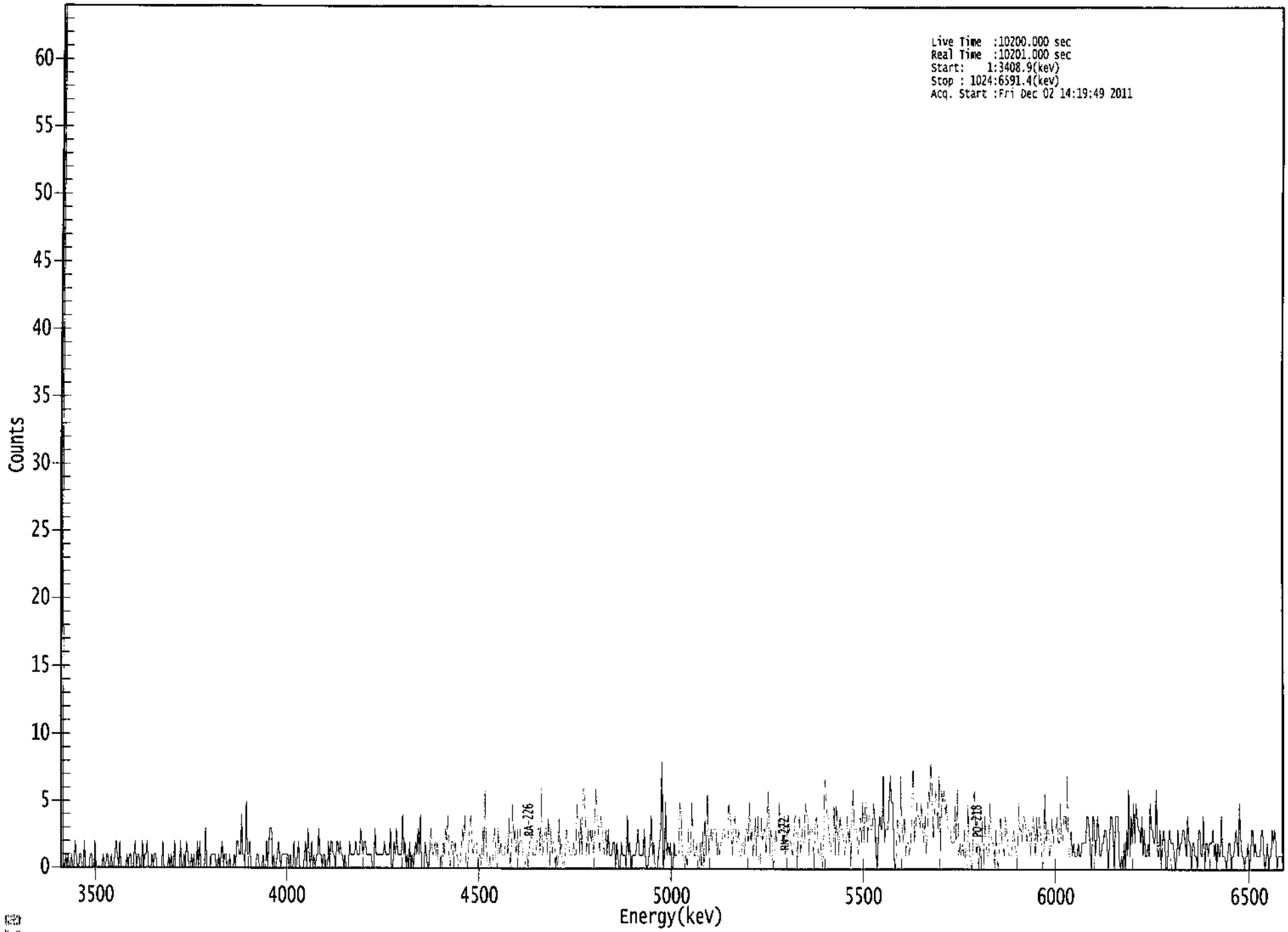
8718

0000011184.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10201

Channel								
1:	10201	10200	0	0	1	0	1	0
9:	0	1	0	0	2	1	0	0
17:	1	1	0	0	2	0	0	0
25:	0	1	1	0	0	2	0	0
33:	0	0	0	0	1	0	0	1
41:	1	0	0	1	0	0	1	2
49:	1	0	2	0	0	0	0	0
57:	1	0	1	1	0	0	1	2
65:	0	1	1	0	0	2	0	1
73:	1	2	0	0	0	1	0	1
81:	1	0	0	0	0	0	2	0
89:	0	0	0	1	0	1	0	0
97:	2	0	0	0	0	2	0	0
105:	1	0	2	1	0	0	1	0
113:	1	0	0	2	0	2	0	0
121:	0	0	3	0	0	0	0	1
129:	1	1	1	0	0	1	0	1
137:	2	0	1	1	0	0	1	0
145:	0	0	1	0	2	2	1	1
153:	4	1	1	0	5	1	1	2
161:	0	0	0	0	0	1	1	0
169:	0	0	1	0	0	2	0	2
177:	3	3	0	1	0	0	1	2
185:	1	0	1	1	1	1	1	1
193:	0	1	0	0	2	0	0	1
201:	2	0	0	0	0	1	2	0
209:	3	1	0	2	0	1	0	1
217:	1	3	1	1	0	1	1	0
225:	0	2	0	2	2	1	1	0
233:	2	2	1	2	1	1	0	1
241:	0	0	0	2	1	1	1	1
249:	2	1	1	1	3	2	1	2
257:	2	1	1	1	1	1	0	0
265:	3	1	1	1	1	1	1	1
273:	2	1	1	1	1	3	0	0
281:	2	1	3	1	1	1	1	4
289:	1	2	0	1	0	2	0	1
297:	0	1	2	1	3	1	4	0
305:	0	0	2	1	0	0	2	3
313:	1	1	2	1	2	0	0	1
321:	0	2	1	3	2	4	1	0
329:	2	2	0	2	1	1	0	0
337:	1	3	2	4	0	0	1	3
345:	4	2	1	2	2	2	0	1
353:	1	0	3	1	6	2	0	0
361:	1	0	0	2	3	1	0	3

369:	1	2	1	1	1	2	2	1

Sample Title: 05

Channel								
377:	4	0	2	5	2	3	1	3
385:	1	3	2	2	0	0	1	1
393:	0	2	2	3	1	1	1	2
401:	3	3	1	6	1	2	3	3
409:	1	4	0	3	1	2	2	0
417:	1	0	4	1	2	0	0	1
425:	3	2	2	1	1	1	2	1
433:	1	5	3	1	4	1	6	6
441:	4	1	3	1	3	2	3	1
449:	3	6	4	3	1	4	3	2
457:	1	3	1	3	1	1	1	2
465:	2	0	2	1	0	0	2	1
473:	1	1	0	4	1	2	0	1
481:	1	1	1	2	3	1	1	1
489:	1	3	1	0	0	1	2	4
497:	1	2	0	0	0	1	2	3
505:	8	0	1	5	1	2	1	2
513:	0	0	2	1	1	1	1	5
521:	4	1	1	0	1	0	3	1
529:	1	5	2	1	1	2	0	0
537:	2	0	3	0	4	1	6	1
545:	2	3	2	3	3	3	1	2
553:	1	2	2	3	3	2	2	2
561:	5	4	3	1	3	4	2	2
569:	3	1	1	2	2	1	3	3
577:	2	5	2	3	1	2	4	1
585:	4	0	0	4	2	3	3	1
593:	4	6	1	3	2	0	1	3
601:	2	3	5	3	3	2	4	1
609:	2	4	4	2	2	1	2	4
617:	4	0	3	4	1	3	2	2
625:	5	4	4	1	3	3	3	0
633:	3	4	3	1	1	2	0	1
641:	7	6	4	4	2	2	1	1
649:	5	1	5	3	1	4	3	3
657:	2	1	2	4	2	3	0	4
665:	6	3	3	3	1	2	4	2
673:	5	2	5	5	2	4	4	3
681:	3	5	4	1	0	3	4	3
689:	3	7	2	3	3	3	5	7
697:	5	5	1	0	1	4	3	2
705:	7	3	2	4	1	2	2	1
713:	2	4	8	2	3	5	4	4
721:	3	5	3	2	4	1	3	6
729:	5	8	6	2	4	6	5	3
737:	7	1	6	5	6	4	5	3
745:	3	3	2	2	2	5	2	6
753:	1	2	1	2	1	3	0	0
761:	5	1	1	0	1	6	5	1
769:	2	0	2	0	4	0	4	2
777:	1	1	5	3	2	2	0	3
785:	1	0	2	4	2	2	1	4
793:	3	2	1	1	1	2	3	2

801:	1	0	5	3	3	2	4	4

Sample Title: 05

Channel								
809:	3	2	3	3	1	3	4	3
817:	1	4	2	4	3	2	0	1
825:	6	2	3	3	1	2	4	2
833:	3	3	4	2	2	5	2	2
841:	4	4	3	7	1	1	3	1
849:	2	1	1	1	2	1	1	2
857:	2	2	2	4	4	3	1	0
865:	4	4	1	2	4	3	1	1
873:	2	2	3	3	2	0	2	4
881:	4	3	0	4	4	4	1	0
889:	1	0	2	0	3	1	6	1
897:	4	2	5	2	5	4	3	3
905:	2	4	1	3	1	1	2	1
913:	5	3	3	2	2	6	1	1
921:	3	0	2	3	2	0	0	2
929:	3	2	2	2	1	0	1	3
937:	1	2	2	3	3	2	1	4
945:	2	2	0	2	2	1	1	0
953:	3	3	1	1	4	0	2	2
961:	1	2	2	2	3	1	2	0
969:	2	1	1	4	1	1	1	0
977:	1	2	2	0	1	1	2	3
985:	2	1	5	2	1	1	0	1
993:	1	2	0	1	3	3	1	2
1001:	1	1	1	1	3	3	1	0
1009:	1	2	0	1	1	3	2	3
1017:	2	0	1	1	1	1	0	2

Apex-Alpha™

Sample Description: IB3-8
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011181.cnf
Batch Identification: 1111140A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_024
Chamber Serial Number:
Detector Serial Number: 24
Env. Background: System Bkgd 10003
Reagent Blank: <not performed>

Sample Size: 1.041E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:50 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8303 +/- 0.0000
Counting Efficiency: 0.1530 +/- 0.0025 on 9/4/2011 10:44:18 AM
Effective Efficiency: 0.1270 +/- 0.0021

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

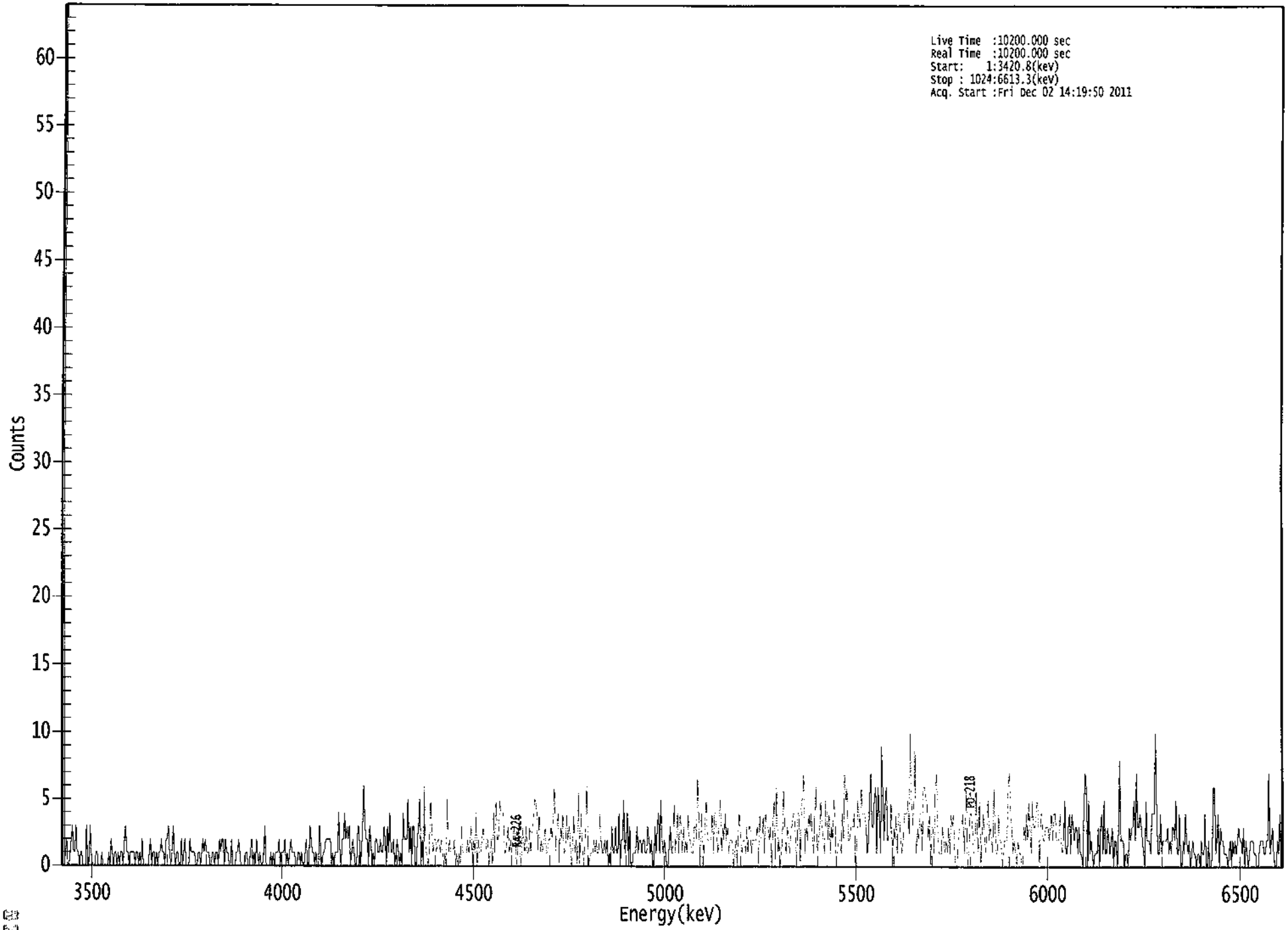
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.802	407.94	9.75	3.06	0.00E+000	5.1
RN-222	5.291	428.13	9.50	1.87	0.00E+000	4.9
RA-226	4.616	287.81	11.58	1.19	0.00E+000	3.1

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	2.00E+001 +/- 2.05E+000	4.37E-001 +/- 1.39E-002
RN-222	0.975	5490.00*	2.10E+001 +/- 2.10E+000	3.71E-001 +/- 1.18E-002
RA-226	0.982	4785.00*	1.41E+001 +/- 1.69E+000	3.22E-001 +/- 1.02E-002

AG
12/3/11

0000011181.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	1	2	0	0	1
9:	2	3	1	1	3	1	1	0
17:	1	1	0	0	0	3	0	0
25:	3	1	0	0	0	1	1	0
33:	0	0	1	0	0	0	0	0
41:	1	0	2	1	0	1	1	0
49:	1	0	1	1	0	2	3	1
57:	1	0	1	1	1	1	0	1
65:	1	0	1	0	2	0	0	0
73:	0	0	1	2	0	1	1	0
81:	1	0	1	1	2	1	1	0
89:	2	2	3	1	0	1	3	1
97:	0	1	1	0	0	2	0	1
105:	2	0	0	0	2	1	1	1
113:	1	0	0	1	1	0	1	2
121:	1	2	1	1	1	0	0	1
129:	1	0	1	1	0	2	1	2
137:	2	0	2	1	1	0	0	2
145:	0	0	0	1	1	2	1	0
153:	0	0	0	1	1	0	0	1
161:	2	0	1	0	2	1	0	1
169:	0	0	1	3	0	0	0	0
177:	1	0	1	0	1	1	1	2
185:	0	1	1	1	2	0	1	0
193:	1	2	1	1	1	0	0	1
201:	1	0	1	0	0	1	2	0
209:	0	3	2	1	1	0	1	0
217:	0	3	1	0	1	1	2	2
225:	2	2	2	0	1	0	1	1
233:	1	4	1	0	2	2	4	2
241:	3	2	3	0	1	2	1	0
249:	0	3	3	0	1	3	6	3
257:	2	2	0	3	2	0	1	0
265:	2	2	1	1	2	1	1	3
273:	2	0	3	1	4	1	1	2
281:	0	1	2	1	0	1	0	4
289:	2	2	2	5	1	3	0	3
297:	3	0	0	2	3	5	0	2
305:	0	6	1	1	0	1	5	3
313:	1	2	2	1	2	2	1	2
321:	1	0	1	0	5	1	2	1
329:	1	1	2	0	1	0	1	0
337:	3	1	1	1	1	2	1	2
345:	3	0	2	1	4	0	2	1
353:	1	2	3	1	1	2	2	0
361:	1	2	0	4	1	5	2	2

369:	5	4	4	4	1	1	2	3

Sample Title: 06

Channel								
377:	1	2	1	2	3	2	0	1
385:	4	1	0	3	2	1	3	1
393:	1	3	1	3	3	5	5	4
401:	1	4	1	2	1	2	3	1
409:	1	2	2	3	2	4	6	1
417:	3	4	0	3	2	4	1	1
425:	4	2	3	2	0	1	4	1
433:	2	0	6	0	4	2	0	1
441:	3	6	1	0	1	1	1	2
449:	1	2	1	1	4	2	1	1
457:	2	1	2	0	1	0	3	1
465:	1	3	1	1	4	0	2	2
473:	5	1	2	4	0	3	0	0
481:	1	1	1	3	1	2	2	1
489:	2	2	1	1	3	2	1	2
497:	0	0	3	1	3	4	1	5
505:	2	1	2	1	0	0	2	3
513:	1	1	5	1	2	4	1	4
521:	3	1	3	1	2	1	4	2
529:	2	1	1	3	3	2	7	3
537:	0	4	2	1	3	5	2	2
545:	2	2	4	1	4	4	2	1
553:	4	5	1	3	2	4	2	3
561:	1	2	2	2	0	1	2	0
569:	3	4	2	1	2	2	1	3
577:	1	3	3	1	2	2	2	2
585:	3	0	4	2	2	4	1	4
593:	3	3	2	3	0	3	5	0
601:	6	1	2	0	1	3	6	2
609:	1	3	2	1	3	3	4	4
617:	2	0	4	4	0	5	5	7
625:	1	3	2	4	3	4	2	1
633:	4	6	1	2	3	5	3	2
641:	1	5	4	2	4	1	3	2
649:	5	4	0	1	2	2	1	4
657:	2	7	5	6	2	2	3	3
665:	3	4	0	0	5	4	3	6
673:	4	4	4	3	1	2	5	7
681:	3	3	5	6	1	6	4	1
689:	9	5	2	5	6	2	2	2
697:	5	0	3	2	4	1	4	4
705:	2	1	2	4	4	4	5	2
713:	10	5	3	5	9	1	3	2
721:	4	4	1	6	6	5	5	2
729:	4	0	3	3	1	6	7	3
737:	1	1	1	3	2	1	2	1
745:	3	1	4	3	4	1	0	0
753:	2	3	3	3	4	1	3	6
761:	0	1	4	4	3	1	1	6
769:	3	1	5	0	2	4	3	1
777:	2	5	2	3	2	1	6	3
785:	1	1	4	2	2	0	1	2
793:	2	2	6	7	4	3	1	2

801:	1	0	2	1	1	0	0	3

Sample Title: 06

Channel								
809:	2	4	2	5	3	1	5	3
817:	3	4	5	4	0	4	4	2
825:	2	3	3	3	2	3	4	2
833:	4	4	2	2	2	4	2	1
841:	2	5	1	1	3	4	1	4
849:	3	2	3	3	1	3	1	1
857:	0	4	7	6	0	5	1	2
865:	1	0	1	1	1	3	0	3
873:	4	1	5	1	1	3	2	1
881:	2	3	0	2	2	0	2	8
889:	2	2	2	0	1	1	0	3
897:	2	3	3	5	2	7	3	3
905:	4	3	2	1	0	5	2	2
913:	2	1	4	4	4	10	3	1
921:	1	4	1	2	2	2	2	3
929:	1	2	1	3	3	2	5	1
937:	1	4	0	0	2	1	4	2
945:	1	2	0	1	2	1	1	0
953:	1	1	0	2	1	1	4	0
961:	0	2	0	0	1	6	6	1
969:	2	4	0	3	2	2	1	1
977:	1	0	1	2	0	2	1	2
985:	1	2	3	2	2	1	3	0
993:	2	1	0	1	2	2	2	1
1001:	1	0	0	1	2	2	2	1
1009:	1	2	2	7	1	2	3	1
1017:	0	0	2	1	4	0	3	2

Apex-Alpha™

Sample Description: IB3-9
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011185.cnf
Batch Identification: 1111140A-RA
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_025
Chamber Serial Number:
Detector Serial Number: 25
Env. Background: System Bkgd 10004
Reagent Blank: <not performed>

Sample Size: 1.017E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:51 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8906 +/- 0.0000
Counting Efficiency: 0.1672 +/- 0.0027 on 9/4/2011 10:45:06 AM
Effective Efficiency: 0.1489 +/- 0.0024

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.811	185.09	14.58	3.91	0.00E+000	6.5
RN-222	5.287	185.11	14.54	2.89	0.00E+000	4.2
RA-226	4.627	122.32	17.78	0.68	0.00E+000	11.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	7.90E+000 +/- 1.18E+000	4.16E-001 +/- 1.31E-002
RN-222	0.974	5490.00*	7.91E+000 +/- 1.18E+000	3.74E-001 +/- 1.18E-002
RA-226	0.984	4785.00*	5.22E+000 +/- 9.43E-001	2.41E-001 +/- 7.60E-003

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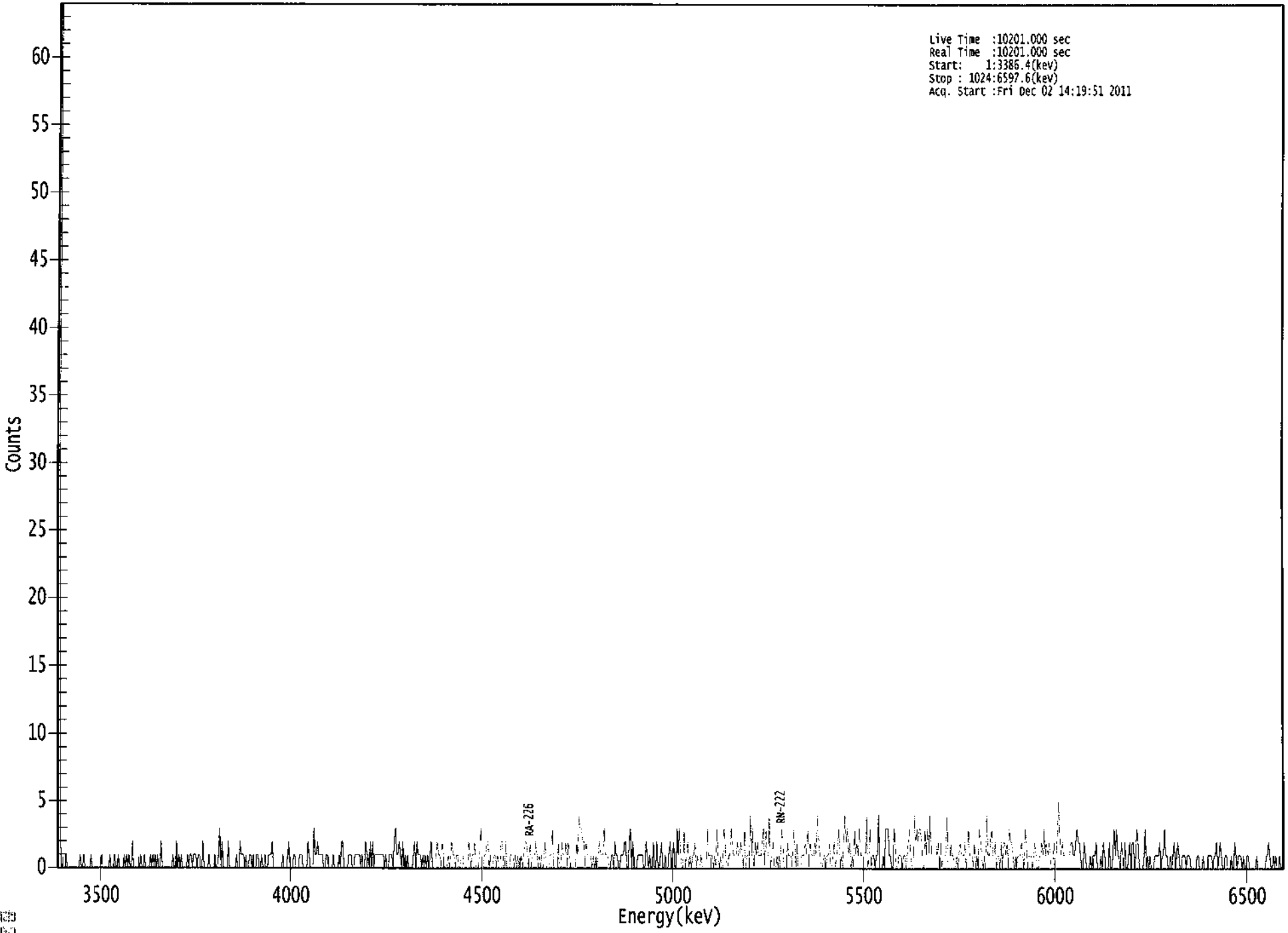
12/3/11

0000011185.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 07

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	3	0	0	0	0	1
9:	0	0	0	0	0	0	0	0
17:	0	0	0	1	0	0	1	0
25:	0	0	0	0	1	0	0	0
33:	0	0	0	0	0	1	0	0
41:	0	0	0	0	1	0	0	0
49:	1	0	0	1	0	0	0	0
57:	1	0	1	0	1	0	0	2
65:	0	0	0	0	0	0	1	0
73:	0	1	0	0	0	0	1	0
81:	1	0	1	0	1	0	0	2
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	2	0	1	0
105:	1	0	0	0	0	1	0	1
113:	1	0	1	1	1	0	1	1
121:	0	0	2	0	0	0	0	1
129:	0	0	0	0	1	0	0	1
137:	3	0	2	0	0	0	0	2
145:	0	0	0	0	0	0	1	0
153:	0	2	1	1	1	0	1	0
161:	0	1	1	0	1	0	0	1
169:	1	0	0	1	0	0	1	0
177:	0	1	1	1	2	0	0	0
185:	0	0	0	0	0	1	0	0
193:	0	1	2	0	0	0	1	1
201:	0	0	0	1	1	1	0	0
209:	0	0	2	1	0	0	0	3
217:	1	1	2	1	1	1	1	0
225:	0	1	1	0	0	0	0	1
233:	0	0	0	0	1	0	2	2
241:	0	0	0	0	1	1	1	0
249:	0	1	1	1	1	1	0	1
257:	0	0	2	1	1	0	2	0
265:	2	0	1	1	1	1	1	1
273:	1	1	0	1	0	0	1	1
281:	1	0	2	3	1	1	2	1
289:	0	2	0	1	0	1	0	0
297:	0	0	1	2	0	2	1	1
305:	1	0	1	0	1	0	1	0
313:	1	2	0	0	0	1	2	1
321:	1	0	2	1	0	0	0	1
329:	0	1	2	1	1	0	1	1
337:	0	0	1	1	0	0	0	0
345:	2	1	0	1	1	2	0	0
353:	0	1	3	0	0	1	1	2
361:	2	0	1	0	0	1	1	0

369:	1	0	0	2	2	0	0	2

Sample Title: 07

Channel								
377:	0	0	0	1	1	1	0	1
385:	0	1	0	0	1	0	1	2
393:	2	1	0	2	0	1	1	1
401:	2	1	0	1	0	1	0	1
409:	2	0	0	0	1	1	3	0
417:	0	0	0	2	0	0	2	1
425:	1	2	0	2	1	0	0	0
433:	0	0	2	1	4	3	3	2
441:	2	0	2	1	1	1	1	0
449:	1	0	1	0	1	2	1	1
457:	1	3	1	1	1	0	0	1
465:	1	0	2	1	1	0	0	1
473:	1	1	2	2	0	0	2	3
481:	0	2	0	0	0	1	1	1
489:	1	1	0	0	2	1	0	1
497:	0	0	2	0	0	2	0	0
505:	1	2	0	0	1	0	0	1
513:	2	0	1	2	0	0	3	1
521:	3	1	0	0	3	0	1	2
529:	0	1	0	1	1	2	0	1
537:	0	0	1	0	0	0	0	3
545:	1	1	1	1	0	1	0	3
553:	1	0	1	0	0	3	2	0
561:	0	1	1	3	2	1	1	1
569:	2	1	1	2	1	0	3	0
577:	1	1	1	4	1	3	0	2
585:	1	2	1	1	1	2	3	0
593:	3	1	1	4	0	1	2	0
601:	0	1	0	1	0	3	2	0
609:	0	0	2	1	1	1	0	3
617:	2	0	2	0	0	0	1	1
625:	1	2	1	3	0	2	1	1
633:	1	2	1	4	2	1	0	0
641:	1	1	0	1	1	2	0	0
649:	1	2	0	1	2	3	0	1
657:	0	2	4	2	3	1	2	0
665:	1	0	3	1	2	1	3	1
673:	1	1	0	0	4	0	1	3
681:	0	1	1	0	1	1	4	0
689:	0	0	1	0	3	3	3	1
697:	1	0	0	3	2	0	0	1
705:	1	1	0	1	1	0	1	2
713:	3	1	0	0	4	2	3	2
721:	3	3	2	0	0	3	1	3
729:	1	4	1	2	2	2	2	1
737:	2	0	2	0	1	1	1	4
745:	0	0	2	1	1	0	0	1
753:	0	1	2	1	1	1	2	0
761:	1	3	1	1	1	0	2	0
769:	1	0	3	2	1	0	1	0
777:	4	1	1	2	3	1	1	2
785:	0	1	1	0	2	0	2	2
793:	1	2	0	3	2	2	1	0

801:	1	0	1	1	1	2	1	0

Sample Title: 07

Channel								
809:	3	2	0	1	1	1	0	1
817:	2	1	0	0	1	1	2	1
825:	3	1	2	1	2	1	0	0
833:	2	1	1	3	5	2	1	2
841:	1	1	1	1	1	1	2	2
849:	1	1	2	3	2	2	1	0
857:	0	2	1	0	0	0	1	0
865:	1	1	1	2	0	0	0	1
873:	0	2	1	0	0	0	2	0
881:	0	1	3	1	3	1	1	0
889:	2	1	0	2	0	0	1	2
897:	0	2	2	0	1	3	2	0
905:	0	0	0	1	3	0	1	0
913:	1	0	0	0	1	1	1	1
921:	2	0	1	1	3	1	1	0
929:	0	1	0	1	2	0	1	2
937:	1	0	0	1	1	1	0	1
945:	1	1	0	0	0	0	0	1
953:	1	0	0	0	1	0	0	0
961:	1	1	1	1	0	1	1	2
969:	0	1	2	1	0	0	1	1
977:	0	0	0	1	0	0	2	1
985:	0	1	1	1	0	1	0	0
993:	1	1	0	0	0	0	0	0
1001:	1	0	0	0	0	0	0	0
1009:	1	1	2	1	0	0	1	0
1017:	1	0	0	1	0	0	1	0

KB
12/2/11

Apex-Alpha™

Sample Description: IB3-6A
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011186.cnf
Batch Identification: 1111140A-RA
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_026
Chamber Serial Number:
Detector Serial Number: 26
Env. Background: System Bkgd 10005
Reagent Blank: <not performed>

Sample Size: 1.053E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:52 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1583 +/- 0.0026 on 9/4/2011 10:46:49 AM
Effective Efficiency: 0.1583 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

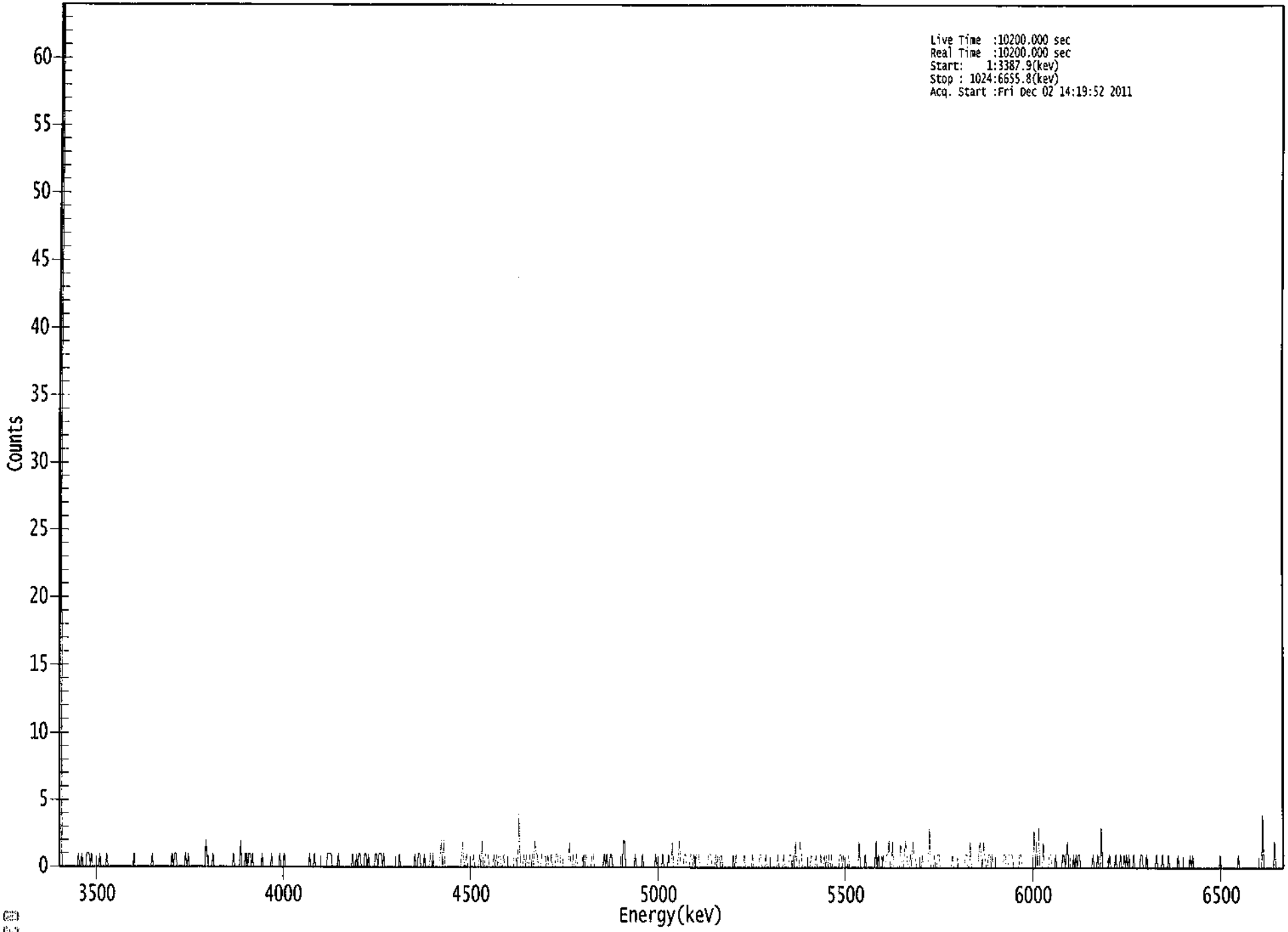
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.807	58.11	26.45	2.89	0.00E+000	3.2
RN-222	5.253	48.79	28.79	2.21	0.00E+000	3.2
RA-226	4.602	51.98	27.50	1.02	0.00E+000	3.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.56E+000 +/- 6.82E-001	3.86E-001 +/- 1.22E-002
RN-222	0.965	5490.00*	2.15E+000 +/- 6.23E-001	3.52E-001 +/- 1.12E-002
RA-226	0.979	4785.00*	2.29E+000 +/- 6.33E-001	2.77E-001 +/- 8.78E-003

AG
12/3/11

0000011186.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	1	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	1	0	0	1	0	0	0	1
25:	1	1	0	1	0	0	0	0
33:	0	0	1	0	0	0	0	0
41:	1	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	1
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	1	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	1
97:	0	1	1	0	0	0	0	0
105:	0	0	1	0	1	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	2	1	0	0	0
129:	0	1	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	1	0	0	0	0	0
153:	2	0	0	0	1	1	0	1
161:	1	0	1	0	0	0	0	0
169:	0	0	1	0	0	0	0	0
177:	0	0	1	0	0	0	0	0
185:	0	1	0	0	0	1	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	1	0
217:	0	0	0	0	0	0	0	0
225:	0	1	1	1	1	0	0	0
233:	0	0	1	0	0	0	0	0
241:	0	0	0	0	0	0	1	0
249:	0	1	0	1	1	0	0	0
257:	1	1	0	1	0	0	0	0
265:	0	1	1	0	1	1	1	0
273:	1	0	0	0	0	0	0	0
281:	0	0	0	0	0	1	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	0	1	1	0
305:	0	0	1	0	0	0	0	1
313:	0	1	0	0	0	0	0	1
321:	2	0	2	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	1	2	0	0	1	0	0
345:	0	0	0	1	0	0	0	0
353:	1	0	2	0	0	1	1	1
361:	0	0	0	0	1	0	1	0

369:	1	1	0	0	1	0	0	0

Sample Title: 08

Channel								
377:	0	0	0	0	0	1	1	0
385:	1	4	0	0	0	1	0	1
393:	0	0	1	0	1	0	2	1
401:	1	0	0	0	1	0	0	0
409:	0	1	0	0	1	0	0	0
417:	1	1	0	0	1	1	0	0
425:	0	0	0	2	0	0	1	0
433:	0	1	0	0	0	0	0	1
441:	0	1	0	0	0	0	1	1
449:	0	0	0	0	0	0	0	0
457:	1	0	1	0	0	1	1	0
465:	0	0	0	0	0	0	0	0
473:	2	2	0	0	0	0	0	0
481:	0	0	1	0	0	0	0	0
489:	1	0	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	0
505:	0	1	0	0	0	0	1	0
513:	0	2	0	0	0	0	1	2
521:	0	0	0	1	1	0	0	0
529:	1	1	0	1	0	1	1	1
537:	0	0	0	0	0	0	0	1
545:	1	1	0	0	0	1	0	1
553:	1	0	1	0	0	0	0	0
561:	0	0	0	0	1	0	1	0
569:	0	0	0	0	0	1	0	0
577:	0	0	0	0	1	0	0	0
585:	0	0	1	1	0	0	0	1
593:	0	0	0	0	0	0	0	0
601:	0	1	0	0	0	0	1	0
609:	0	0	0	1	1	0	1	0
617:	2	0	0	0	2	1	0	0
625:	0	0	0	0	0	1	0	0
633:	0	1	0	0	0	1	0	0
641:	1	0	1	0	1	0	1	0
649:	0	0	0	0	0	1	1	0
657:	1	0	0	0	1	0	0	0
665:	0	0	0	0	0	2	0	0
673:	0	0	1	0	0	0	0	0
681:	0	0	0	2	0	1	0	0
689:	1	1	0	0	1	1	2	0
697:	0	2	0	0	0	0	0	0
705:	2	0	0	1	2	1	0	0
713:	1	0	2	1	1	0	0	0
721:	0	0	1	0	0	0	0	0
729:	3	0	0	0	1	0	0	1
737:	1	0	0	0	0	0	0	0
745:	0	0	0	1	0	0	0	0
753:	0	0	0	0	0	0	1	1
761:	0	0	2	0	0	0	0	0
769:	0	1	2	1	0	2	1	0
777:	0	1	1	0	1	0	0	0
785:	0	0	0	0	0	0	1	1
793:	0	0	1	1	1	1	0	0

801:	0	0	0	1	1	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	3
817:	0	2	0	3	0	0	0	2
825:	0	0	0	0	1	1	0	0
833:	0	1	0	0	0	0	0	1
841:	1	0	1	2	0	0	0	0
849:	1	0	1	0	1	1	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	1	0	0	3
873:	0	0	0	0	0	0	1	0
881:	0	0	0	1	0	0	0	1
889:	0	0	1	0	1	0	1	0
897:	0	0	1	0	0	0	0	0
905:	1	1	0	0	0	1	0	0
913:	0	0	0	0	0	1	0	0
921:	0	0	1	0	0	0	0	1
929:	0	0	0	0	0	0	0	1
937:	0	0	0	0	0	0	0	0
945:	0	1	0	1	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	1	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	1	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	4	0	0
1009:	0	0	0	0	0	0	0	2
1017:	0	0	0	0	0	0	0	0

ICB 12/2/14

Apex-Alpha™

Sample Description: IB3-6B
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011187.cnf
Batch Identification: 1111140A-RA
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_028
Chamber Serial Number:
Detector Serial Number: 28
Env. Background: System Bkgd 10007
Reagent Blank: <not performed>

Sample Size: 1.029E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.820E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:53 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9574 +/- 0.0000
Counting Efficiency: 0.1845 +/- 0.0034 on 11/6/2011 1:01:18 PM
Effective Efficiency: 0.1766 +/- 0.0033

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

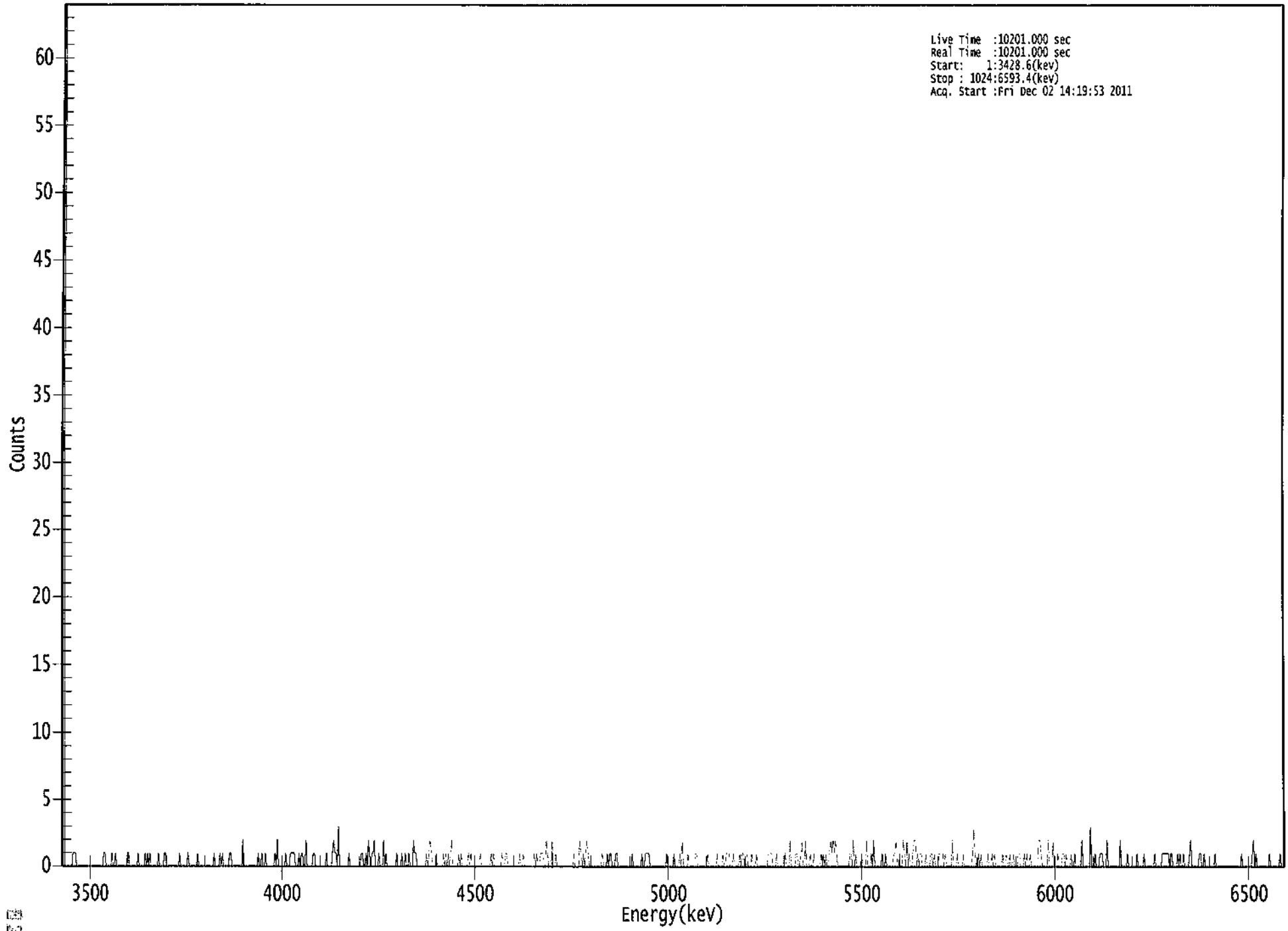
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.787	62.79	25.24	2.21	0.00E+000	4.6
RN-222	5.308	56.30	26.58	1.70	0.00E+000	3.1
RA-226	4.594	43.47	30.33	1.53	0.00E+000	6.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.971	6003.00*	2.58E+000 +/- 6.59E-001	3.29E-001 +/- 1.20E-002
RN-222	0.979	5490.00*	2.32E+000 +/- 6.22E-001	3.02E-001 +/- 1.10E-002
RA-226	0.977	4785.00*	1.79E+000 +/- 5.46E-001	2.92E-001 +/- 1.06E-002

AG
12/3/11

0000011187.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 09

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	1	1	1	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	1	1	0	0	0
41:	0	0	1	0	0	1	0	0
49:	0	0	0	0	0	0	0	1
57:	1	0	0	0	0	0	0	0
65:	1	0	0	0	0	0	1	0
73:	1	0	1	0	0	0	0	0
81:	0	1	0	0	0	0	1	1
89:	0	0	0	0	0	0	0	0
97:	0	0	0	1	0	0	0	0
105:	0	0	1	0	0	0	0	0
113:	0	0	1	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	1	0	0	0	0	1	0	1
137:	0	0	0	0	0	1	1	0
145:	0	0	0	0	0	0	0	0
153:	2	0	0	0	0	0	0	0
161:	0	0	0	0	0	1	0	0
169:	1	0	0	1	0	0	0	0
177:	0	0	0	1	0	2	0	0
185:	0	0	0	0	1	0	0	0
193:	1	1	1	1	0	0	0	1
201:	0	1	1	0	0	2	0	0
209:	0	0	0	1	1	0	0	0
217:	0	0	0	0	0	0	1	0
225:	0	0	0	1	2	1	1	0
233:	3	0	0	0	0	0	0	0
241:	0	1	0	0	0	0	0	0
249:	0	0	0	1	1	0	0	1
257:	0	2	1	0	1	1	2	0
265:	0	0	1	0	0	0	2	0
273:	1	0	0	0	0	0	0	0
281:	0	1	0	0	0	1	0	0
289:	1	0	0	1	0	0	0	2
297:	1	1	0	0	0	0	0	0
305:	0	0	1	0	1	2	1	0
313:	0	0	1	0	0	0	0	0
321:	1	0	1	0	1	0	1	2
329:	0	0	0	0	0	1	0	1
337:	0	0	0	0	0	1	0	1
345:	0	0	0	0	0	0	0	1
353:	0	0	0	0	0	0	0	0
361:	1	0	1	0	0	0	0	0

369:	0	1	0	0	1	1	0	0

Sample Title: 09

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	1	0	0	0	0
393:	0	0	0	0	1	0	1	0
401:	0	1	1	1	0	0	2	1
409:	0	0	0	2	0	0	1	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	1	0	0
433:	0	0	2	1	0	1	0	1
441:	2	1	0	0	0	0	0	0
449:	0	0	0	0	0	1	0	0
457:	0	1	0	1	1	0	0	0
465:	1	1	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	1	0
489:	0	1	1	1	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	1	0	0	0	0
513:	0	1	0	0	0	0	1	0
521:	2	0	0	0	0	1	0	0
529:	0	0	0	1	1	0	0	0
537:	0	0	0	0	0	1	0	0
545:	0	0	0	0	0	1	0	0
553:	0	0	1	0	0	1	1	1
561:	0	0	0	1	0	0	0	0
569:	1	0	1	1	0	0	1	0
577:	0	0	1	0	0	0	1	0
585:	0	0	0	0	0	0	0	0
593:	1	1	1	1	0	0	0	1
601:	0	0	0	0	0	0	1	0
609:	0	0	2	0	0	0	0	1
617:	1	0	0	1	2	0	0	2
625:	0	0	0	1	0	0	1	0
633:	0	0	0	0	1	0	1	0
641:	1	0	0	1	2	1	2	1
649:	2	1	0	0	0	0	0	0
657:	0	0	0	0	1	1	0	2
665:	0	1	0	0	0	0	1	0
673:	0	0	2	0	0	0	1	0
681:	2	0	0	0	0	0	0	1
689:	0	0	1	0	0	0	0	0
697:	0	1	1	2	0	0	1	0
705:	0	2	1	0	2	0	1	0
713:	0	1	2	2	0	1	0	1
721:	1	0	0	0	1	0	0	0
729:	1	1	0	1	0	0	0	1
737:	1	1	1	0	1	0	0	0
745:	0	0	2	0	0	0	1	0
753:	0	0	0	1	0	0	0	0
761:	0	0	0	1	3	1	0	0
769:	1	0	1	0	0	0	0	0
777:	1	0	0	1	0	1	0	0
785:	0	0	0	0	1	0	0	1
793:	0	0	1	0	0	1	0	0

801:	0	1	1	0	0	0	1	0

Sample Title: 09

Channel								
809:	1	0	0	1	0	0	0	0
817:	0	0	2	2	1	0	0	0
825:	0	0	2	0	0	0	2	0
833:	0	0	1	0	0	0	1	1
841:	0	1	0	0	0	1	0	0
849:	1	0	0	0	0	0	2	0
857:	0	0	0	0	0	3	0	0
865:	0	1	0	0	0	1	1	1
873:	0	0	0	2	0	0	0	0
881:	0	0	0	0	0	0	2	0
889:	0	0	0	0	1	0	0	0
897:	0	0	0	0	1	0	0	0
905:	0	0	1	0	0	0	0	0
913:	0	0	0	1	0	0	0	0
921:	0	1	1	1	1	1	1	0
929:	1	1	0	0	0	0	1	0
937:	1	0	0	1	0	0	0	0
945:	1	2	0	0	0	0	0	0
953:	1	1	0	0	1	0	0	0
961:	0	0	0	0	0	1	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	1	0	0	0	0
993:	0	0	0	0	1	2	0	1
1001:	0	0	0	0	0	0	0	0
1009:	0	0	1	0	0	0	0	0
1017:	0	0	0	1	0	0	0	1

KB
12/2/11

Apex-Alpha™

Sample Description: IB3-6C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011198.cnf
Batch Identification: 1111140A-RA
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_029
Chamber Serial Number:
Detector Serial Number: 29
Env. Background: System Bkgd 10008
Reagent Blank: <not performed>

Sample Size: 1.043E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:54 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1913 +/- 0.0037 on 10/23/2011 12:20:56 PM
Effective Efficiency: 0.1913 +/- 0.0037

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

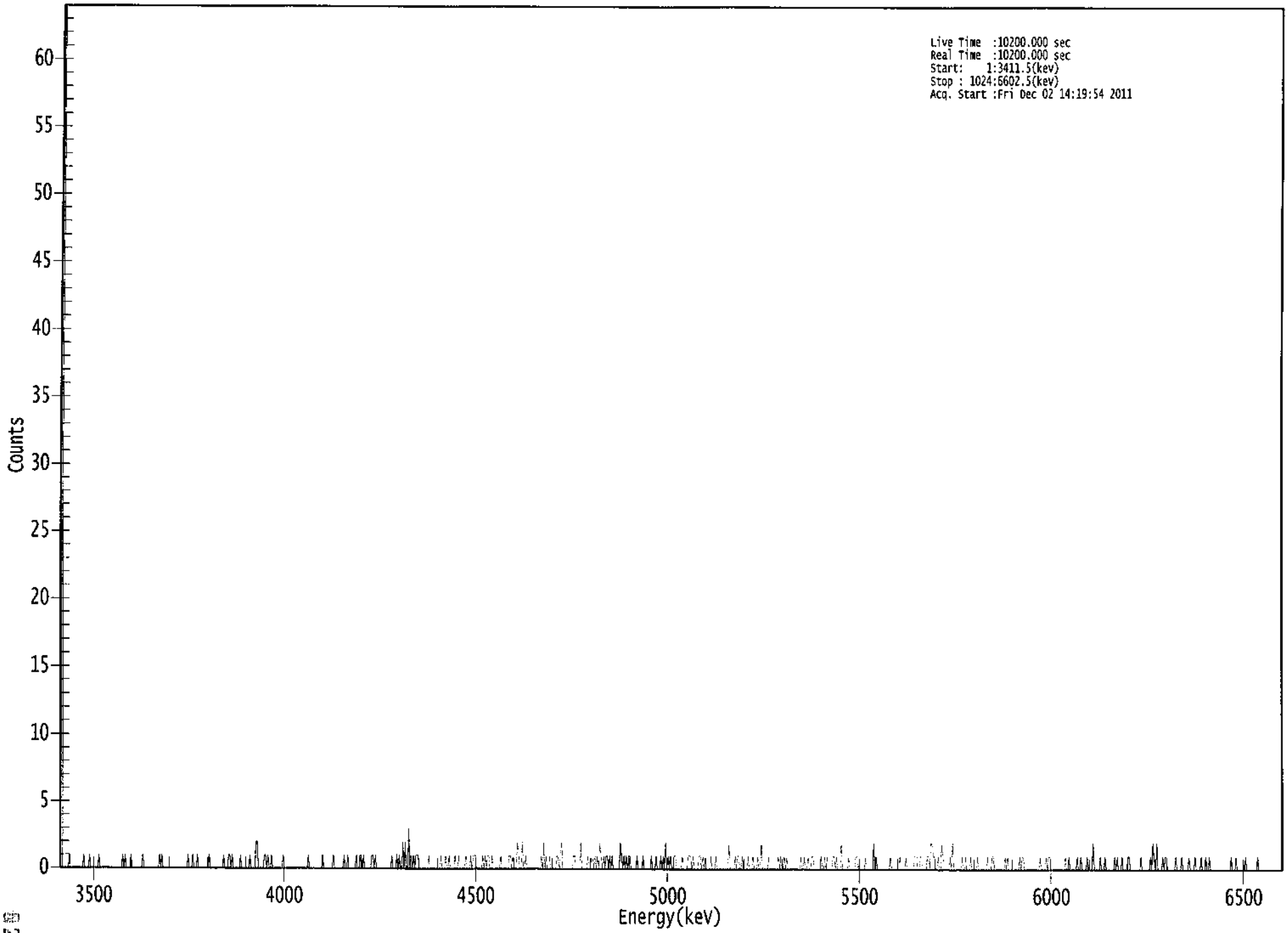
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.773	36.09	34.63	3.91	0.00E+000	7.8
RN-222	5.258	44.98	29.61	1.02	0.00E+000	3.1
RA-226	4.635	48.66	28.21	0.34	0.00E+000	4.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.967	6003.00*	1.33E+000 +/- 4.63E-001	3.58E-001 +/- 1.36E-002
RN-222	0.966	5490.00*	1.66E+000 +/- 4.94E-001	2.32E-001 +/- 8.81E-003
RA-226	0.986	4785.00*	1.79E+000 +/- 5.10E-001	1.76E-001 +/- 6.68E-003

AG
12/3/11

0000011198.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0
17:	0	0	0	0	1	0	0	0
25:	0	1	0	0	0	0	0	0
33:	0	1	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	0	1
57:	0	0	0	0	1	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	1	0	1	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	1	0	0	0
113:	1	0	0	0	1	0	0	0
121:	0	0	0	0	0	0	1	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	1	1
145:	0	1	0	0	0	0	0	0
153:	1	0	0	0	0	0	0	0
161:	1	0	0	0	0	2	2	0
169:	0	0	0	0	1	1	0	1
177:	0	0	1	0	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	1	0	0	0	0	0	0
217:	0	0	0	0	0	1	0	0
225:	0	0	0	0	0	0	1	0
233:	0	0	0	0	0	0	0	1
241:	0	0	1	0	0	0	0	0
249:	0	1	0	0	1	1	0	1
257:	0	0	0	0	0	0	1	1
265:	0	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	1
281:	0	0	0	1	0	1	0	0
289:	2	0	2	0	0	3	0	1
297:	0	1	0	1	1	1	0	0
305:	0	0	0	0	0	0	1	0
313:	0	0	0	0	0	0	0	0
321:	1	0	0	0	1	0	0	1
329:	0	0	0	0	1	0	0	1
337:	0	0	0	0	0	1	0	0
345:	0	1	0	1	1	1	0	0
353:	0	0	0	1	0	1	0	1
361:	1	0	0	1	0	0	0	0

369:	0	0	1	0	0	0	0	0

Sample Title: 10

Channel								
377:	0	1	1	0	1	0	0	0
385:	2	1	0	0	2	0	0	1
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	1	0	2	0
409:	1	0	0	1	0	0	0	0
417:	0	1	1	0	1	2	0	0
425:	0	0	0	0	0	0	0	1
433:	1	0	0	0	0	2	0	0
441:	0	0	0	1	0	0	1	1
449:	0	1	0	1	0	2	1	0
457:	1	0	1	1	0	1	0	1
465:	0	0	0	0	0	0	2	1
473:	0	1	0	1	0	1	1	0
481:	0	0	0	0	1	0	0	0
489:	0	1	0	0	0	0	0	0
497:	1	0	0	0	1	0	0	0
505:	1	0	1	0	2	0	1	0
513:	1	0	0	1	1	0	0	0
521:	0	0	1	0	0	0	0	1
529:	1	1	0	1	0	0	0	0
537:	1	1	0	1	0	1	0	0
545:	0	0	1	0	0	0	1	0
553:	0	0	0	0	0	0	0	0
561:	0	2	0	0	0	0	1	0
569:	1	1	0	0	1	0	0	0
577:	0	1	0	0	0	1	0	0
585:	0	1	0	0	2	0	0	0
593:	0	0	1	0	0	0	0	0
601:	0	0	1	0	1	0	0	1
609:	0	1	0	0	0	0	0	0
617:	0	0	0	0	0	1	0	0
625:	1	0	0	1	0	0	1	1
633:	0	0	0	0	0	0	1	0
641:	0	1	0	1	0	0	0	0
649:	1	1	0	1	0	0	0	2
657:	0	0	0	0	0	1	0	0
665:	0	0	0	1	1	0	0	0
673:	0	0	0	1	0	0	0	0
681:	0	0	2	0	1	0	0	0
689:	0	0	0	0	0	0	0	0
697:	1	0	0	0	0	0	0	0
705:	1	0	0	0	0	1	0	0
713:	0	0	0	0	1	1	1	0
721:	0	1	1	0	0	0	0	1
729:	1	0	2	2	1	1	0	0
737:	1	0	0	2	1	0	0	0
745:	0	0	1	0	2	0	0	0
753:	0	0	0	0	1	0	0	1
761:	0	0	0	1	0	0	0	0
769:	0	1	0	0	0	0	0	0
777:	0	1	0	0	0	1	1	0
785:	0	0	0	0	0	0	0	0
793:	1	0	1	0	0	0	0	0

801:	0	0	0	0	1	0	1	1

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	1	0	0
825:	0	0	1	0	1	1	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	1	0	0	1	0	0
849:	0	0	0	0	1	0	0	1
857:	0	0	0	0	1	0	0	0
865:	0	2	0	0	0	0	0	1
873:	0	0	0	1	0	0	0	0
881:	0	0	0	1	0	1	0	0
889:	0	1	0	0	0	0	1	1
897:	0	0	0	0	0	0	0	0
905:	0	1	0	0	0	0	0	0
913:	0	1	0	2	1	0	2	0
921:	0	0	0	1	0	1	1	0
929:	0	0	0	0	0	0	1	0
937:	0	0	0	1	0	0	0	0
945:	0	1	0	0	0	0	1	0
953:	0	0	0	1	0	0	0	1
961:	0	0	1	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	1	0	0	0
985:	1	0	0	0	0	0	0	0
993:	1	0	0	0	0	0	0	0
1001:	0	0	1	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/2/11

Apex-Alpha™

Sample Description: IB3-6D
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011199.cnf
Batch Identification: 1111140A-RA
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_030
Chamber Serial Number:
Detector Serial Number: 30
Env. Background: System Bkgd 10009
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.660E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 2:19:55 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9462 +/- 0.0000
Counting Efficiency: 0.1739 +/- 0.0033 on 10/22/2011 1:05:39 PM
Effective Efficiency: 0.1645 +/- 0.0031

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

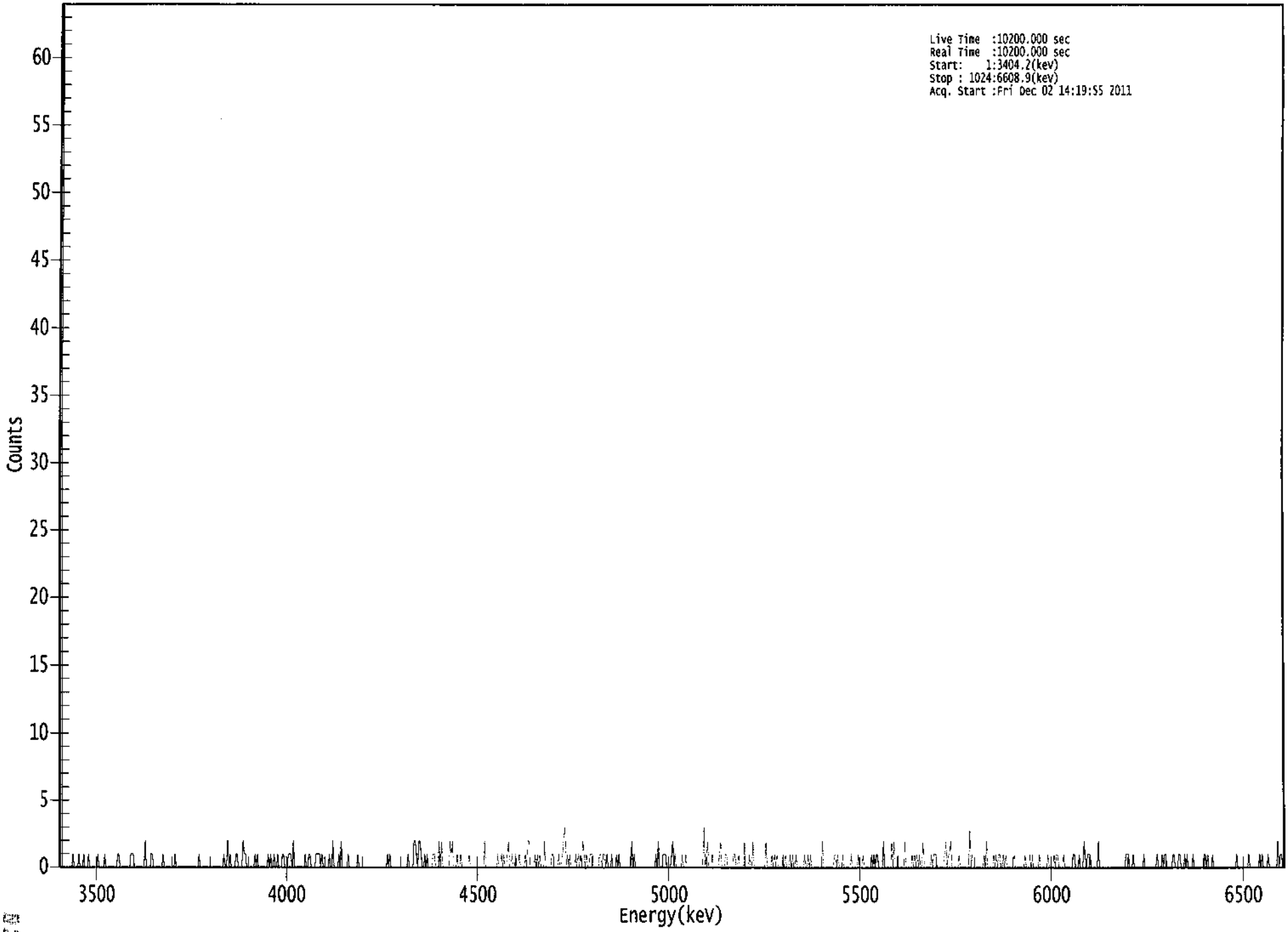
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.779	45.62	29.89	2.38	0.00E+000	3.1
RN-222	5.248	44.32	29.70	0.68	0.00E+000	3.1
RA-226	4.629	59.66	25.46	0.34	0.00E+000	6.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.968	6003.00*	1.95E+000 +/- 5.88E-001	3.51E-001 +/- 1.29E-002
RN-222	0.963	5490.00*	1.90E+000 +/- 5.68E-001	2.41E-001 +/- 8.86E-003
RA-226	0.985	4785.00*	2.55E+000 +/- 6.56E-001	2.04E-001 +/- 7.51E-003

AG 12/3/11

0000011199.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	1	0	0	0	0
17:	1	0	0	0	1	0	0	0
25:	1	0	0	0	0	0	0	0
33:	1	0	0	0	0	0	1	0
41:	0	0	0	0	0	0	0	0
49:	0	1	1	0	0	0	0	0
57:	0	0	0	0	1	1	1	0
65:	0	0	0	0	0	0	0	0
73:	2	0	0	0	0	1	1	0
81:	0	0	0	0	0	0	0	1
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	1	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	2	0	1
145:	0	0	0	0	1	1	0	0
153:	0	0	2	1	1	0	0	0
161:	0	0	0	0	1	0	1	0
169:	0	0	0	0	0	0	0	1
177:	0	1	0	0	1	0	0	1
185:	0	0	0	1	1	0	0	0
193:	1	1	1	0	2	0	0	0
201:	0	0	0	0	0	0	1	0
209:	0	1	1	0	0	0	0	1
217:	1	1	1	0	1	0	0	0
225:	0	0	1	0	0	2	0	0
233:	0	0	1	0	2	0	0	0
241:	0	0	1	0	0	0	0	0
249:	0	0	1	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	1	0	1	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	1	0	0	0
297:	0	2	2	1	0	2	2	1
305:	0	0	1	0	1	0	0	0
313:	0	1	1	0	0	0	2	0
321:	2	0	0	0	0	0	0	2
329:	1	2	0	0	0	1	0	0
337:	1	0	0	0	0	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	2	0	0	0
361:	0	0	0	0	0	0	0	1

369:	0	0	1	0	1	0	0	1

Sample Title: 11

Channel								
377:	2	0	0	1	0	0	1	0
385:	0	1	0	0	0	0	1	0
393:	2	2	0	0	0	0	1	0
401:	1	0	1	0	0	0	2	0
409:	0	0	0	0	1	1	0	0
417:	0	0	1	0	0	1	2	3
425:	0	1	0	1	0	0	0	0
433:	1	0	1	0	1	0	2	1
441:	0	1	0	0	1	1	1	0
449:	0	0	0	0	1	1	0	1
457:	1	0	1	0	0	0	1	0
465:	0	0	1	0	1	0	0	0
473:	0	0	0	0	0	0	0	2
481:	0	1	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	1	0	2	0	0
505:	0	1	1	1	0	0	0	0
513:	1	2	0	1	0	0	0	0
521:	0	1	0	0	1	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	3	0	1	2	0
545:	0	0	1	0	0	0	0	0
553:	1	2	0	0	0	1	1	0
561:	0	0	0	0	1	1	0	0
569:	1	0	0	0	0	2	0	0
577:	0	1	0	0	2	0	0	0
585:	0	0	0	0	0	0	0	2
593:	0	0	0	0	1	0	1	0
601:	1	0	0	0	0	1	0	1
609:	0	0	0	1	0	1	0	0
617:	1	0	0	0	0	0	0	1
625:	0	0	1	0	1	0	0	0
633:	0	0	0	0	0	0	2	0
641:	0	0	0	0	0	0	0	0
649:	1	1	0	1	0	0	0	1
657:	0	0	0	0	0	0	1	0
665:	0	0	0	0	1	0	0	0
673:	1	0	0	0	0	0	0	1
681:	0	1	0	1	1	0	0	0
689:	0	2	0	0	0	0	0	0
697:	2	0	2	0	0	1	0	0
705:	0	0	0	2	0	0	0	0
713:	0	1	0	1	0	1	0	1
721:	0	0	2	0	0	0	0	0
729:	0	1	0	1	1	1	0	0
737:	0	0	0	0	1	2	0	1
745:	1	2	0	0	0	0	0	0
753:	1	0	0	0	0	0	0	0
761:	0	3	0	1	0	0	0	0
769:	0	0	0	0	0	1	0	2
777:	0	0	0	0	0	1	0	1
785:	0	1	1	0	0	1	0	1
793:	0	0	0	0	0	0	1	0

801:	0	0	0	0	0	0	0	1

Sample Title: 11

Channel								
809:	0	0	0	1	0	1	0	0
817:	0	0	0	1	0	0	0	0
825:	0	0	1	0	0	0	0	1
833:	0	1	1	0	0	0	0	1
841:	0	0	0	0	0	0	0	1
849:	1	0	0	0	1	0	0	0
857:	2	1	0	1	1	1	0	0
865:	0	0	0	0	2	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	1	1	1	0	0
897:	0	1	0	0	0	0	0	0
905:	0	0	1	0	0	0	0	0
913:	0	0	0	0	0	1	0	0
921:	0	1	0	1	1	0	0	0
929:	0	0	1	1	0	0	0	1
937:	1	0	0	0	1	0	1	0
945:	0	0	0	1	0	0	0	0
953:	0	0	0	0	1	1	0	1
961:	0	0	0	1	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	1
985:	0	0	0	0	0	0	0	0
993:	0	1	0	0	0	0	0	0
1001:	0	0	1	0	1	0	0	0
1009:	0	1	0	0	0	0	0	0
1017:	0	2	0	1	1	0	0	0

ICB
12/2/14

Apex-Alpha™

Sample Description: IB3-6E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011143.cnf
Batch Identification: 1111140A-RA
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_017
Chamber Serial Number:
Detector Serial Number: 17
Env. Background: System Bkgd 9997
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.870E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:13 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9895 +/- 0.0000
Counting Efficiency: 0.1746 +/- 0.0028 on 9/4/2011 10:54:36 AM
Effective Efficiency: 0.1727 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

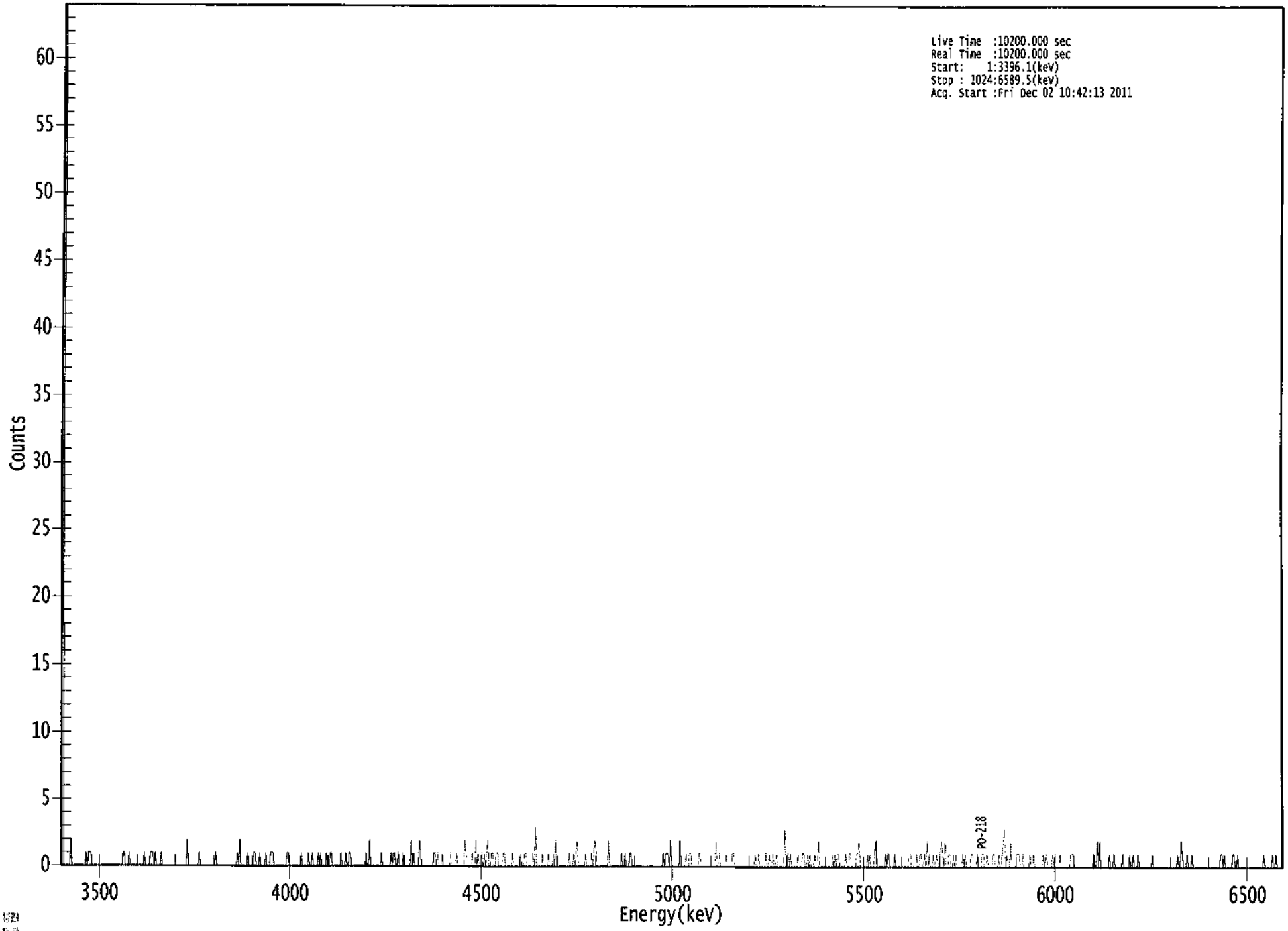
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.807	51.09	28.62	3.91	0.00E+000	6.2
RN-222	5.303	41.94	31.53	3.06	0.00E+000	3.1
RA-226	4.598	48.81	28.45	1.19	0.00E+000	3.1

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.25E+000 +/- 6.47E-001	4.28E-001 +/- 1.35E-002
RN-222	0.978	5490.00*	1.85E+000 +/- 5.85E-001	3.93E-001 +/- 1.24E-002
RA-226	0.978	4785.00*	2.15E+000 +/- 6.14E-001	2.90E-001 +/- 9.15E-003

AG
12/3/11

0000011143.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 12

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	2	0	0	0	0	0	0	0
17:	0	0	0	0	0	1	0	1
25:	1	1	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	1	1	0	0
57:	0	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	1	1	1	0	1
81:	0	0	0	0	1	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	2	0	0	0	0	0
113:	0	0	0	0	1	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	1	0	2	0
153:	0	0	0	0	0	1	0	0
161:	0	0	1	1	0	0	0	1
169:	0	0	0	0	1	0	0	0
177:	1	1	1	0	0	0	0	0
185:	0	0	0	0	0	0	1	1
193:	0	0	0	0	0	0	0	0
201:	0	0	1	0	0	0	0	0
209:	1	0	0	1	0	0	0	0
217:	1	0	1	0	0	0	0	1
225:	0	0	1	1	0	0	0	0
233:	0	0	0	1	0	0	0	1
241:	0	0	1	1	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	1	0	0	2	0	0	0	0
265:	0	0	0	0	0	1	0	0
273:	0	0	0	0	0	1	0	1
281:	1	0	0	1	0	0	0	1
289:	0	0	0	0	0	0	2	0
297:	1	0	0	0	0	2	1	0
305:	0	0	0	0	0	0	0	0
313:	0	1	1	0	1	0	0	0
321:	1	0	0	0	0	0	0	1
329:	0	0	0	0	1	0	0	0
337:	0	0	0	2	1	0	0	0
345:	0	1	0	0	2	0	1	0
353:	0	1	0	1	0	1	2	0
361:	0	1	1	0	0	1	1	0

369:	0	0	0	1	1	0	0	0

Sample Title: 12

Channel								
377:	0	0	0	1	0	0	0	0
385:	0	0	1	0	0	1	1	0
393:	0	0	0	0	1	0	3	0
401:	0	0	0	0	1	0	0	0
409:	0	1	0	0	0	1	0	2
417:	0	0	0	0	0	0	0	0
425:	0	0	1	0	0	0	1	0
433:	1	2	0	0	0	0	0	0
441:	1	0	0	0	0	1	0	1
449:	2	1	0	0	0	0	0	0
457:	0	0	0	2	0	0	0	0
465:	0	0	0	0	0	0	1	0
473:	0	1	0	0	0	1	1	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	1	0	1	1	1	0	2
513:	0	0	0	0	0	0	0	2
521:	0	0	0	0	1	0	0	1
529:	1	0	0	0	0	0	0	1
537:	1	0	0	0	0	0	0	0
545:	0	0	0	0	0	2	0	0
553:	1	0	0	0	0	0	1	0
561:	0	0	0	1	1	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	1	0
585:	0	1	0	0	0	0	0	1
593:	0	0	1	0	0	1	0	0
601:	1	0	0	0	0	0	0	3
609:	0	1	1	0	1	0	0	0
617:	0	0	1	0	0	0	1	1
625:	0	0	1	0	1	0	0	0
633:	1	0	0	2	0	0	0	0
641:	0	0	0	0	0	0	0	1
649:	0	1	0	1	1	0	0	0
657:	0	0	1	0	0	1	1	0
665:	0	0	0	1	1	2	0	0
673:	0	0	0	0	1	0	1	0
681:	0	0	1	2	0	0	0	0
689:	0	0	0	1	0	1	1	0
697:	0	0	0	1	0	0	0	0
705:	0	0	0	0	0	0	0	1
713:	1	0	0	0	0	1	0	0
721:	1	1	0	0	1	0	2	0
729:	1	0	0	1	0	0	1	0
737:	0	1	2	1	0	2	0	0
745:	1	1	0	0	1	0	1	0
753:	0	0	0	0	1	0	1	0
761:	0	0	0	1	1	0	0	0
769:	1	0	0	0	1	1	0	0
777:	1	0	0	0	0	1	1	0
785:	0	0	1	0	0	1	2	3
793:	0	1	0	0	2	0	0	0

801:	0	1	1	1	0	0	1	0

Sample Title: 12

Channel								
809:	0	0	0	0	1	0	0	1
817:	0	0	0	0	0	0	0	1
825:	0	1	1	0	0	0	0	1
833:	0	1	0	0	0	1	0	0
841:	0	0	0	0	0	0	1	1
849:	1	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	1	0	0	2	0	2	0
873:	0	0	0	0	0	0	1	0
881:	0	0	1	0	0	0	0	0
889:	0	1	0	0	0	0	0	1
897:	0	0	1	0	0	0	1	0
905:	0	0	0	0	0	0	0	0
913:	0	0	1	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	1
937:	0	0	2	1	0	0	0	1
945:	0	0	0	1	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	1	1	0	1	0
977:	0	0	0	0	0	1	1	0
985:	0	1	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	1
1009:	0	0	0	0	0	0	1	0
1017:	0	1	0	0	0	0	0	0

1CB
12/2/11

Apex-Alpha™

Sample Description: IB4-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011148.cnf
Batch Identification: 1111140A-RA
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_020
Chamber Serial Number:
Detector Serial Number: 20
Env. Background: System Bkgd 9999
Reagent Blank: <not performed>

Sample Size: 1.021E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:15 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9349 +/- 0.0000
Counting Efficiency: 0.2073 +/- 0.0033 on 9/4/2011 11:23:25 AM
Effective Efficiency: 0.1938 +/- 0.0031

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

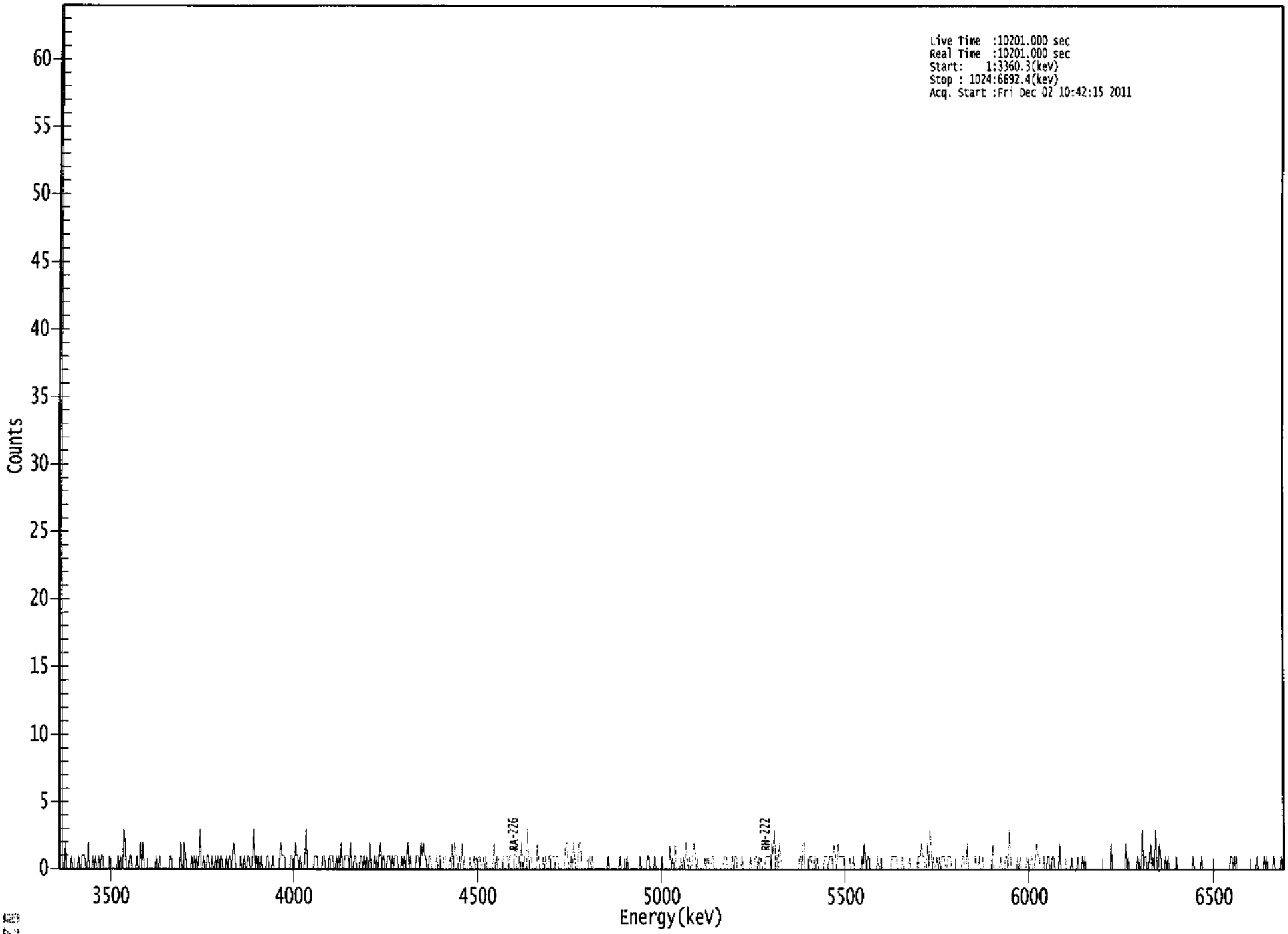
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.815	57.98	26.00	1.02	0.00E+000	5.7
RN-222	5.284	73.66	22.90	0.34	0.00E+000	4.1
RA-226	4.601	76.64	22.62	1.36	0.00E+000	3.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.978	6003.00*	2.15E+000 +/- 5.63E-001	2.34E-001 +/- 7.30E-003
RN-222	0.973	5490.00*	2.73E+000 +/- 6.32E-001	1.77E-001 +/- 5.54E-003
RA-226	0.978	4785.00*	2.84E+000 +/- 6.49E-001	2.54E-001 +/- 7.94E-003

AG
12/3/11

0000011148.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 13

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	1	0	0	2	0	0
9:	0	0	1	0	0	0	0	0
17:	1	0	0	1	1	1	0	0
25:	2	0	0	0	1	0	1	0
33:	0	1	0	1	1	0	0	0
41:	0	0	1	0	0	0	0	0
49:	0	1	0	1	0	0	3	2
57:	0	0	0	1	1	0	0	0
65:	0	1	0	0	2	0	2	0
73:	0	0	0	0	0	0	0	0
81:	0	1	0	0	1	0	0	0
89:	0	0	0	0	0	1	1	0
97:	0	0	0	0	0	0	2	0
105:	0	2	1	0	0	0	0	1
113:	0	1	0	1	0	1	3	0
121:	0	1	0	0	1	1	0	0
129:	1	0	0	1	0	1	0	1
137:	1	0	0	0	1	0	1	1
145:	0	1	2	1	0	0	0	0
153:	1	0	0	1	0	0	1	1
161:	0	0	1	3	0	1	0	1
169:	0	1	0	0	0	0	1	1
177:	0	0	0	1	0	0	0	0
185:	0	1	2	1	1	1	0	0
193:	0	0	1	1	0	0	2	1
201:	1	0	1	0	0	0	1	3
209:	0	0	0	0	0	0	1	1
217:	1	0	0	0	0	1	1	0
225:	0	0	1	1	1	1	0	0
233:	1	0	1	0	2	0	0	1
241:	1	1	1	0	2	0	0	1
249:	1	0	0	0	1	1	0	1
257:	0	1	0	0	2	0	0	0
265:	1	0	1	0	1	2	0	1
273:	1	0	0	1	1	1	0	1
281:	0	1	1	1	0	0	0	1
289:	0	1	0	1	2	0	1	0
297:	0	0	0	1	1	1	0	2
305:	1	2	1	1	0	0	1	1
313:	0	0	0	0	1	0	1	1
321:	0	0	1	1	0	0	0	1
329:	0	2	0	2	1	1	0	1
337:	0	2	0	1	0	0	0	0
345:	1	0	0	1	0	1	0	1
353:	1	0	0	1	0	1	0	0
361:	0	0	0	0	2	0	1	0

369:	1	1	1	0	1	1	1	1

Sample Title: 13

Channel								
377:	0	1	1	1	1	1	2	0
385:	0	1	0	2	0	1	0	0
393:	3	0	1	1	0	0	0	0
401:	2	1	0	0	0	1	0	1
409:	0	0	1	1	1	1	1	0
417:	1	1	0	0	0	0	0	1
425:	2	2	0	0	1	0	2	1
433:	0	0	1	2	2	0	0	0
441:	0	0	0	0	1	0	1	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	1	0	0	0	0
465:	0	0	0	0	0	1	0	0
473:	0	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	1	0
489:	0	0	0	0	1	1	0	0
497:	0	0	1	0	0	0	0	0
505:	1	0	0	0	0	0	0	2
513:	0	1	0	2	0	0	0	0
521:	1	0	1	0	2	1	0	1
529:	0	0	1	2	1	0	0	0
537:	0	0	0	0	1	0	1	1
545:	0	0	1	1	0	0	0	0
553:	0	0	0	0	1	1	1	0
561:	0	0	0	1	0	1	1	0
569:	0	0	0	1	0	0	0	0
577:	0	0	1	0	0	0	1	1
585:	0	1	0	1	0	0	0	1
593:	1	1	1	0	2	1	3	0
601:	1	0	2	1	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	1	1	0	2	2
625:	0	0	0	0	1	1	0	0
633:	1	0	1	0	0	0	0	0
641:	1	1	1	0	1	1	1	0
649:	2	1	0	2	1	1	1	1
657:	1	0	0	0	0	1	0	0
665:	1	0	0	0	0	0	0	1
673:	0	2	1	0	1	1	0	0
681:	0	0	0	0	1	0	0	1
689:	0	0	0	0	0	0	0	0
697:	1	1	1	1	1	0	0	0
705:	0	1	0	0	0	0	0	1
713:	0	0	0	0	0	0	1	1
721:	1	2	1	1	0	0	2	0
729:	3	2	0	1	0	0	1	0
737:	1	0	1	1	1	0	0	1
745:	1	1	0	0	0	0	0	0
753:	0	0	0	1	1	0	0	2
761:	0	0	0	0	0	0	1	0
769:	0	1	0	0	1	0	0	0
777:	0	0	0	0	2	0	0	0
785:	0	0	0	1	0	0	0	1
793:	1	0	3	1	0	0	0	0

801:	0	1	0	1	0	0	0	0

Sample Title: 13

Channel								
809:	0	1	0	0	1	1	0	0
817:	1	2	1	1	0	0	0	1
825:	0	0	1	1	0	0	1	1
833:	0	0	0	0	2	0	0	0
841:	0	0	0	0	0	0	1	0
849:	0	0	0	1	0	0	0	1
857:	0	1	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	2
881:	0	0	0	0	0	0	0	0
889:	0	0	0	2	0	1	0	0
897:	0	0	0	0	0	1	0	0
905:	0	3	0	1	1	0	0	1
913:	2	0	1	0	3	0	0	2
921:	1	0	0	0	1	0	1	0
929:	0	0	0	0	0	1	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	1	0	0	0	0
953:	0	0	1	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	1	1	0	1	0	1
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	1	0	0	0	0	0	1	0
1009:	1	0	0	0	0	0	1	0
1017:	0	0	0	0	1	0	1	0

ICB 12/2/14

Apex-Alpha™

Sample Description: IB4-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011147.cnf
Batch Identification: 1111140A-RA
Sample Identification: 14
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_021
Chamber Serial Number:
Detector Serial Number: 21
Env. Background: System Bkgd 10000
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.870E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:16 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9771 +/- 0.0000
Counting Efficiency: 0.1620 +/- 0.0026 on 9/4/2011 11:24:40 AM
Effective Efficiency: 0.1583 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

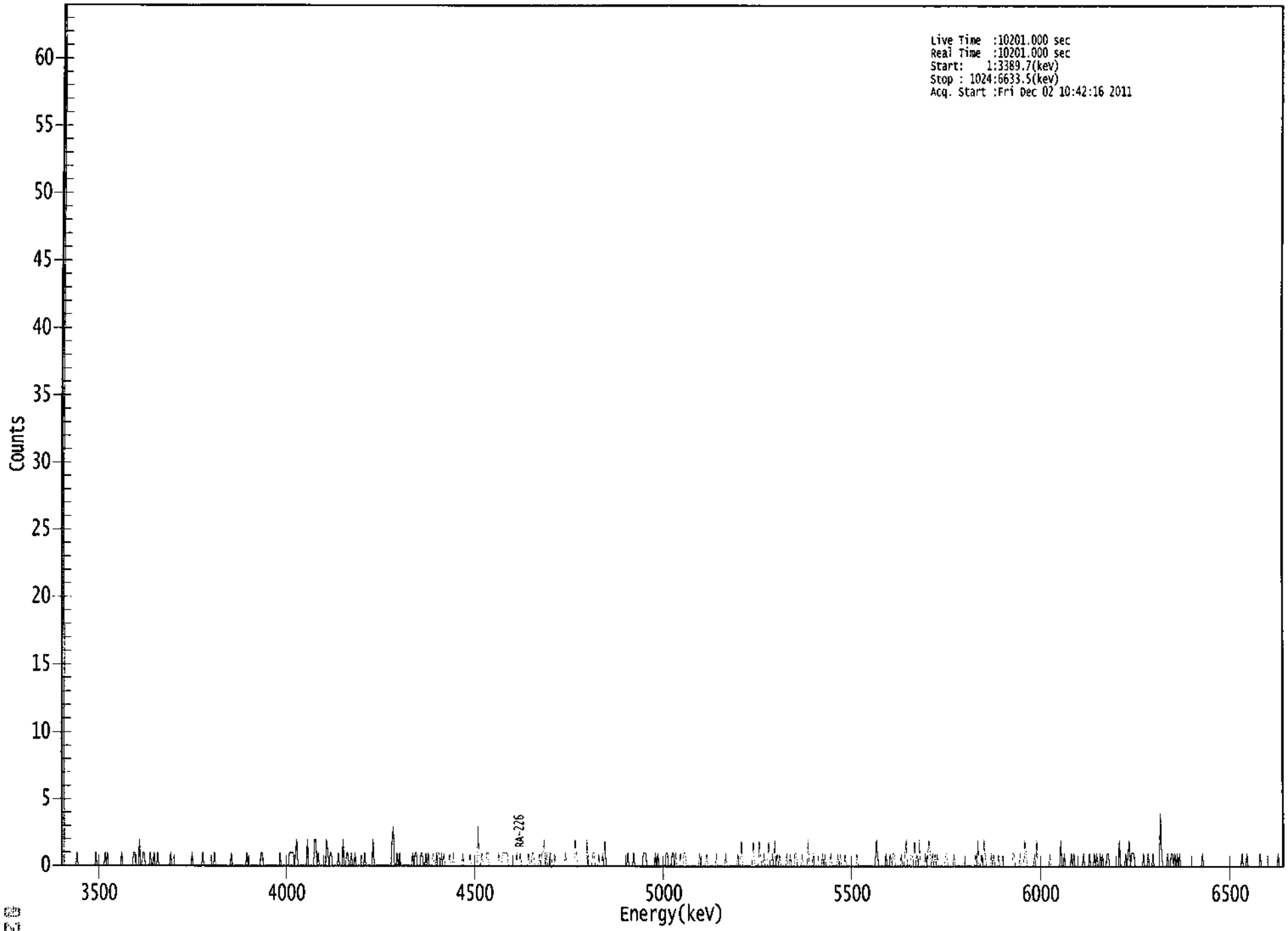
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.773	41.94	31.53	3.06	0.00E+000	4.8
RN-222	5.284	38.92	33.29	4.08	0.00E+000	3.2
RA-226	4.612	44.77	30.50	3.23	0.00E+000	3.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.967	6003.00*	1.99E+000 +/- 6.31E-001	4.24E-001 +/- 1.34E-002
RN-222	0.973	5490.00*	1.85E+000 +/- 6.18E-001	4.70E-001 +/- 1.49E-002
RA-226	0.981	4785.00*	2.13E+000 +/- 6.52E-001	4.32E-001 +/- 1.37E-002

AG
12/3/11

0000011147.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 14

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	1	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	1	0	0
33:	0	0	0	0	0	1	0	1
41:	0	0	0	0	0	0	0	0
49:	0	0	0	1	0	0	0	0
57:	0	0	0	0	0	1	1	0
65:	0	0	2	0	0	1	1	0
73:	0	0	0	1	0	0	1	0
81:	0	1	0	0	0	0	0	0
89:	0	0	0	0	1	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	1	0
113:	0	0	0	0	0	0	0	1
121:	0	0	0	0	0	0	0	0
129:	0	1	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	1
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	1	0	0	0
161:	0	0	0	0	0	0	0	0
169:	1	1	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	0	0	0	0	0	0
193:	1	1	1	1	0	1	2	0
201:	0	0	0	0	0	0	0	2
209:	0	0	0	0	0	2	2	0
217:	1	0	0	0	0	0	0	2
225:	1	0	1	1	0	0	0	0
233:	0	1	0	0	0	2	0	0
241:	1	1	0	0	1	0	0	1
249:	0	0	0	0	0	0	0	1
257:	0	0	0	0	0	0	2	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	2	3
281:	0	0	1	0	1	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	1	1	0	0	0	1	1
305:	0	0	1	0	1	0	0	0
313:	1	0	0	1	1	1	0	1
321:	0	1	0	0	0	0	1	0
329:	0	1	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	1
345:	0	0	0	0	0	0	3	0
353:	0	1	0	0	0	1	1	0
361:	0	0	0	0	0	0	0	1

369:	0	0	1	1	1	1	1	0

Sample Title: 14

Channel								
377:	0	0	0	0	0	0	1	0
385:	0	1	0	0	0	0	0	0
393:	1	0	0	1	1	0	0	0
401:	0	1	0	1	1	2	0	1
409:	0	0	1	1	0	0	1	0
417:	0	0	0	0	0	0	0	1
425:	0	0	0	0	0	0	0	2
433:	1	0	0	0	0	0	0	0
441:	0	2	0	0	0	0	1	1
449:	0	0	0	1	0	0	1	0
457:	2	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	1	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	1	1	1	0	0	0	0	0
497:	0	0	1	0	1	0	0	0
505:	0	0	0	1	1	0	0	0
513:	1	1	0	1	0	0	0	1
521:	0	0	1	1	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	0	0	0	0	0	1	0	0
545:	0	0	0	0	0	1	0	0
553:	0	0	0	0	0	1	0	0
561:	0	0	0	0	0	0	0	1
569:	0	0	2	0	0	0	0	0
577:	0	0	0	0	2	0	0	0
585:	0	2	1	0	0	1	0	0
593:	0	2	0	0	1	0	2	0
601:	1	0	1	0	0	0	0	0
609:	1	0	0	1	0	0	0	1
617:	1	0	0	0	0	1	0	0
625:	0	0	2	0	0	0	1	1
633:	1	1	1	0	0	0	1	0
641:	1	0	0	0	0	1	0	0
649:	0	0	0	1	0	1	0	0
657:	0	1	0	0	0	0	0	0
665:	0	0	0	1	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	2	1	0	0	0
689:	0	0	0	1	0	0	0	1
697:	0	1	1	0	0	0	0	0
705:	1	0	0	1	2	0	0	0
713:	1	1	0	2	0	1	0	2
721:	0	0	0	0	1	0	1	2
729:	1	0	1	0	1	0	1	0
737:	0	0	0	0	0	1	1	0
745:	0	0	0	0	1	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	1	0
769:	2	0	0	1	0	2	1	0
777:	0	0	0	1	0	1	0	0
785:	0	1	0	0	0	0	0	0
793:	0	0	0	0	0	1	1	0

801:	0	0	0	1	0	0	0	2

Sample Title: 14

Channel								
809:	1	0	0	0	0	0	0	1
817:	0	2	0	0	0	0	0	0
825:	0	0	0	0	1	0	0	0
833:	0	0	0	0	0	2	0	0
841:	1	0	0	0	0	0	1	0
849:	1	0	0	0	0	0	0	0
857:	1	0	0	0	0	1	0	0
865:	0	1	0	1	0	0	1	0
873:	1	0	0	0	1	1	0	0
881:	0	0	0	0	0	0	2	0
889:	0	0	0	1	0	1	2	0
897:	1	1	1	0	0	0	0	0
905:	0	0	1	0	0	0	1	0
913:	0	0	1	0	0	0	0	0
921:	4	1	0	0	0	0	1	0
929:	0	1	1	0	1	0	1	0
937:	1	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	1	0	0	0
993:	1	0	0	0	0	0	0	0
1001:	0	0	0	1	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	1	0	0	0	0	0

KB
12/2/11

Apex-Alpha™

Sample Description: IB4-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011149.cnf
Batch Identification: 1111140A-RA
Sample Identification: 15
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_022
Chamber Serial Number:
Detector Serial Number: 22
Env. Background: System Bkgd 10001
Reagent Blank: <not performed>

Sample Size: 1.026E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.550E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:17 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9603 +/- 0.0000
Counting Efficiency: 0.1614 +/- 0.0026 on 9/4/2011 11:25:40 AM
Effective Efficiency: 0.1549 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

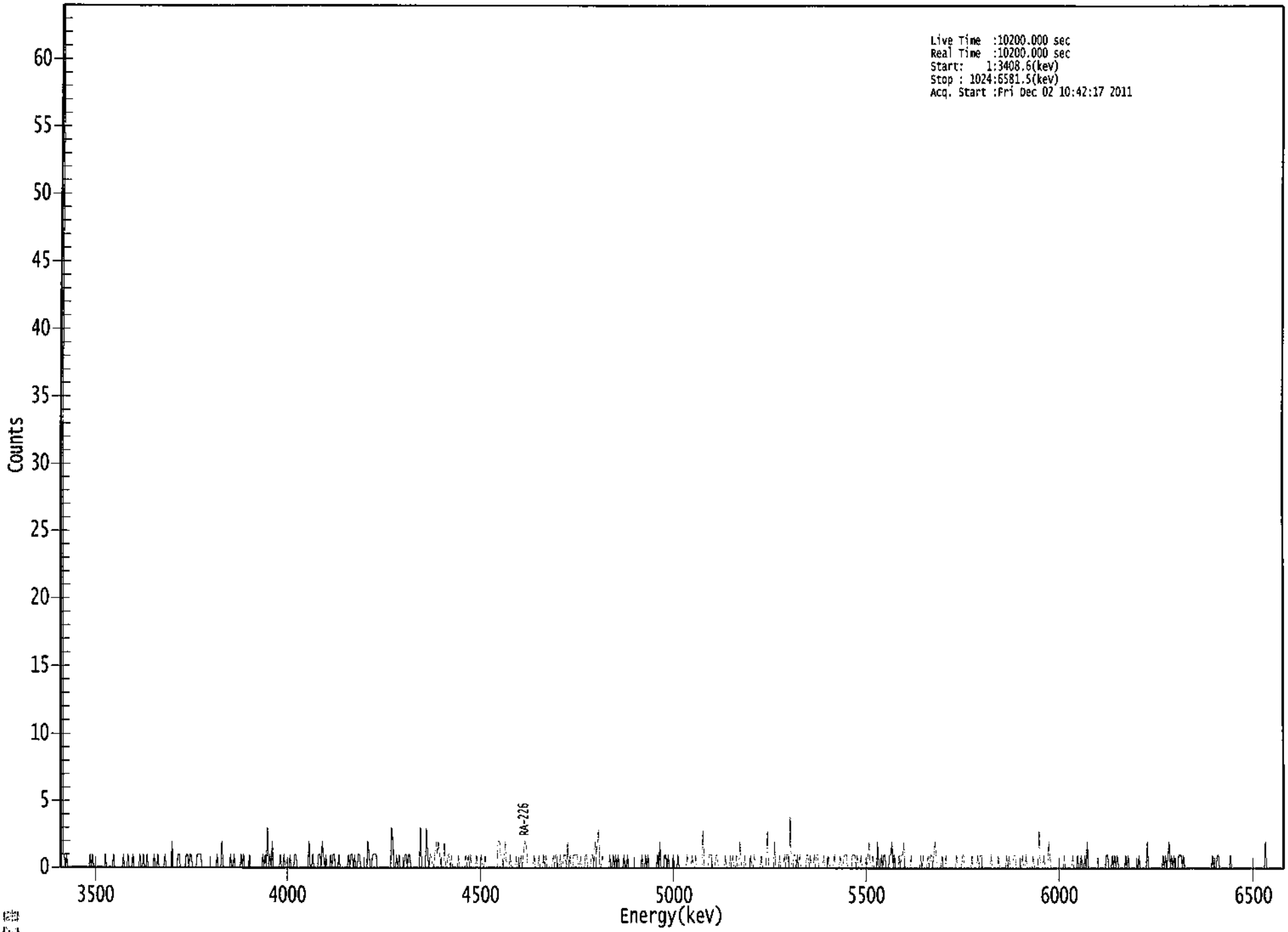
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.788	37.75	33.94	4.25	0.00E+000	3.1
RN-222	5.286	56.94	26.78	3.06	0.00E+000	3.1
RA-226	4.614	68.64	23.93	1.36	0.00E+000	6.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.971	6003.00*	1.61E+000 +/- 5.47E-001	4.27E-001 +/- 1.35E-002
RN-222	0.974	5490.00*	2.42E+000 +/- 6.53E-001	3.80E-001 +/- 1.20E-002
RA-226	0.982	4785.00*	2.92E+000 +/- 7.04E-001	2.91E-001 +/- 9.22E-003

AG
12/3/11

0000011149.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 15

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	1	1	0	1	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	1	0	1	0	0	0	0
33:	0	0	0	0	0	0	1	0
41:	0	0	0	0	0	1	0	0
49:	0	0	0	0	0	1	0	0
57:	0	1	0	0	0	1	0	0
65:	0	0	0	1	0	0	1	0
73:	0	1	0	0	0	0	0	1
81:	0	0	1	0	0	0	0	0
89:	1	0	0	0	0	0	2	0
97:	0	0	0	1	1	0	0	0
105:	0	0	1	1	0	1	1	0
113:	0	0	0	1	1	1	1	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	0	0	0
137:	2	0	0	0	0	0	0	1
145:	0	0	1	0	0	0	0	0
153:	1	0	1	0	0	0	0	1
161:	0	0	0	0	0	0	0	0
169:	0	0	1	0	1	0	3	0
177:	1	0	2	0	0	0	0	0
185:	0	1	0	0	1	0	0	0
193:	0	1	0	0	0	1	1	0
201:	0	0	0	0	0	0	0	0
209:	0	2	0	0	1	0	0	0
217:	0	1	1	0	2	1	0	1
225:	0	0	0	1	0	1	1	0
233:	0	0	1	0	0	0	0	0
241:	0	0	1	0	1	1	0	1
249:	0	0	1	1	0	0	0	0
257:	0	0	2	1	0	0	1	1
265:	1	1	0	0	0	0	0	0
273:	0	0	0	0	0	0	3	2
281:	0	0	1	0	1	0	0	0
289:	0	1	1	0	1	1	0	0
297:	0	0	0	0	0	0	3	0
305:	0	0	0	3	1	0	1	1
313:	0	0	1	2	1	2	1	0
321:	0	0	2	0	0	1	1	0
329:	1	0	0	0	0	0	1	0
337:	0	0	0	0	1	0	1	0
345:	1	0	0	0	0	1	0	0
353:	0	1	0	0	1	0	0	0
361:	0	0	0	0	0	0	0	2

369:	2	1	1	0	1	2	0	0

Sample Title: 15

Channel								
377:	0	1	0	0	0	0	1	0
385:	0	0	1	0	1	2	2	1
393:	0	0	0	0	0	1	0	0
401:	0	1	0	0	0	1	0	1
409:	0	0	0	0	0	1	0	1
417:	1	0	0	1	0	0	1	1
425:	0	2	0	1	0	0	1	1
433:	1	1	0	0	1	0	0	0
441:	1	1	0	0	0	1	1	0
449:	2	1	2	3	0	0	1	0
457:	0	0	0	0	1	0	0	1
465:	0	1	0	1	0	0	0	0
473:	1	0	0	1	0	0	0	0
481:	0	0	0	0	0	0	0	1
489:	0	0	1	0	1	0	0	0
497:	0	0	0	0	1	0	2	0
505:	0	0	1	1	0	1	0	0
513:	0	1	0	0	0	1	0	0
521:	0	0	0	0	0	1	0	0
529:	0	1	0	0	1	0	0	0
537:	0	0	3	0	0	0	0	1
545:	1	1	0	0	0	1	1	0
553:	0	0	0	0	0	1	0	0
561:	0	1	0	1	0	0	1	0
569:	0	2	0	0	0	1	0	0
577:	0	0	1	0	0	1	0	0
585:	0	0	0	1	0	0	0	0
593:	3	0	0	0	0	0	2	0
601:	0	0	1	0	0	0	1	0
609:	1	1	0	4	0	0	1	1
617:	0	1	0	1	0	0	0	0
625:	0	1	1	0	1	0	0	1
633:	0	1	1	0	0	0	0	1
641:	0	0	0	1	0	0	0	0
649:	1	0	0	0	0	1	0	0
657:	1	1	1	0	0	0	0	1
665:	1	1	0	1	0	0	1	0
673:	0	0	0	0	1	2	0	0
681:	1	0	0	0	2	0	0	1
689:	0	1	1	0	0	0	1	1
697:	2	0	1	0	0	0	1	0
705:	1	1	2	0	0	0	0	0
713:	1	0	0	0	0	0	0	0
721:	1	0	1	0	0	0	1	0
729:	1	1	0	1	2	1	0	0
737:	0	0	1	0	0	1	0	0
745:	0	0	0	0	0	0	1	0
753:	0	0	0	1	1	0	0	0
761:	0	0	0	1	0	0	0	0
769:	1	0	1	1	0	0	0	0
777:	0	0	0	1	0	0	0	0
785:	0	1	0	0	0	0	0	0
793:	1	0	1	0	0	0	1	1

801:	0	0	0	0	0	1	0	0

Sample Title: 15

Channel								
809:	1	0	0	0	0	0	1	0
817:	0	0	0	3	0	0	0	1
825:	0	0	0	2	1	0	0	0
833:	0	0	0	0	0	0	0	0
841:	1	0	0	0	0	0	0	1
849:	0	0	0	1	0	0	1	0
857:	0	1	0	2	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	1	1	0	0	0
881:	1	0	1	0	1	0	0	0
889:	0	0	0	1	0	1	0	0
897:	0	0	0	0	0	0	1	0
905:	0	0	0	0	0	2	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	1	0	1	0	1	2
929:	0	1	0	1	0	0	0	1
937:	1	1	0	1	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	1	0	0	0	1
969:	1	0	0	0	0	0	0	0
977:	0	0	1	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	2
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	1

ICB 12/2/11

Apex-Alpha™

Sample Description: IB4-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011146.cnf
Batch Identification: 1111140A-RA
Sample Identification: 16
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_023
Chamber Serial Number:
Detector Serial Number: 23
Env. Background: System Bkgd 10002
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.530E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:18 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8482 +/- 0.0000
Counting Efficiency: 0.1625 +/- 0.0026 on 9/4/2011 12:49:03 AM
Effective Efficiency: 0.1378 +/- 0.0022

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.803	45.75	30.51	4.25	0.00E+000	3.1
RN-222	5.272	69.45	24.02	2.55	0.00E+000	5.4
RA-226	4.588	93.81	20.39	1.19	0.00E+000	3.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.975	6003.00*	2.21E+000 +/- 6.77E-001	4.85E-001 +/- 1.54E-002
RN-222	0.970	5490.00*	3.35E+000 +/- 8.13E-001	4.05E-001 +/- 1.28E-002
RA-226	0.975	4785.00*	4.53E+000 +/- 9.34E-001	3.18E-001 +/- 1.01E-002

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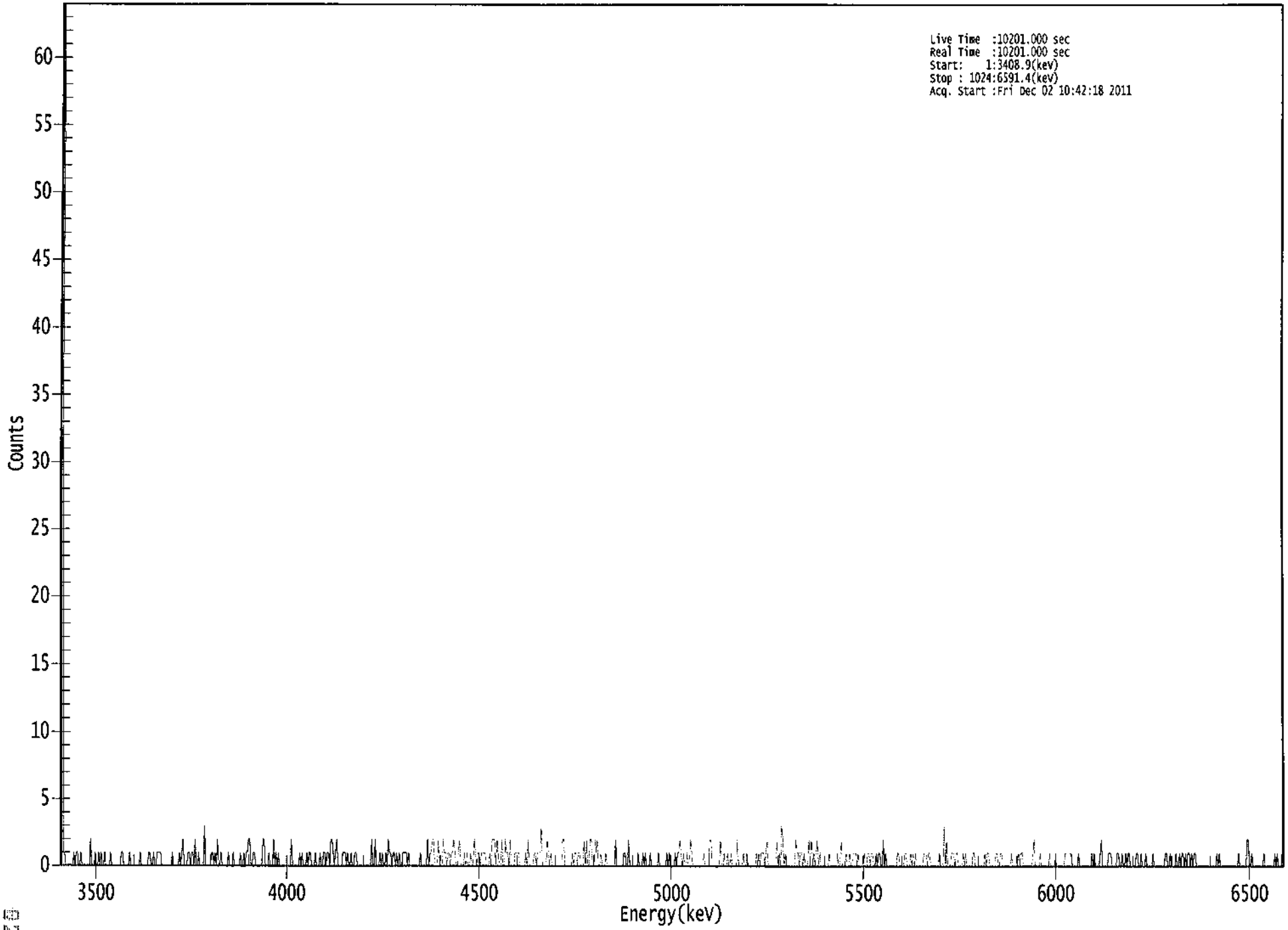
0000011146.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 16

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	1	1	0	0	0	0
9:	0	0	0	1	0	1	1	0
17:	0	1	0	0	0	0	0	0
25:	0	2	0	0	0	1	0	0
33:	1	0	1	0	0	1	0	0
41:	0	0	1	0	0	0	0	0
49:	0	0	0	1	1	0	0	0
57:	0	0	1	0	0	0	0	0
65:	0	0	0	1	0	0	0	0
73:	0	0	1	1	0	0	1	0
81:	0	1	1	1	1	0	0	0
89:	0	0	0	0	0	0	1	0
97:	0	0	0	0	1	0	1	2
105:	0	0	0	1	1	0	1	1
113:	0	2	0	0	1	0	0	0
121:	0	3	0	0	0	0	0	1
129:	1	0	1	0	2	0	0	1
137:	0	0	0	0	0	1	0	0
145:	0	1	0	0	0	0	0	1
153:	0	0	1	0	1	1	2	2
161:	0	0	1	1	0	0	0	0
169:	0	0	2	2	0	0	0	1
177:	0	0	0	2	0	1	0	1
185:	0	0	0	0	0	0	0	0
193:	0	0	2	0	0	0	0	0
201:	0	1	0	1	0	0	0	1
209:	0	1	1	0	0	0	1	0
217:	0	0	1	0	0	1	1	0
225:	1	1	0	2	2	1	0	1
233:	2	0	0	0	0	1	1	1
241:	0	1	0	0	1	0	0	1
249:	1	0	0	0	0	0	0	0
257:	0	0	0	0	0	2	0	0
265:	2	0	0	0	1	0	1	0
273:	0	1	0	2	1	1	0	1
281:	1	0	1	0	1	0	0	1
289:	1	1	1	0	1	0	0	0
297:	0	0	0	0	0	0	1	0
305:	0	0	0	0	2	0	1	1
313:	2	2	0	0	0	2	0	0
321:	0	2	1	1	0	1	1	0
329:	1	1	2	1	0	0	1	2
337:	0	0	0	1	0	1	0	0
345:	1	0	0	2	1	0	1	1
353:	0	1	1	1	1	0	0	0
361:	1	0	2	2	2	0	2	1

369:	0	0	2	0	0	2	1	1

Sample Title: 16

Channel								
377:	0	2	0	0	0	1	1	1
385:	1	0	0	0	0	0	1	0
393:	2	0	0	0	0	1	1	0
401:	1	1	1	3	0	0	0	0
409:	2	1	0	1	0	0	0	0
417:	0	0	0	0	0	2	2	0
425:	0	0	0	0	0	1	0	1
433:	1	0	1	1	0	0	0	2
441:	0	2	0	0	2	2	0	0
449:	2	1	2	0	0	1	0	0
457:	0	1	0	0	0	0	0	0
465:	0	2	0	0	0	0	0	0
473:	1	1	0	0	2	0	0	0
481:	0	0	0	0	1	0	0	0
489:	1	0	1	0	0	0	1	0
497:	0	0	0	0	0	1	0	0
505:	0	0	0	0	1	0	1	0
513:	0	0	0	1	0	1	1	2
521:	1	0	1	0	0	1	0	0
529:	2	1	0	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	2	2	0	0	0	0	0	0
553:	0	2	0	0	1	0	0	1
561:	0	0	1	0	0	0	0	2
569:	0	0	0	0	1	0	0	1
577:	0	0	0	0	0	0	0	1
585:	0	1	0	1	1	1	0	1
593:	2	0	0	0	0	0	0	0
601:	2	0	1	0	3	2	0	1
609:	0	0	0	0	0	0	0	0
617:	2	1	1	0	1	1	0	1
625:	0	0	0	2	0	2	0	1
633:	0	1	2	0	1	0	0	0
641:	0	0	0	0	1	0	0	0
649:	0	0	0	1	0	0	2	0
657:	0	0	1	0	0	1	0	0
665:	1	1	1	0	1	0	0	0
673:	0	1	0	0	1	1	0	1
681:	1	0	0	1	0	1	1	0
689:	0	2	0	1	0	0	0	0
697:	0	0	0	0	0	1	1	0
705:	0	0	0	1	1	0	0	0
713:	1	0	1	0	1	0	0	0
721:	0	0	0	1	1	1	0	1
729:	1	0	0	0	0	0	0	0
737:	1	0	0	0	3	0	2	0
745:	0	0	1	1	1	0	1	1
753:	0	0	0	0	1	0	1	0
761:	0	0	0	0	1	1	0	0
769:	0	0	0	0	0	0	1	0
777:	1	1	0	0	0	0	0	1
785:	1	0	0	1	1	0	0	0
793:	0	0	0	0	1	0	0	0

801:	0	0	1	0	1	1	0	0

Sample Title: 16

Channel								
809:	0	0	0	0	0	0	1	2
817:	0	0	0	0	1	0	0	0
825:	0	0	0	0	1	0	0	0
833:	0	1	0	0	0	0	0	0
841:	0	1	1	1	1	1	1	0
849:	0	0	0	0	1	0	0	0
857:	0	0	0	0	0	0	0	1
865:	0	1	0	0	0	0	1	2
873:	0	0	0	0	0	1	1	1
881:	0	0	0	0	1	1	0	0
889:	1	0	0	1	0	1	1	0
897:	0	0	0	0	1	1	0	0
905:	1	0	0	0	1	0	0	0
913:	0	0	1	0	0	0	0	0
921:	0	0	0	0	1	1	0	0
929:	1	0	0	0	0	1	0	0
937:	1	0	1	1	0	1	0	1
945:	1	0	1	0	1	1	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	1
969:	0	1	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	1	0	0	0	0	0	0
993:	2	2	0	0	1	0	0	0
1001:	0	0	0	0	0	0	1	0
1009:	0	0	0	0	0	0	0	1
1017:	0	1	0	0	0	1	1	0

ICB
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Apex-Alpha™

Sample Description: IB4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011145.cnf
Batch Identification: 1111140A-RA
Sample Identification: 17
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_024
Chamber Serial Number:
Detector Serial Number: 24
Env. Background: System Bkgd 10003
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.580E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:19 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8985 +/- 0.0000
Counting Efficiency: 0.1530 +/- 0.0025 on 9/4/2011 10:44:18 AM
Effective Efficiency: 0.1375 +/- 0.0022

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.801	71.94	23.68	3.06	0.00E+000	5.5
RN-222	5.288	87.13	21.26	1.87	0.00E+000	3.1
RA-226	4.609	129.81	17.29	1.19	0.00E+000	3.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	3.56E+000 +/- 8.51E-001	4.42E-001 +/- 1.40E-002
RN-222	0.974	5490.00*	4.32E+000 +/- 9.28E-001	3.75E-001 +/- 1.19E-002
RA-226	0.980	4785.00*	6.43E+000 +/- 1.13E+000	3.26E-001 +/- 1.04E-002

AG
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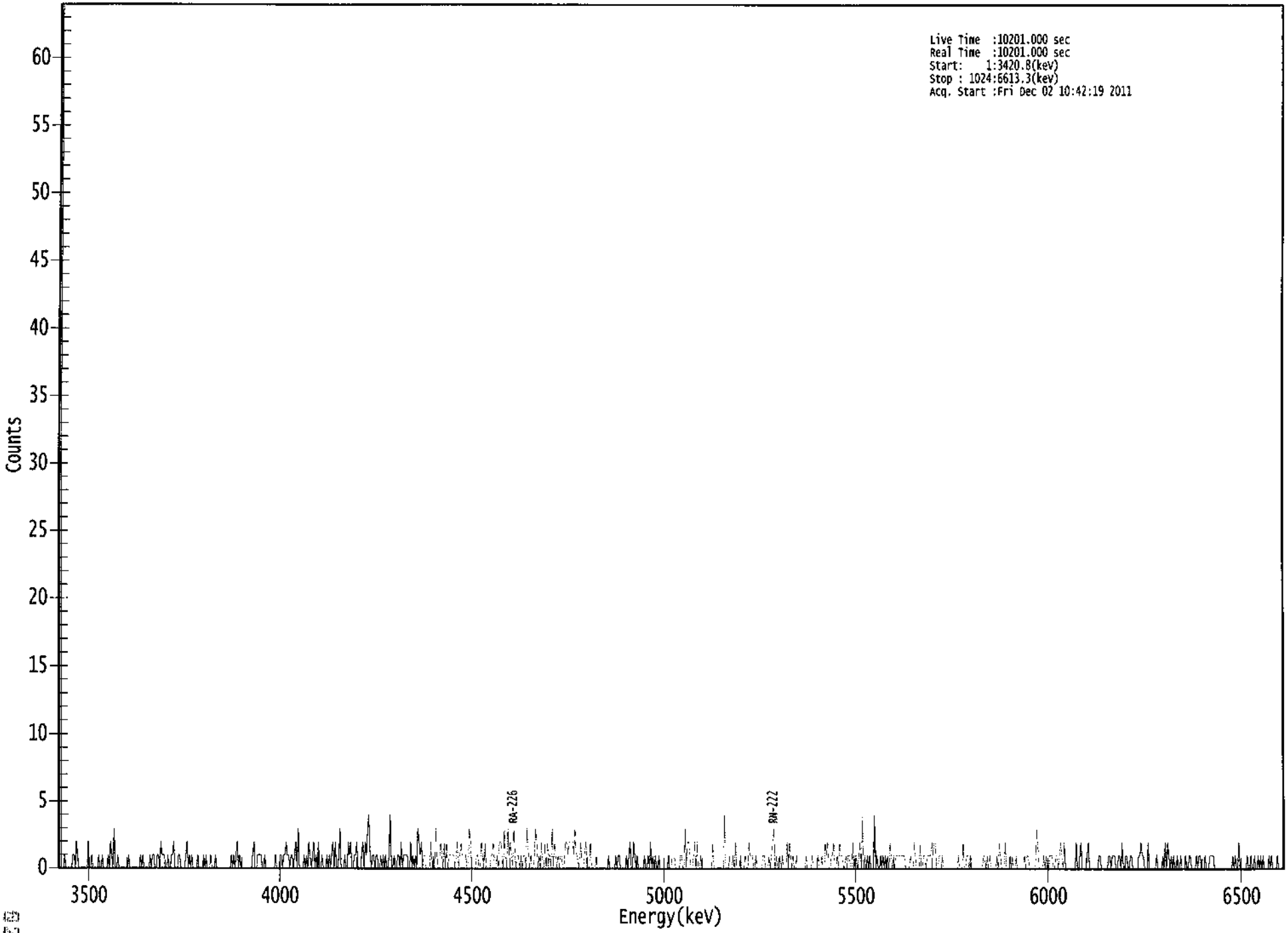
0000011145.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 17

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	1	0	0
9:	0	0	0	0	1	1	0	2
17:	1	0	0	0	0	0	0	0
25:	0	2	0	0	1	0	0	0
33:	0	0	1	0	0	1	0	0
41:	0	0	1	0	2	1	0	3
49:	0	0	1	0	0	0	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	0	0	1	0	1
73:	0	0	0	0	0	1	0	1
81:	1	0	0	1	1	0	2	1
89:	1	1	0	0	1	0	0	1
97:	1	2	0	0	0	1	1	0
105:	0	0	0	1	2	0	1	0
113:	1	0	0	0	0	1	0	0
121:	0	0	1	0	1	0	0	0
129:	1	0	0	0	1	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	1	0	1	0	1	2	0
153:	1	0	0	0	0	0	0	0
161:	0	0	0	1	2	0	0	1
169:	1	1	1	0	0	1	0	0
177:	0	0	0	0	0	0	1	0
185:	0	0	1	1	0	1	1	2
193:	1	1	0	1	1	0	1	2
201:	0	3	0	0	0	0	1	0
209:	1	0	2	1	0	1	2	0
217:	1	0	2	0	0	1	0	0
225:	0	1	0	1	0	1	2	0
233:	2	0	0	1	3	0	0	0
241:	1	0	0	2	1	2	0	0
249:	1	1	2	0	0	0	1	2
257:	0	2	1	3	4	1	0	1
265:	1	0	1	1	0	0	1	0
273:	1	0	1	0	0	1	4	0
281:	0	1	0	0	1	1	0	2
289:	0	1	1	1	1	0	0	2
297:	0	1	0	1	0	3	2	1
305:	2	0	1	1	0	0	0	0
313:	2	0	1	0	3	1	0	0
321:	2	1	0	2	0	2	0	1
329:	1	1	1	1	0	1	2	0
337:	1	2	1	1	1	1	0	0
345:	3	2	0	0	0	0	1	1
353:	0	0	2	1	0	2	0	0
361:	0	0	1	1	2	0	0	1

369:	0	2	2	1	0	3	1	0

Sample Title: 17

Channel								
377:	3	1	2	1	0	3	1	0
385:	1	1	0	1	0	1	1	0
393:	3	1	0	1	0	0	1	3
401:	2	0	1	0	2	0	0	2
409:	0	2	1	1	0	3	0	2
417:	1	0	1	0	1	1	0	0
425:	2	2	1	2	2	2	2	1
433:	3	1	1	0	1	2	0	0
441:	1	2	1	0	0	2	0	0
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	1	0	0	0
465:	0	0	1	0	1	1	0	0
473:	0	0	0	1	0	1	2	0
481:	0	2	1	0	1	0	0	0
489:	0	0	1	0	0	1	0	2
497:	0	1	0	1	0	0	1	0
505:	0	0	0	0	0	0	1	0
513:	0	1	1	1	0	0	0	0
521:	1	1	0	0	3	0	2	2
529:	1	0	0	1	2	0	2	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	2	0	0	0	0
553:	0	0	0	0	0	4	0	0
561:	0	1	0	0	1	0	2	0
569:	0	0	1	0	0	0	1	0
577:	0	2	1	1	1	0	0	1
585:	0	0	0	0	0	1	1	0
593:	0	0	1	0	1	2	3	0
601:	1	0	0	1	0	1	0	0
609:	0	2	0	2	1	0	1	0
617:	0	1	0	0	0	0	0	0
625:	0	1	0	0	0	0	1	0
633:	0	0	0	1	0	0	1	0
641:	0	2	1	2	0	0	1	1
649:	2	0	0	1	0	2	1	1
657:	0	0	1	0	1	1	0	0
665:	2	0	1	1	0	1	2	0
673:	4	0	1	0	1	0	1	0
681:	0	0	4	0	1	0	0	1
689:	0	1	0	1	0	1	0	2
697:	1	0	1	0	1	1	1	1
705:	1	1	1	1	0	0	0	0
713:	1	0	0	2	1	0	0	0
721:	2	0	0	1	1	0	1	1
729:	1	1	2	1	2	2	0	0
737:	1	1	0	1	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	1	0	0	0	2	0	0	1
761:	1	0	1	0	0	0	0	0
769:	0	0	0	0	0	1	1	0
777:	1	0	1	0	0	0	0	0
785:	1	0	2	1	0	0	0	2
793:	0	0	0	1	0	1	0	0

801:	1	0	0	0	0	0	0	1

Sample Title: 17

Channel								
809:	0	1	1	0	0	0	0	0
817:	0	3	2	0	0	0	0	1
825:	0	1	0	0	1	1	1	0
833:	0	1	1	0	1	2	1	0
841:	2	0	0	0	0	0	0	0
849:	0	0	2	0	0	1	2	0
857:	0	0	0	1	2	0	0	0
865:	0	0	0	0	0	1	1	0
873:	0	0	0	0	0	1	1	0
881:	1	1	1	0	0	1	1	0
889:	2	0	0	1	1	0	0	1
897:	1	0	0	0	0	0	1	1
905:	2	1	1	0	0	0	2	0
913:	0	0	0	0	0	1	0	0
921:	0	0	1	0	2	0	2	1
929:	0	1	0	1	0	0	1	0
937:	0	1	0	0	0	1	0	0
945:	1	1	0	0	0	0	1	0
953:	1	1	0	0	0	1	0	0
961:	0	1	1	1	1	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	1	0	1	0
985:	0	2	0	0	0	0	0	0
993:	1	0	0	1	0	0	1	0
1001:	0	1	0	1	0	1	0	0
1009:	0	0	1	0	1	0	0	0
1017:	0	1	0	0	0	0	1	0

Apex-Alpha™

ICB 12/2/11

Sample Description: BKG-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011144.cnf
Batch Identification: 1111140A-RA
Sample Identification: 18
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_025
Chamber Serial Number:
Detector Serial Number: 25
Env. Background: System Bkgd 10004
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.910E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:20 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9583 +/- 0.0000
Counting Efficiency: 0.1672 +/- 0.0027 on 9/4/2011 10:45:06 AM
Effective Efficiency: 0.1603 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

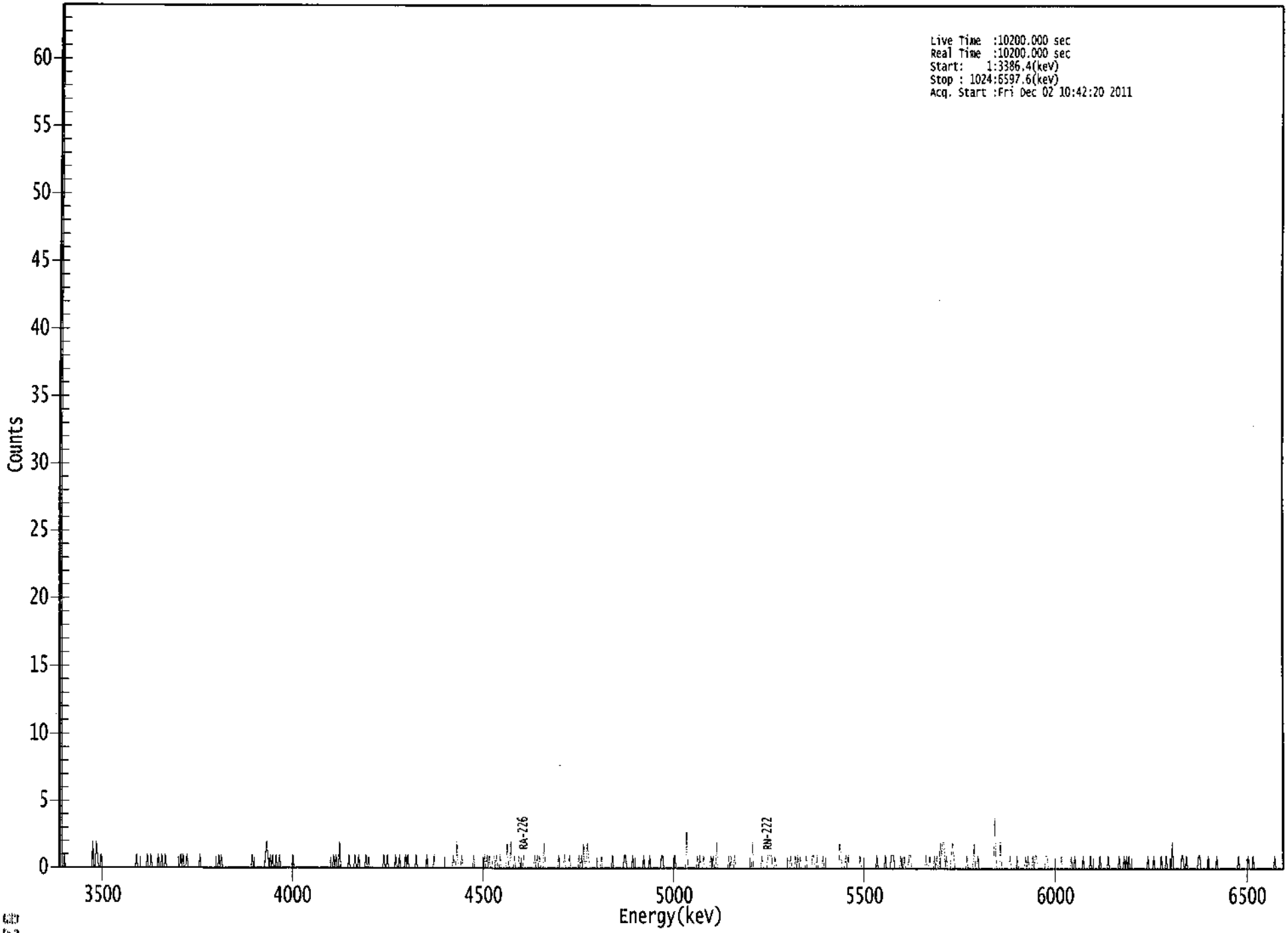
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.792	38.09	33.61	3.91	0.00E+000	3.7
RN-222	5.249	33.11	35.76	2.89	0.00E+000	3.1
RA-226	4.607	35.32	33.35	0.68	0.00E+000	3.1

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.972	6003.00*	1.83E+000 +/- 6.16E-001	4.67E-001 +/- 1.47E-002
RN-222	0.963	5490.00*	1.59E+000 +/- 5.70E-001	4.20E-001 +/- 1.33E-002
RA-226	0.980	4785.00*	1.69E+000 +/- 5.67E-001	2.70E-001 +/- 8.53E-003

AG
12/3/11

0000011144.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 18

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	1	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	2	0	0	2
33:	1	0	0	1	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	1	0	0	0	0	0	0
73:	0	0	1	0	0	1	0	0
81:	0	0	0	1	0	0	1	0
89:	0	1	0	0	0	0	0	0
97:	0	0	0	0	0	0	1	0
105:	1	0	0	1	0	0	0	0
113:	0	0	0	0	0	0	1	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	1	0
137:	1	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	1	0	0	0	0	0
169:	0	0	0	0	0	1	2	1
177:	0	1	0	1	0	0	1	0
185:	0	1	0	0	0	0	0	0
193:	0	0	0	0	1	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	1	0
233:	1	0	0	2	0	0	0	0
241:	0	0	0	1	0	0	0	0
249:	1	0	0	1	0	0	0	0
257:	0	1	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	1	0	0	1	0	0	0	0
281:	0	0	1	0	0	1	0	0
289:	0	0	1	0	1	0	0	0
297:	0	0	0	1	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	1	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	1	0	0	2	0	0
337:	0	1	0	0	0	0	0	0
345:	0	0	0	1	0	0	0	0
353:	0	0	0	0	1	0	1	0
361:	1	0	0	1	1	0	1	0

369:	0	1	0	0	0	0	0	2

Sample Title: 18

Channel								
377:	0	0	2	0	0	1	0	0
385:	0	1	0	0	0	1	0	0
393:	0	0	0	0	0	0	1	0
401:	1	0	1	0	0	0	2	0
409:	0	0	0	0	0	0	0	0
417:	0	0	1	0	0	0	0	1
425:	0	0	0	1	0	0	0	0
433:	0	0	0	1	0	1	0	2
441:	0	0	2	1	0	0	0	0
449:	0	0	0	0	0	0	1	0
457:	0	0	0	0	0	0	0	1
465:	0	0	0	0	0	0	0	0
473:	0	1	1	0	0	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	1	0	0	0	0	1	0
497:	0	0	0	0	0	0	0	0
505:	1	1	0	0	0	0	0	0
513:	0	0	0	1	0	0	0	0
521:	0	0	0	0	0	3	0	0
529:	0	0	0	0	0	0	1	0
537:	1	0	0	1	0	0	0	0
545:	0	1	0	1	0	0	2	0
553:	0	0	0	0	0	0	0	0
561:	1	0	1	0	0	1	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	2	0	0	0
585:	0	0	0	0	1	0	0	0
593:	0	1	1	1	1	0	0	1
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	1	0	0	0
617:	1	0	1	0	1	0	0	0
625:	0	1	0	0	0	0	1	1
633:	0	0	1	0	0	0	0	1
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	2	1	0
657:	0	0	1	0	1	0	0	0
665:	0	0	0	0	0	0	1	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	1	0	0	0
689:	0	0	0	1	0	0	0	0
697:	1	1	1	0	0	0	0	0
705:	1	0	0	1	0	0	0	1
713:	1	0	0	0	0	0	0	0
721:	0	0	0	0	0	1	0	0
729:	1	0	0	0	1	0	1	0
737:	0	2	1	2	2	0	1	0
745:	0	0	1	2	1	0	0	0
753:	0	0	0	0	0	0	0	1
761:	0	0	0	0	0	2	0	0
769:	1	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	4	1
785:	0	0	0	2	0	0	0	0
793:	0	0	0	1	0	0	0	0

801:	0	1	0	0	0	0	0	0

Sample Title: 18

Channel								
809:	1	0	1	0	0	0	1	0
817:	1	1	0	0	0	0	0	0
825:	0	1	1	0	0	0	0	0
833:	0	0	0	0	0	0	1	0
841:	0	0	0	0	0	0	1	0
849:	0	1	0	0	0	0	0	0
857:	1	0	0	0	0	0	1	0
865:	0	0	0	0	0	0	1	0
873:	0	0	0	0	0	1	0	0
881:	0	0	0	0	0	0	1	0
889:	0	0	1	0	1	0	1	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	1	0
913:	0	0	0	1	0	0	0	0
921:	0	1	0	0	0	1	0	0
929:	0	0	2	0	0	0	0	0
937:	0	0	1	1	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	1	1	0	0	0	0	0	0
961:	1	0	0	0	0	0	0	1
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	1	0	0	0	0	0	0
993:	0	1	0	0	0	1	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	1
1017:	0	0	0	0	0	0	0	0

ICB
12/2/11

Apex-Alpha™

Sample Description: BKG-2
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011150.cnf
Batch Identification: 1111140A-RA
Sample Identification: 19
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_026
Chamber Serial Number:
Detector Serial Number: 26
Env. Background: System Bkgd 10005
Reagent Blank: <not performed>

Sample Size: 1.038E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 3.010E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:21 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1583 +/- 0.0026 on 9/4/2011 10:46:49 AM
Effective Efficiency: 0.1583 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

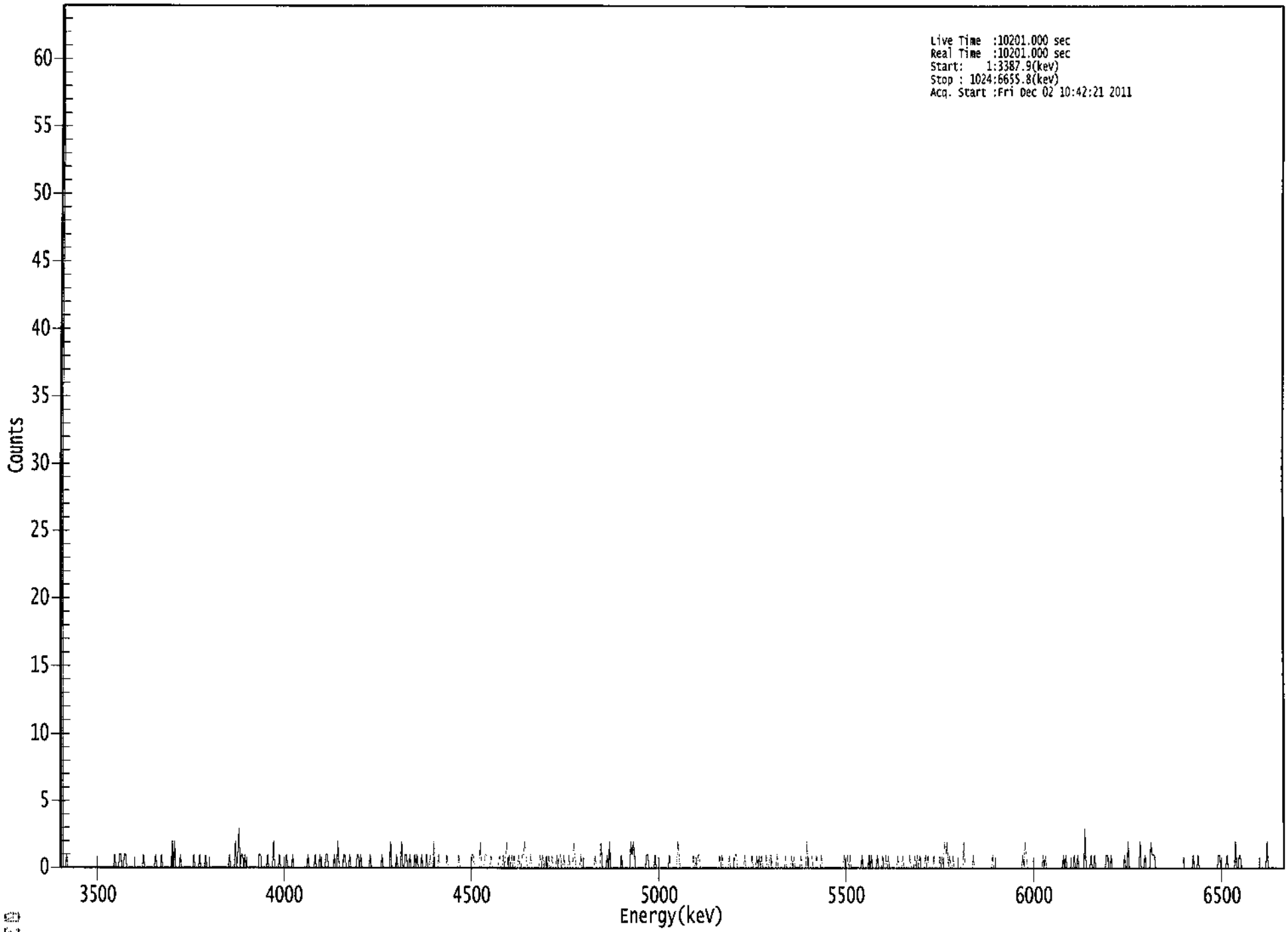
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.770	28.11	39.13	2.89	0.00E+000	4.8
RN-222	5.258	30.79	36.78	2.21	0.00E+000	4.8
RA-226	4.618	44.98	29.61	1.02	0.00E+000	3.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.966	6003.00*	1.36E+000 +/- 5.35E-001	4.25E-001 +/- 1.35E-002
RN-222	0.966	5490.00*	1.50E+000 +/- 5.52E-001	3.88E-001 +/- 1.23E-002
RA-226	0.982	4785.00*	2.18E+000 +/- 6.50E-001	3.06E-001 +/- 9.68E-003

AG
12/3/11

0000011150.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 19

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	1	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	1	1	0	0	1	1
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	0	0	0	0	0	0	0
81:	1	0	0	0	0	1	0	0
89:	0	0	0	0	0	0	2	0
97:	2	0	0	0	0	1	0	0
105:	0	0	0	0	0	0	0	0
113:	1	0	0	0	0	1	0	0
121:	0	0	1	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	1	0
145:	0	0	0	2	0	1	3	0
153:	1	1	0	1	0	0	0	0
161:	0	0	0	0	0	0	0	1
169:	1	0	0	0	0	0	1	0
177:	0	0	0	2	0	0	0	0
185:	1	0	0	0	0	0	1	0
193:	0	0	0	1	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	1	0	0	0	0	0	1	0
217:	0	0	1	0	0	0	0	1
225:	1	0	0	0	0	0	1	0
233:	0	2	0	0	0	0	1	1
241:	0	0	0	1	0	0	0	0
249:	0	1	1	0	1	0	0	0
257:	0	0	0	0	1	0	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	0	0	2	0	0
281:	0	0	1	0	0	0	2	0
289:	0	1	1	0	0	1	0	0
297:	0	1	0	1	0	0	0	1
305:	0	0	0	1	0	0	1	0
313:	0	2	0	0	0	1	0	0
321:	0	0	0	0	1	0	0	0
329:	0	0	0	0	0	0	1	0
337:	0	0	0	0	0	0	0	0
345:	0	1	1	0	0	0	0	0
353:	2	0	0	0	1	1	0	0
361:	0	1	0	0	0	0	0	0

369:	1	0	0	1	0	1	2	0

Sample Title: 19

Channel								
377:	1	0	1	0	1	0	0	0
385:	1	0	0	1	1	2	1	0
393:	0	0	1	0	0	0	0	0
401:	0	0	1	0	1	0	1	1
409:	0	1	0	0	1	0	0	0
417:	1	0	1	1	0	0	1	0
425:	0	0	1	0	0	0	2	1
433:	0	0	0	0	1	0	0	0
441:	0	0	0	0	0	0	0	0
449:	1	0	0	0	0	2	0	0
457:	0	0	1	0	2	0	0	0
465:	0	0	0	0	0	0	1	0
473:	0	0	0	0	0	0	2	1
481:	2	1	0	0	0	0	0	0
489:	0	0	0	1	1	0	0	0
497:	0	0	1	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	2	1	0
521:	0	0	0	0	0	0	0	0
529:	0	0	1	0	0	0	1	1
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	1	0	1	0	0	0	0	0
561:	1	0	0	0	0	1	1	0
569:	0	0	0	0	0	1	0	0
577:	0	0	0	1	0	0	0	1
585:	0	1	0	1	0	0	0	1
593:	0	0	1	1	0	0	0	0
601:	1	0	0	0	0	0	0	1
609:	0	0	0	0	1	0	1	0
617:	0	0	0	0	1	0	0	0
625:	0	2	0	0	0	1	0	0
633:	0	1	0	0	0	1	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	1	0	0	1	0	1	0	0
665:	0	0	0	0	0	0	0	1
673:	0	0	0	0	0	1	0	1
681:	0	0	0	0	1	0	0	0
689:	1	0	0	1	0	1	0	0
697:	0	0	0	0	0	1	0	0
705:	0	1	0	0	0	0	0	1
713:	0	0	0	1	0	1	0	1
721:	0	0	0	0	1	0	1	0
729:	0	0	0	1	0	0	0	0
737:	1	0	1	0	2	1	2	0
745:	1	0	0	1	0	0	0	0
753:	0	0	0	0	2	0	0	0
761:	0	0	0	0	1	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	1	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	1	0	2

Sample Title: 19

Channel								
809:	1	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	1	0
825:	1	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	1
841:	0	1	0	0	0	0	0	0
849:	1	0	0	1	0	0	0	0
857:	0	3	0	0	0	0	1	0
865:	0	1	0	0	0	0	0	0
873:	0	0	0	1	1	0	0	1
881:	0	0	0	0	0	0	0	0
889:	0	0	1	0	0	2	0	0
897:	0	0	0	0	0	0	0	2
905:	0	0	0	1	0	0	0	0
913:	2	1	1	1	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	1	0	0	0	1
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	1	1	0	0	0	0	0	1
977:	0	0	0	0	0	0	2	0
985:	0	1	1	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	2	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	1

ICB
12/2/14

Apex-Alpha™

Sample Description: BKG-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011151.cnf
Batch Identification: 1111140A-RA
Sample Identification: 20
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_028
Chamber Serial Number:
Detector Serial Number: 28
Env. Background: System Bkgd 10007
Reagent Blank: <not performed>

Sample Size: 1.058E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.910E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 10:25:08 AM
Acquisition Date/Time: 12/2/2011 10:42:22 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9680 +/- 0.0000
Counting Efficiency: 0.1845 +/- 0.0034 on 11/6/2011 1:01:18 PM
Effective Efficiency: 0.1786 +/- 0.0033

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

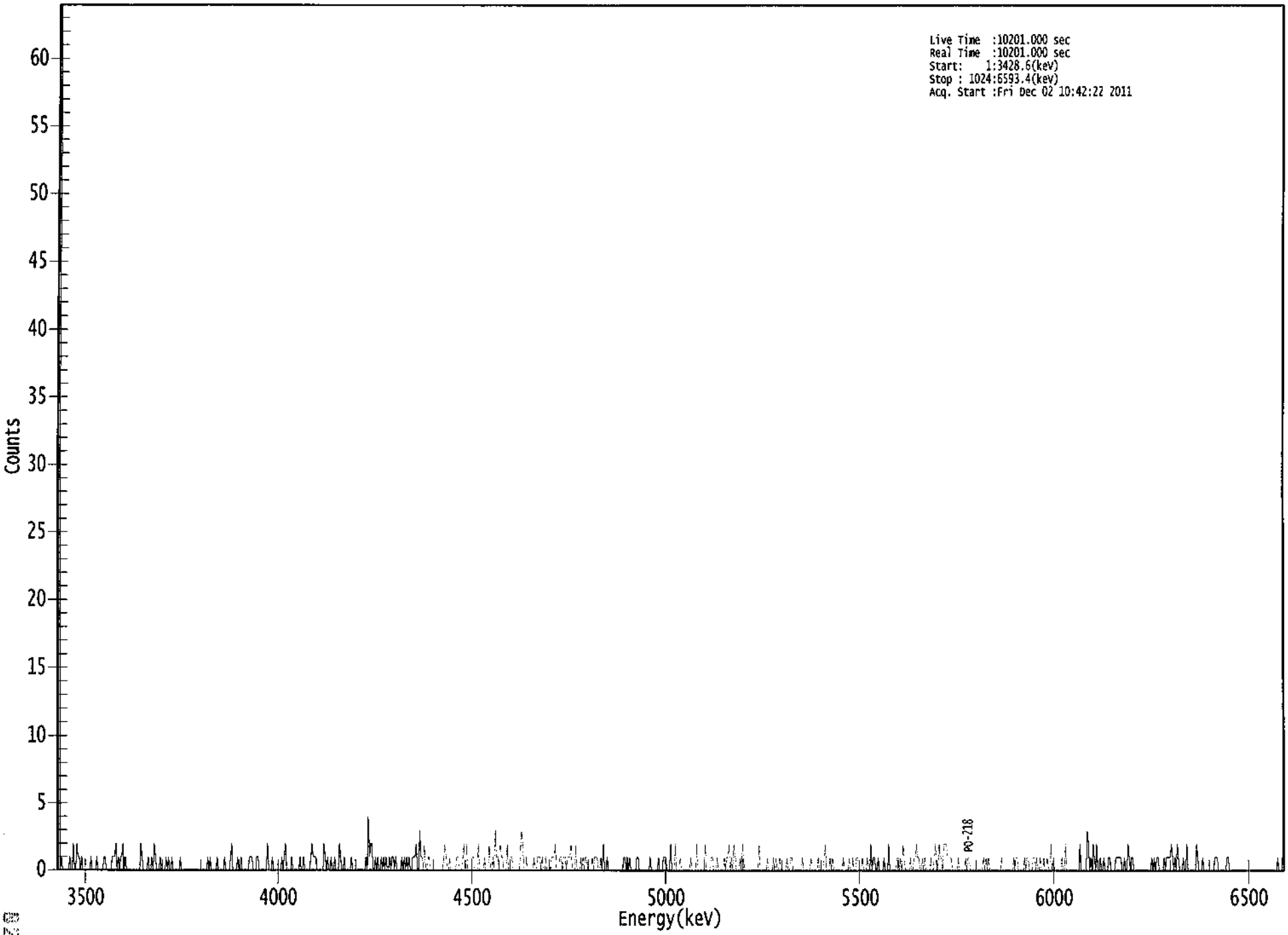
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.782	56.79	26.59	2.21	0.00E+000	4.6
RN-222	5.258	46.30	29.42	1.70	0.00E+000	3.1
RA-226	4.614	74.47	22.98	1.53	0.00E+000	3.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.969	6003.00*	2.32E+000 +/- 6.22E-001	3.27E-001 +/- 1.19E-002
RN-222	0.966	5490.00*	1.89E+000 +/- 5.61E-001	3.00E-001 +/- 1.09E-002
RA-226	0.981	4785.00*	3.04E+000 +/- 7.07E-001	2.90E-001 +/- 1.06E-002

AG
12/3/11

0000011151.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 20

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	1	0	0	0	0
9:	0	0	1	0	0	2	0	0
17:	2	1	1	0	1	0	0	0
25:	0	0	0	0	1	0	0	0
33:	0	1	0	0	0	0	0	1
41:	1	0	0	0	0	0	1	1
49:	1	2	0	1	0	1	1	2
57:	0	1	0	0	0	0	0	0
65:	0	0	0	0	0	0	2	1
73:	0	0	0	0	1	0	0	1
81:	0	2	1	0	0	0	1	0
89:	0	0	0	1	0	1	0	0
97:	1	0	0	0	0	0	0	1
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	1	0
129:	1	0	0	0	0	0	1	0
137:	0	0	0	0	1	0	0	0
145:	0	1	2	0	0	0	0	1
153:	0	0	1	0	0	0	0	0
161:	0	1	1	1	0	0	0	1
169:	1	0	0	0	0	0	0	0
177:	2	0	0	0	1	0	0	0
185:	0	0	0	0	1	0	1	2
193:	0	0	0	0	1	0	0	0
201:	0	0	0	1	0	0	1	0
209:	0	0	0	0	1	2	1	1
217:	1	0	0	0	0	0	0	2
225:	1	0	1	0	0	1	0	0
233:	1	0	0	0	2	1	0	0
241:	1	0	0	0	0	0	1	0
249:	0	0	0	0	0	0	0	0
257:	0	0	1	0	4	1	2	2
265:	0	0	1	0	1	0	0	1
273:	0	1	0	1	0	0	1	0
281:	1	1	0	1	0	0	0	0
289:	1	0	1	0	1	0	1	0
297:	0	1	1	1	2	0	0	3
305:	1	1	0	2	0	0	1	1
313:	0	0	0	0	0	0	0	0
321:	0	0	0	1	2	1	0	0
329:	1	0	0	0	0	0	1	1
337:	0	0	0	1	2	0	2	0
345:	0	0	0	1	1	0	0	0
353:	2	0	0	0	0	1	0	0
361:	0	2	0	0	1	0	3	1

369:	1	0	2	1	1	0	0	0

Sample Title: 20

Channel								
377:	2	0	0	1	1	0	0	0
385:	0	0	0	1	3	2	0	0
393:	1	0	0	0	0	0	1	0
401:	0	1	1	1	0	1	0	0
409:	1	0	0	0	0	1	1	1
417:	2	0	0	0	1	1	0	1
425:	1	0	1	1	1	2	0	0
433:	0	2	0	0	0	1	0	1
441:	0	1	1	0	0	0	0	1
449:	0	1	1	1	0	0	1	0
457:	2	0	0	1	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	1	1	0	1	0	1	0
481:	0	0	0	0	1	1	0	0
489:	0	0	0	0	0	0	0	1
497:	0	0	0	0	0	0	1	0
505:	0	0	1	1	1	0	0	0
513:	2	0	0	0	2	0	0	0
521:	1	0	0	0	0	0	0	0
529:	0	1	0	0	0	0	2	0
537:	0	0	0	0	0	2	0	0
545:	0	0	1	1	0	0	0	1
553:	0	0	0	0	0	1	0	1
561:	1	2	0	1	0	2	1	0
569:	0	0	1	0	2	1	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	2	0	0	0	0	0
593:	0	1	0	0	0	0	1	0
601:	1	0	0	1	0	0	0	0
609:	0	1	0	0	1	1	0	0
617:	0	0	0	0	0	0	1	0
625:	0	0	0	0	0	1	0	0
633:	0	0	0	1	0	0	0	0
641:	1	2	0	0	0	1	0	1
649:	0	0	0	0	0	0	0	0
657:	1	0	0	0	0	1	0	0
665:	1	0	0	1	1	0	0	0
673:	1	0	0	0	1	0	0	2
681:	0	1	1	0	0	1	0	0
689:	0	0	1	0	0	0	2	0
697:	0	0	0	0	0	1	1	0
705:	1	0	2	1	0	0	0	0
713:	1	0	0	1	1	2	1	1
721:	0	0	1	0	1	0	0	0
729:	0	1	0	0	1	2	0	0
737:	2	1	1	0	2	2	2	1
745:	1	1	1	0	0	0	0	0
753:	1	0	0	0	0	0	1	0
761:	1	1	0	0	0	0	0	0
769:	0	0	0	0	0	1	0	1
777:	0	1	0	0	0	0	0	0
785:	0	0	0	0	1	0	0	0
793:	0	0	0	0	0	0	1	0

801:	1	1	0	0	0	0	0	1

Sample Title: 20

Channel								
809:	0	1	1	0	0	0	1	1
817:	0	1	0	0	1	0	0	1
825:	0	0	1	0	0	2	0	1
833:	0	0	0	0	0	0	1	0
841:	0	2	0	0	0	0	0	0
849:	0	0	0	0	0	2	0	0
857:	0	0	0	3	2	0	1	0
865:	2	1	0	2	0	0	1	0
873:	0	1	0	0	0	1	1	0
881:	0	0	0	1	1	1	1	1
889:	0	0	1	0	0	2	1	0
897:	1	1	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	1	0	1	0	1	1	0
921:	0	0	0	1	0	1	1	1
929:	1	2	1	0	1	0	2	1
937:	0	0	0	1	0	0	2	0
945:	0	0	0	0	0	0	2	1
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	1	1	1
969:	0	0	0	0	0	0	0	1
977:	1	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	1	0	0	0	1	0	0

12/2/2011 5:40:57 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 12/2/2011
Time : 5:40:57 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	12/2/2011 5:26:50 AM
Alpha_010	AIM21F	ALL	Passed	12/2/2011 5:26:51 AM
Alpha_011	AIM21F	ALL	Passed	12/2/2011 5:26:52 AM
Alpha_012	AIM21F	ALL	Passed	12/2/2011 5:26:53 AM
Alpha_013	AIM21F	ALL	Passed	12/2/2011 5:26:54 AM
Alpha_014	AIM21F	ALL	Passed	12/2/2011 5:26:54 AM
Alpha_015	AIM21F	ALL	Passed	12/2/2011 5:26:55 AM
Alpha_017	AIM730	ALL	Passed	12/2/2011 5:26:56 AM
Alpha_020	AIM730	ALL	Passed	12/2/2011 5:26:57 AM
Alpha_021	AIM730	ALL	Passed	12/2/2011 5:26:58 AM
Alpha_022	AIM730	ALL	Passed	12/2/2011 5:26:59 AM
Alpha_023	AIM730	ALL	Passed	12/2/2011 5:26:59 AM
Alpha_024	AIM730	ALL	Passed	12/2/2011 5:27:00 AM
Alpha_025	AIM730	ALL	Passed	12/2/2011 5:27:01 AM
Alpha_026	AIM730	ALL	Passed	12/2/2011 5:27:02 AM
Alpha_028	AIM730	Peak FWHM	Action	12/2/2011 5:27:03 AM
Alpha_029	AIM730	ALL	Passed	12/2/2011 5:27:04 AM
Alpha_030	AIM730	ALL	Passed	12/2/2011 5:27:04 AM
Alpha_031	AIM730	ALL	Passed	12/2/2011 5:27:05 AM
Alpha_033	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:07 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:08 AM
Alpha_035	Alpha Analyst100DC	ALL	Not Done	
Alpha_036	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:11 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:12 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:14 AM
Alpha_039	Alpha Analyst100DC	Peak Energy	Action	12/2/2011 5:27:15 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:17 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:18 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:20 AM
Alpha_043	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:21 AM
Alpha_044	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:23 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:25 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:26 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:28 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:29 AM

APPROVED BY: _____

12/2/11

12/2/2011 6:05:22 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

ıte : 12/2/2011
ne : 6:05:22 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_035	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:54:50 AM

APPROVED BY: _____

APPROVAL DATE: 12/2/2011

SECTION X

ANALYTICAL DATA (RADIUM-228)

11-11140
Ra228
Run 1

Work Order	11-11140
Analysis Code	Ra228
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 904.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	Yttirum
Carrier Conc (mg/ml)	30

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	IB3-6	41	11/18/11 00:00	1.0153E+00
04	DO	IB3-6	41	11/18/11 00:00	1.0024E+00
05	TRG	IB3-7	88	11/18/11 14:26	1.0208E+00
06	TRG	IB3-8	52	11/18/11 00:00	1.0409E+00
07	TRG	IB3-9	60	11/18/11 00:00	1.0167E+00
08	TRG	IB3-6A	50	11/18/11 00:00	1.0530E+00
09	TRG	IB3-6B	44	11/18/11 00:00	1.0287E+00
10	TRG	IB3-6C	54	11/18/11 00:00	1.0428E+00
11	TRG	IB3-6D	47	11/18/11 00:00	1.0017E+00
12	TRG	IB3-6E	35	11/18/11 00:00	1.0015E+00
13	TRG	IB4-1	38	11/18/11 13:44	1.0214E+00
14	TRG	IB4-2	52	11/18/11 13:35	1.0119E+00
15	TRG	IB4-3	47	11/18/11 13:50	1.0258E+00
16	TRG	IB4-4	47	11/18/11 14:00	1.0079E+00
17	TRG	IB4-5	48	11/18/11 13:30	1.0041E+00
18	TRG	BKG-1	53	11/18/11 00:00	1.0039E+00
19	TRG	BKG-2	53	11/18/11 00:00	1.0381E+00
20	TRG	BKG-3	45	11/18/11 13:25	1.0576E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9106	1009.4	466.9	102.69	2.000	0.0969	0.1493	0.0524	87.33	89.68	1.00	1.00
02	MBL	0.9088	1007.4	494.8	109.04	2.000	0.0970	0.1482	0.0512	85.33	93.05	1.00	1.00
03	DUP	0.9086	1007.2	444.8	98.04	2.000	0.0965	0.1488	0.0523	87.17	85.46	1.00	1.00
04	DO	0.9074	1005.8	453.8	100.16	2.000	0.0974	0.1490	0.0516	86.00	86.14	1.00	1.00
05	TRG	0.9083	1006.8	382.0	84.23	2.000	0.0970	0.1501	0.0531	88.50	74.54	1.00	1.00
06	TRG	0.9069	1005.3	376.0	83.03	2.000	0.0966	0.1508	0.0542	90.33	75.01	1.00	1.00
07	TRG	0.9081	1006.6	403.8	89.06	2.000	0.0967	0.1503	0.0536	89.33	79.56	1.00	1.00
08	TRG	0.9074	1005.8	468.8	103.47	2.000	0.0964	0.1500	0.0536	89.33	92.43	1.00	1.00
09	TRG	0.9070	1005.4	433.6	95.74	2.000	0.0963	0.1491	0.0528	88.00	84.25	1.00	1.00
10	TRG	0.9062	1004.5	471.3	104.16	2.000	0.0961	0.1498	0.0537	89.50	93.22	1.00	1.00
11	TRG	0.9080	1006.5	429.0	94.62	2.000	0.0970	0.1487	0.0517	86.17	81.53	1.00	1.00
12	TRG	0.9059	1004.2	447.6	98.95	2.000	0.0964	0.1504	0.0540	90.00	89.06	1.00	1.00
13	TRG	0.9066	1004.9	423.2	93.49	2.000	0.0968	0.1507	0.0539	89.83	83.98	1.00	1.00
14	TRG	0.9049	1003.1	441.5	97.71	2.000	0.0969	0.1507	0.0538	89.67	87.62	1.00	1.00
15	TRG	0.9058	1004.1	434.3	96.03	2.000	0.0966	0.1496	0.0530	88.33	84.82	1.00	1.00
16	TRG	0.9050	1003.2	383.3	84.82	2.000	0.0965	0.1505	0.0540	90.00	76.34	1.00	1.00
17	TRG	0.9050	1003.2	406.0	89.85	2.000	0.0974	0.1500	0.0526	87.67	78.77	1.00	1.00
18	TRG	0.9060	1004.3	433.5	95.83	2.000	0.0966	0.1496	0.0530	88.33	84.65	1.00	1.00
19	TRG	0.9056	1003.8	471.4	104.25	2.000	0.0964	0.1496	0.0532	88.67	92.44	1.00	1.00
20	TRG	0.9058	1004.1	437.8	96.80	2.000	0.0970	0.1509	0.0539	89.83	86.96	1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11140
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
02	MBL			11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
03	DUP			11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
04	DO	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
05	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
06	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
07	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
08	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
09	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
10	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
11	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
12	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
13	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
14	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
15	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
16	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
17	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
18	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
19	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH
20	TRG	11/23/11 08:02	KSALLINGS	11/23/11 07:44	JBARNARD	11/30/11 10:34	TSMITH	12/08/11 06:53	TSMITH

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/g	6.57E+00	8.03E-01	1.11E+00	8.54E+00	76.98	OK		OK	
02	RA-228	MBL	BLANK	pCi/g	8.04E-01	4.73E-01	9.15E-01					OK	OK
03	RA-228	DUP	IB3-6	pCi/g	1.17E+00	6.21E-01	1.20E+00				NA	OK	
04	RA-228	DO	IB3-6	pCi/g	1.64E+00	5.88E-01	1.07E+00					OK	
05	RA-228	TRG	IB3-7	pCi/g	1.34E+01	1.09E+00	1.20E+00					OK	
06	RA-228	TRG	IB3-8	pCi/g	1.33E+01	1.09E+00	1.19E+00					OK	
07	RA-228	TRG	IB3-9	pCi/g	3.77E+00	7.88E-01	1.33E+00					OK	
08	RA-228	TRG	IB3-6A	pCi/g	1.51E+00	5.13E-01	9.25E-01					OK	
09	RA-228	TRG	IB3-6B	pCi/g	1.59E+00	5.20E-01	9.15E-01					OK	
10	RA-228	TRG	IB3-6C	pCi/g	8.28E-01	4.94E-01	9.58E-01					OK	
11	RA-228	TRG	IB3-6D	pCi/g	1.37E+00	5.71E-01	1.05E+00					OK	
12	RA-228	TRG	IB3-6E	pCi/g	2.06E+00	5.71E-01	9.70E-01					OK	
13	RA-228	TRG	IB4-1	pCi/g	1.95E+00	6.64E-01	1.18E+00					OK	
14	RA-228	TRG	IB4-2	pCi/g	8.52E-01	5.95E-01	1.18E+00					OK	
15	RA-228	TRG	IB4-3	pCi/g	1.70E+00	5.99E-01	1.08E+00					OK	
16	RA-228	TRG	IB4-4	pCi/g	2.33E+00	6.88E-01	1.20E+00					OK	
17	RA-228	TRG	IB4-5	pCi/g	1.53E+00	6.58E-01	1.23E+00					OK	
18	RA-228	TRG	BKG-1	pCi/g	1.14E+00	6.93E-01	1.36E+00					OK	
19	RA-228	TRG	BKG-2	pCi/g	7.20E-01	5.67E-01	1.11E+00					OK	
20	RA-228	TRG	BKG-3	pCi/g	1.62E+00	5.99E-01	1.10E+00					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	11/22/11 00:00	1.00E+00	102.69	87.33	89.68	1.00	11/30/2011 10:34	12/8/2011 6:53
02	RA-228	MBL	11/22/11 00:00	1.00E+00	109.04	85.33	93.05	1.00	11/30/2011 10:34	12/8/2011 6:53
03	RA-228	DUP	11/18/11 00:00	1.02E+00	98.04	87.17	85.46	1.00	11/30/2011 10:34	12/8/2011 6:53
04	RA-228	DO	11/18/11 00:00	1.00E+00	100.16	86.00	86.14	1.00	11/30/2011 10:34	12/8/2011 6:53
05	RA-228	TRG	11/18/11 14:26	1.02E+00	84.23	88.50	74.54	1.00	11/30/2011 10:34	12/8/2011 6:53
06	RA-228	TRG	11/18/11 00:00	1.04E+00	83.03	90.33	75.01	1.00	11/30/2011 10:34	12/8/2011 6:53
07	RA-228	TRG	11/18/11 00:00	1.02E+00	89.06	89.33	79.56	1.00	11/30/2011 10:34	12/8/2011 6:53
08	RA-228	TRG	11/18/11 00:00	1.05E+00	103.47	89.33	92.43	1.00	11/30/2011 10:34	12/8/2011 6:53
09	RA-228	TRG	11/18/11 00:00	1.03E+00	95.74	88.00	84.25	1.00	11/30/2011 10:34	12/8/2011 6:53
10	RA-228	TRG	11/18/11 00:00	1.04E+00	104.16	89.50	93.22	1.00	11/30/2011 10:34	12/8/2011 6:53
11	RA-228	TRG	11/18/11 00:00	1.00E+00	94.62	86.17	81.53	1.00	11/30/2011 10:34	12/8/2011 6:53
12	RA-228	TRG	11/18/11 00:00	1.00E+00	98.95	90.00	89.06	1.00	11/30/2011 10:34	12/8/2011 6:53
13	RA-228	TRG	11/18/11 13:44	1.02E+00	93.49	89.83	83.98	1.00	11/30/2011 10:34	12/8/2011 6:53
14	RA-228	TRG	11/18/11 13:35	1.01E+00	97.71	89.67	87.62	1.00	11/30/2011 10:34	12/8/2011 6:53
15	RA-228	TRG	11/18/11 13:50	1.03E+00	96.03	88.33	84.82	1.00	11/30/2011 10:34	12/8/2011 6:53
16	RA-228	TRG	11/18/11 14:00	1.01E+00	84.82	90.00	76.34	1.00	11/30/2011 10:34	12/8/2011 6:53
17	RA-228	TRG	11/18/11 13:30	1.00E+00	89.85	87.67	78.77	1.00	11/30/2011 10:34	12/8/2011 6:53
18	RA-228	TRG	11/18/11 00:00	1.00E+00	95.83	88.33	84.65	1.00	11/30/2011 10:34	12/8/2011 6:53
19	RA-228	TRG	11/18/11 00:00	1.04E+00	104.25	88.67	92.44	1.00	11/30/2011 10:34	12/8/2011 6:53
20	RA-228	TRG	11/18/11 13:25	1.06E+00	96.80	89.83	86.96	1.00	11/30/2011 10:34	12/8/2011 6:53

Preliminary Data Report & Analytical Calculations
Work Order: 11-11140-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11140
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	12/08/11 10:14		LB4110A	B1	120	603	1.333333333	0.4626
02	RA-228	MBL	12/08/11 10:14		LB4110A	B2	120	175	0.983333333	0.4691
03	RA-228	DUP	12/08/11 10:14		LB4110A	B3	120	238	1.366666667	0.449
04	RA-228	DO	12/08/11 10:14		LB4110A	B4	120	242	1.133333333	0.4619
05	RA-228	TRG	12/08/11 10:14		LB4110A	C1	120	905	1.116666667	0.4667
06	RA-228	TRG	12/08/11 10:14		LB4110A	C2	120	909	1.116666667	0.4578
07	RA-228	TRG	12/08/11 10:14		LB4110A	C3	120	425	1.6	0.4699
08	RA-228	TRG	12/08/11 10:14		LB4110A	D2	120	244	1.1	0.4682
09	RA-228	TRG	12/08/11 10:14		LB4110A	D4	120	210	0.866666667	0.4741
10	RA-228	TRG	12/08/11 10:54		LB4110R	A2	120	179	1.016666667	0.4699
11	RA-228	TRG	12/08/11 10:54		LB4110R	A3	120	189	0.9	0.4809
12	RA-228	TRG	12/08/11 10:54		LB4110R	A4	120	237	0.883333333	0.4732
13	RA-228	TRG	12/08/11 10:54		LB4110R	B1	120	270	1.25	0.4754
14	RA-228	TRG	12/08/11 10:54		LB4110R	B2	120	205	1.266666667	0.4658
15	RA-228	TRG	12/08/11 10:54		LB4110R	B3	120	231	1.05	0.4713
16	RA-228	TRG	12/08/11 10:54		LB4110R	B4	120	253	1.033333333	0.4773
17	RA-228	TRG	12/08/11 10:54		LB4110R	C1	120	220	1.116666667	0.4705
18	RA-228	TRG	12/08/11 10:54		LB4110R	C2	120	258	1.583333333	0.4676
19	RA-228	TRG	12/08/11 10:54		LB4110R	C3	120	204	1.3	0.4614
20	RA-228	TRG	12/08/11 10:54		LB4110R	C4	120	252	1.216666667	0.4714

Count Room Report
Client: Foxfire Scientific, Inc.

11-11140-Ra228-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9106	1009.3755	466.9000	102.69	1.00	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9088	1007.3803	494.8000	109.04	1.00	1.00
03	DUP	IB3-6	11/18/11 00:00	1.0153	0.9086	1007.1586	444.8000	98.04	1.00	1.00
04	DO	IB3-6	11/18/11 00:00	1.0024	0.9074	1005.8284	453.8000	100.16	1.00	1.00
05	TRG	IB3-7	11/18/11 14:26	1.0208	0.9083	1006.8260	382.0000	84.23	1.00	1.00
06	TRG	IB3-8	11/18/11 00:00	1.0409	0.9069	1005.2742	376.0000	83.03	1.00	1.00
07	TRG	IB3-9	11/18/11 00:00	1.0167	0.9081	1006.6043	403.8000	89.06	1.00	1.00
08	TRG	IB3-6A	11/18/11 00:00	1.0530	0.9074	1005.8284	468.8000	103.47	1.00	1.00
09	TRG	IB3-6B	11/18/11 00:00	1.0287	0.9070	1005.3850	433.6000	95.74	1.00	1.00
10	TRG	IB3-6C	11/18/11 00:00	1.0428	0.9062	1004.4982	471.3000	104.16	1.00	1.00
11	TRG	IB3-6D	11/18/11 00:00	1.0017	0.9080	1006.4935	429.0000	94.62	1.00	1.00
12	TRG	IB3-6E	11/18/11 00:00	1.0015	0.9059	1004.1657	447.6000	98.95	1.00	1.00
13	TRG	IB4-1	11/18/11 13:44	1.0214	0.9066	1004.9416	423.2000	93.49	1.00	1.00
14	TRG	IB4-2	11/18/11 13:35	1.0119	0.9049	1003.0572	441.5000	97.71	1.00	1.00
15	TRG	IB4-3	11/18/11 13:50	1.0258	0.9058	1004.0548	434.3000	96.03	1.00	1.00
16	TRG	IB4-4	11/18/11 14:00	1.0079	0.9050	1003.1681	383.3000	84.82	1.00	1.00
17	TRG	IB4-5	11/18/11 13:30	1.0041	0.9050	1003.1681	406.0000	89.85	1.00	1.00
18	TRG	BKG-1	11/18/11 00:00	1.0039	0.9060	1004.2765	433.5000	95.83	1.00	1.00
19	TRG	BKG-2	11/18/11 00:00	1.0381	0.9056	1003.8331	471.4000	104.25	1.00	1.00
20	TRG	BKG-3	11/18/11 13:25	1.0576	0.9058	1004.0548	437.8000	96.80	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 7:44 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11140	1	Ra228	11/23/2011 7:42	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-11	46.218	11/23/2011	0.430	0.4101				8.54	0.435	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9106	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9088	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9086	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9074	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9083	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9069	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9081	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9074	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9070	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.9062	0.9100
11	Ba-133	Ba-6a	1108.473	11/23/2011	0.9080	0.9100
12	Ba-133	Ba-6a	1108.473	11/23/2011	0.9059	0.9100
13	Ba-133	Ba-6a	1108.473	11/23/2011	0.9066	0.9100
14	Ba-133	Ba-6a	1108.473	11/23/2011	0.9049	0.9100
15	Ba-133	Ba-6a	1108.473	11/23/2011	0.9058	0.9100
16	Ba-133	Ba-6a	1108.473	11/23/2011	0.9050	0.9100
17	Ba-133	Ba-6a	1108.473	11/23/2011	0.9050	0.9100
18	Ba-133	Ba-6a	1108.473	11/23/2011	0.9060	0.9100
19	Ba-133	Ba-6a	1108.473	11/23/2011	0.9056	0.9100
20	Ba-133	Ba-6a	1108.473	11/23/2011	0.9058	0.9100

Balance Printer Tapes

Tracer	LCS

Matrix Spike

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11140	1	Ra228	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	IB3-6	DUP					1.0153E+00	1.0153E+00				
04	IB3-6	DO					1.0024E+00	1.0024E+00				
05	IB3-7	TRG					1.0208E+00	1.0208E+00				
06	IB3-8	TRG					1.0409E+00	1.0409E+00				
07	IB3-9	TRG					1.0167E+00	1.0167E+00				
08	IB3-6A	TRG					1.0530E+00	1.0530E+00				
09	IB3-6B	TRG					1.0287E+00	1.0287E+00				
10	IB3-6C	TRG					1.0428E+00	1.0428E+00				
11	IB3-6D	TRG					1.0017E+00	1.0017E+00				
12	IB3-6E	TRG					1.0015E+00	1.0015E+00				
13	IB4-1	TRG					1.0214E+00	1.0214E+00				
14	IB4-2	TRG					1.0119E+00	1.0119E+00				
15	IB4-3	TRG					1.0258E+00	1.0258E+00				
16	IB4-4	TRG					1.0079E+00	1.0079E+00				
17	IB4-5	TRG					1.0041E+00	1.0041E+00				
18	BKG-1	TRG					1.0039E+00	1.0039E+00				
19	BKG-2	TRG					1.0381E+00	1.0381E+00				
20	BKG-3	TRG					1.0576E+00	1.0576E+00				

Comments	

Technician: _____ Date: 11/23/11

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11140	1	Ra228	Yttirum	30.0000	TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Data: Filter Final (g)	Filter Data: Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS	2.0000	0.0969	0.1493	0.0524	87.33
02	BLANK	MBL	2.0000	0.0970	0.1482	0.0512	85.33
03	DUP	DUP	2.0000	0.0965	0.1488	0.0523	87.17
04	IB3-6	DO	2.0000	0.0974	0.1490	0.0516	86.00
05	IB3-7	TRG	2.0000	0.0970	0.1501	0.0531	88.50
06	IB3-8	TRG	2.0000	0.0966	0.1508	0.0542	90.33
07	IB3-9	TRG	2.0000	0.0967	0.1503	0.0536	89.33
08	IB3-6A	TRG	2.0000	0.0964	0.1500	0.0536	89.33
09	IB3-6B	TRG	2.0000	0.0963	0.1491	0.0528	88.00
10	IB3-6C	TRG	2.0000	0.0961	0.1498	0.0537	89.50
11	IB3-6D	TRG	2.0000	0.0970	0.1487	0.0517	86.17
12	IB3-6E	TRG	2.0000	0.0964	0.1504	0.0540	90.00
13	IB4-1	TRG	2.0000	0.0968	0.1507	0.0539	89.83
14	IB4-2	TRG	2.0000	0.0969	0.1507	0.0538	89.67
15	IB4-3	TRG	2.0000	0.0966	0.1496	0.0530	88.33
16	IB4-4	TRG	2.0000	0.0965	0.1505	0.0540	90.00
17	IB4-5	TRG	2.0000	0.0974	0.1500	0.0526	87.67
18	BKG-1	TRG	2.0000	0.0966	0.1496	0.0530	88.33
19	BKG-2	TRG	2.0000	0.0964	0.1496	0.0532	88.67
20	BKG-3	TRG	2.0000	0.0970	0.1509	0.0539	89.83

Technician: [illegible] Date: 12/8/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11140	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	IB3-6	13.5500	554.6500	431.7000	541.1000	418.1500	22.72%	77.28%			
05	IB3-7	13.5600	192.0600	128.4900	178.5000	114.9300	35.61%	64.39%			
06	IB3-8	13.5700	249.6000	132.0100	236.0300	118.4400	49.82%	50.18%			
07	IB3-9	13.5400	303.6200	244.9000	290.0800	231.3600	20.24%	79.76%			
08	IB3-6A	13.6000	296.8600	234.4700	283.2600	220.8700	22.03%	77.97%			
09	IB3-6B	13.5300	312.9300	249.7700	299.4000	236.2400	21.10%	78.90%			
10	IB3-6C	13.5700	288.0200	224.2900	274.4500	210.7200	23.22%	76.78%			
11	IB3-6D	13.6500	303.7800	232.3600	290.1300	218.7100	24.62%	75.38%			
12	IB3-6E	13.7000	278.0400	218.9700	264.3400	205.2700	22.35%	77.65%			
13	IB4-1	13.5100	240.8500	190.0300	227.3400	176.5200	22.35%	77.65%			
14	IB4-2	13.4200	215.2900	172.1500	201.8700	158.7300	21.37%	78.63%			
15	IB4-3	13.5200	236.9100	201.6400	223.3900	188.1200	15.79%	84.21%			
16	IB4-4	13.4200	205.7100	149.4700	192.2900	136.0500	29.25%	70.75%			
17	IB4-5	13.5100	213.0000	176.0400	199.4900	162.5300	18.53%	81.47%			
18	BKG-1	13.5400	349.7300	297.4900	336.1900	283.9500	15.54%	84.46%			
19	BKG-2	13.6000	291.8700	253.1300	278.2700	239.5300	13.92%	86.08%			
20	BKG-3	13.6200	182.5900	138.0100	168.9700	124.3900	26.38%	73.62%			

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenny Sallings Date: **Analysis: Rough Prep Logbook**

Analysis: Ra228 Page No. 7856

12/8/11
(7)

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
B1	1111140-01	18	603	120	1400	12/8/11 12:14
B2	1111140-02	8	175	120	1400	12/8/11 12:14
B3	1111140-03	15	238	120	1400	12/8/11 12:14
B4	1111140-04	7	242	120	1400	12/8/11 12:14
C1	1111140-05	30	905	120	1400	12/8/11 12:14
C2	1111140-06	20	909	120	1400	12/8/11 12:14
C3	1111140-07	17	425	120	1400	12/8/11 12:14
D2	1111140-08	10	244	120	1400	12/8/11 12:14
D4	1111140-09	18	210	120	1400	12/8/11 12:14

(R) 12/9/11 KB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1111140-17	13	220	120	1400	12/8/11 12:54
C2	1111140-18	13	258	120	1400	12/8/11 12:54
C3	1111140-19	12	204	120	1400	12/8/11 12:54
C4	1111140-20	14	252	120	1400	12/8/11 12:54
A2	1111140-10	8	179	120	1400	12/8/11 12:54
A3	1111140-11	18	189	120	1400	12/8/11 12:54
A4	1111140-12	8	237	120	1400	12/8/11 12:54
B1	1111140-13	15	270	120	1400	12/8/11 12:54
B2	1111140-14	14	205	120	1400	12/8/11 12:54
B3	1111140-15	8	231	120	1400	12/8/11 12:54
B4	1111140-16	10	253	120	1400	12/8/11 12:54

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

121814

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-2.53E+01	3.62E-01	2.60E+01
LB4110A - A2	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-2.15E+01	3.44E-01	2.22E+01
LB4110A - A3	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-2.09E+01	2.98E-01	2.15E+01
LB4110A - A4	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-2.22E+01	3.23E-01	2.29E+01
LB4110A - B1	Alpha	11/18/2007	12/8/2011	6.67E-02	P	-1.16E-01	7.47E-02	2.65E-01
LB4110A - B2	Alpha	11/18/2007	12/8/2011	1.17E-01	P	-6.68E-02	7.18E-02	2.10E-01
LB4110A - B3	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-5.90E-02	4.80E-02	1.55E-01
LB4110A - B4	Alpha	11/18/2007	12/8/2011	1.17E-01	P	-4.95E-02	5.97E-02	1.69E-01
LB4110A - C1	Alpha	11/18/2007	12/8/2011	6.67E-02	P	-6.42E-02	7.58E-02	2.16E-01
LB4110A - C2	Alpha	11/18/2007	12/8/2011	3.33E-02	P	-1.83E-01	9.77E-02	3.79E-01
LB4110A - C3	Alpha	11/18/2007	12/8/2011	1.33E-01	P	-2.06E-01	1.05E-01	4.15E-01
LB4110A - C4	Alpha	11/18/2007	12/8/2011	3.33E-02	P	-6.83E-02	7.26E-02	2.13E-01
LB4110A - D1	Alpha	11/18/2007	12/8/2011	1.67E-02	P	-5.94E-02	8.30E-02	2.26E-01
LB4110A - D2	Alpha	11/18/2007	12/8/2011	0.00E+00	P	-7.00E-02	6.10E-02	1.92E-01
LB4110A - D3	Alpha	11/18/2007	12/8/2011	1.17E-01	P	-4.80E-02	6.88E-02	1.86E-01
LB4110A - D4	Alpha	11/18/2007	12/8/2011	5.00E-02	P	-5.77E-02	7.34E-02	2.04E-01
LB4110R - A1	Alpha	11/24/2006	12/8/2011	1.33E-01	P	-1.13E-01	9.00E-02	2.93E-01
LB4110R - A2	Alpha	11/24/2006	12/8/2011	3.33E-02	P	-9.49E-02	8.48E-02	2.64E-01
LB4110R - A3	Alpha	11/24/2006	12/8/2011	1.00E-01	P	-8.09E-02	7.29E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	12/8/2011	3.33E-02	P	-5.23E-02	7.78E-02	2.08E-01
LB4110R - B1	Alpha	11/24/2006	12/8/2011	5.00E-02	P	-1.07E-01	6.38E-02	2.34E-01
LB4110R - B2	Alpha	11/24/2006	12/8/2011	1.67E-02	P	-7.42E-02	6.91E-02	2.12E-01
LB4110R - B3	Alpha	11/24/2006	12/8/2011	6.67E-02	P	-6.85E-02	6.80E-02	2.04E-01
LB4110R - B4	Alpha	11/24/2006	12/8/2011	5.00E-02	P	-6.68E-02	7.57E-02	2.18E-01
LB4110R - C1	Alpha	11/24/2006	12/8/2011	8.33E-02	P	-8.40E-02	7.90E-02	2.42E-01
LB4110R - C2	Alpha	11/24/2006	12/8/2011	0.00E+00	P	-7.98E-02	7.73E-02	2.34E-01
LB4110R - C3	Alpha	11/24/2006	12/8/2011	8.33E-02	P	-9.72E-02	8.53E-02	2.68E-01
LB4110R - C4	Alpha	11/24/2006	12/8/2011	8.33E-02	P	-6.70E-02	8.67E-02	2.40E-01
LB4110R - D1	Alpha	11/24/2006	12/8/2011	3.33E-02	P	-8.28E-02	8.22E-02	2.47E-01
LB4110R - D2	Alpha	11/24/2006	12/8/2011	1.00E-01	P	-6.10E-02	8.20E-02	2.25E-01
LB4110R - D3	Alpha	11/24/2006	12/8/2011	6.67E-02	P	-5.72E-02	7.43E-02	2.06E-01
LB4110R - D4	Alpha	11/24/2006	12/8/2011	6.67E-02	P	-5.59E-02	8.81E-02	2.32E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

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GPC Detector Report
(ALL Backgrounds)

121814

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/8/2011	1.67E-02	P	-4.12E+01	2.71E+00	4.67E+01
LB4110A - A2	Beta	11/18/2007	12/8/2011	3.33E-02	P	-3.51E+01	1.89E+00	3.89E+01
LB4110A - A3	Beta	11/18/2007	12/8/2011	6.67E-02	P	-3.59E+01	1.68E+00	3.93E+01
LB4110A - A4	Beta	11/18/2007	12/8/2011	5.00E-02	P	-3.74E+01	2.22E+00	4.18E+01
LB4110A - B1	Beta	11/18/2007	12/8/2011	1.33E+00	P	-7.44E+00	3.00E+00	1.34E+01
LB4110A - B2	Beta	11/18/2007	12/8/2011	9.83E-01	P	1.97E-01	1.40E+00	2.60E+00
LB4110A - B3	Beta	11/18/2007	12/8/2011	1.37E+00	P	2.64E-01	1.41E+00	2.56E+00
LB4110A - B4	Beta	11/18/2007	12/8/2011	1.13E+00	P	1.25E-01	1.38E+00	2.63E+00
LB4110A - C1	Beta	11/18/2007	12/8/2011	1.12E+00	P	-6.33E+00	2.45E+00	1.12E+01
LB4110A - C2	Beta	11/18/2007	12/8/2011	1.12E+00	P	3.33E-01	1.32E+00	2.30E+00
LB4110A - C3	Beta	11/18/2007	12/8/2011	1.60E+00	P	4.79E-01	1.53E+00	2.58E+00
LB4110A - C4	Beta	11/18/2007	12/8/2011	6.20E+00	W	-1.74E+00	2.30E+00	6.34E+00
LB4110A - D1	Beta	11/18/2007	12/8/2011	1.95E+00	P	-3.01E+00	2.68E+00	8.38E+00
LB4110A - D2	Beta	11/18/2007	12/8/2011	1.10E+00	P	-9.02E-01	1.62E+00	4.14E+00
LB4110A - D3	Beta	11/18/2007	12/8/2011	4.70E+00	P	7.20E-01	4.36E+00	8.00E+00
LB4110A - D4	Beta	11/18/2007	12/8/2011	8.67E-01	P	-6.15E-01	1.43E+00	3.48E+00
LB4110R - A1	Beta	11/24/2006	12/8/2011	6.13E+00	P	-7.01E+01	4.41E+00	7.89E+01
LB4110R - A2	Beta	11/24/2006	12/8/2011	1.02E+00	P	-5.58E+01	2.37E+00	6.06E+01
LB4110R - A3	Beta	11/24/2006	12/8/2011	9.00E-01	P	-5.16E+01	3.27E+00	5.81E+01
LB4110R - A4	Beta	11/24/2006	12/8/2011	8.83E-01	P	-5.16E+01	2.26E+00	5.62E+01
LB4110R - B1	Beta	11/24/2006	12/8/2011	1.25E+00	P	-5.43E+01	2.27E+00	5.88E+01
LB4110R - B2	Beta	11/24/2006	12/8/2011	1.27E+00	P	-5.42E+01	2.32E+00	5.89E+01
LB4110R - B3	Beta	11/24/2006	12/8/2011	1.05E+00	P	-5.39E+01	3.09E+00	6.01E+01
LB4110R - B4	Beta	11/24/2006	12/8/2011	1.03E+00	P	-5.44E+01	2.15E+00	5.87E+01
LB4110R - C1	Beta	11/24/2006	12/8/2011	1.12E+00	P	-5.40E+01	3.57E+00	6.11E+01
LB4110R - C2	Beta	11/24/2006	12/8/2011	1.58E+00	P	-5.42E+01	3.04E+00	6.03E+01
LB4110R - C3	Beta	11/24/2006	12/8/2011	1.30E+00	P	-5.47E+01	2.89E+00	6.05E+01
LB4110R - C4	Beta	11/24/2006	12/8/2011	1.22E+00	P	-6.17E+01	3.36E+00	6.84E+01
LB4110R - D1	Beta	11/24/2006	12/8/2011	7.13E+00	P	-5.05E+01	6.89E+00	6.43E+01
LB4110R - D2	Beta	11/24/2006	12/8/2011	1.05E+00	P	-5.52E+01	2.18E+00	5.96E+01
LB4110R - D3	Beta	11/24/2006	12/8/2011	3.25E+00	P	-5.85E+01	6.33E+00	7.11E+01
LB4110R - D4	Beta	11/24/2006	12/8/2011	1.02E+00	P	-5.49E+01	2.53E+00	5.99E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

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Oak Ridge Laboratory

GPC Detector Report
(ALL Efficiencies)

12184

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/8/2011	0.0000	F	0.1192	0.2388	0.3584
LB4110A - A2	Alpha	11/18/2007	12/8/2011	0.0000	F	0.1033	0.2099	0.3164
LB4110A - A3	Alpha	11/18/2007	12/8/2011	0.0000	F	0.1029	0.2075	0.3120
LB4110A - A4	Alpha	11/18/2007	12/8/2011	0.0000	F	0.1092	0.2181	0.3270
LB4110A - B1	Alpha	11/18/2007	12/8/2011	0.2096	W	0.2065	0.2270	0.2475
LB4110A - B2	Alpha	11/18/2007	12/8/2011	0.2162	P	0.2088	0.2249	0.2410
LB4110A - B3	Alpha	11/18/2007	12/8/2011	0.2408	P	0.2259	0.2410	0.2561
LB4110A - B4	Alpha	11/18/2007	12/8/2011	0.2360	P	0.2224	0.2381	0.2537
LB4110A - C1	Alpha	11/18/2007	12/8/2011	0.2116	W	0.2102	0.2214	0.2326
LB4110A - C2	Alpha	11/18/2007	12/8/2011	0.2183	P	0.2049	0.2259	0.2468
LB4110A - C3	Alpha	11/18/2007	12/8/2011	0.2419	P	0.2374	0.2494	0.2614
LB4110A - C4	Alpha	11/18/2007	12/8/2011	0.2146	P	0.2061	0.2272	0.2483
LB4110A - D1	Alpha	11/18/2007	12/8/2011	0.2284	P	0.2190	0.2365	0.2540
LB4110A - D2	Alpha	11/18/2007	12/8/2011	0.2598	P	0.2449	0.2611	0.2773
LB4110A - D3	Alpha	11/18/2007	12/8/2011	0.2661	P	0.2464	0.2663	0.2861
LB4110A - D4	Alpha	11/18/2007	12/8/2011	0.1907	P	0.1785	0.2043	0.2302
LB4110R - A1	Alpha	11/24/2006	12/8/2011	0.2370	P	0.2042	0.2396	0.2749
LB4110R - A2	Alpha	11/24/2006	12/8/2011	0.2112	P	0.1949	0.2227	0.2505
LB4110R - A3	Alpha	11/24/2006	12/8/2011	0.2203	P	0.2002	0.2266	0.2529
LB4110R - A4	Alpha	11/24/2006	12/8/2011	0.2450	P	0.2183	0.2465	0.2746
LB4110R - B1	Alpha	11/24/2006	12/8/2011	0.2247	P	0.1881	0.2276	0.2671
LB4110R - B2	Alpha	11/24/2006	12/8/2011	0.2188	P	0.1817	0.2195	0.2573
LB4110R - B3	Alpha	11/24/2006	12/8/2011	0.2358	P	0.2073	0.2449	0.2825
LB4110R - B4	Alpha	11/24/2006	12/8/2011	0.2292	P	0.1978	0.2347	0.2717
LB4110R - C1	Alpha	11/24/2006	12/8/2011	0.2103	P	0.1872	0.2161	0.2449
LB4110R - C2	Alpha	11/24/2006	12/8/2011	0.2265	P	0.1988	0.2260	0.2532
LB4110R - C3	Alpha	11/24/2006	12/8/2011	0.2325	P	0.2083	0.2412	0.2741
LB4110R - C4	Alpha	11/24/2006	12/8/2011	0.2092	P	0.1942	0.2269	0.2596
LB4110R - D1	Alpha	11/24/2006	12/8/2011	0.2272	P	0.1981	0.2285	0.2589
LB4110R - D2	Alpha	11/24/2006	12/8/2011	0.2555	P	0.2296	0.2592	0.2889
LB4110R - D3	Alpha	11/24/2006	12/8/2011	0.2500	P	0.2256	0.2536	0.2816
LB4110R - D4	Alpha	11/24/2006	12/8/2011	0.1931	P	0.1747	0.2068	0.2389
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

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GPC Detector Report
(ALL Efficiencies)

12/8/11

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/8/2011	0.3168	F	0.4774	0.5786	0.6799
LB4110A - A2	Beta	11/18/2007	12/8/2011	0.2972	F	0.4127	0.5118	0.6108
LB4110A - A3	Beta	11/18/2007	12/8/2011	0.2821	F	0.4230	0.5171	0.6111
LB4110A - A4	Beta	11/18/2007	12/8/2011	0.3115	F	0.4431	0.5391	0.6351
LB4110A - B1	Beta	11/18/2007	12/8/2011	0.5126	P	0.4928	0.5335	0.5742
LB4110A - B2	Beta	11/18/2007	12/8/2011	0.5126	P	0.4930	0.5316	0.5701
LB4110A - B3	Beta	11/18/2007	12/8/2011	0.5400	P	0.5058	0.5494	0.5930
LB4110A - B4	Beta	11/18/2007	12/8/2011	0.5527	P	0.5227	0.5541	0.5856
LB4110A - C1	Beta	11/18/2007	12/8/2011	0.4876	P	0.4802	0.5032	0.5261
LB4110A - C2	Beta	11/18/2007	12/8/2011	0.4850	P	0.4401	0.5029	0.5657
LB4110A - C3	Beta	11/18/2007	12/8/2011	0.5781	P	0.5647	0.5880	0.6114
LB4110A - C4	Beta	11/18/2007	12/8/2011	0.5058	P	0.4798	0.5289	0.5781
LB4110A - D1	Beta	11/18/2007	12/8/2011	0.5419	P	0.5121	0.5618	0.6115
LB4110A - D2	Beta	11/18/2007	12/8/2011	0.5703	P	0.5212	0.5995	0.6778
LB4110A - D3	Beta	11/18/2007	12/8/2011	0.6091	P	0.5660	0.6199	0.6739
LB4110A - D4	Beta	11/18/2007	12/8/2011	0.4558	P	0.4169	0.4846	0.5523
LB4110R - A1	Beta	11/24/2006	12/8/2011	0.5530	P	0.4812	0.5697	0.6582
LB4110R - A2	Beta	11/24/2006	12/8/2011	0.5095	P	0.4164	0.5087	0.6010
LB4110R - A3	Beta	11/24/2006	12/8/2011	0.5253	P	0.4647	0.5448	0.6249
LB4110R - A4	Beta	11/24/2006	12/8/2011	0.5972	P	0.5094	0.5913	0.6733
LB4110R - B1	Beta	11/24/2006	12/8/2011	0.5300	P	0.4554	0.5467	0.6380
LB4110R - B2	Beta	11/24/2006	12/8/2011	0.5025	P	0.4321	0.5239	0.6157
LB4110R - B3	Beta	11/24/2006	12/8/2011	0.5814	P	0.5008	0.5913	0.6818
LB4110R - B4	Beta	11/24/2006	12/8/2011	0.5484	P	0.4695	0.5554	0.6413
LB4110R - C1	Beta	11/24/2006	12/8/2011	0.5025	P	0.4259	0.5049	0.5840
LB4110R - C2	Beta	11/24/2006	12/8/2011	0.5258	P	0.4518	0.5315	0.6113
LB4110R - C3	Beta	11/24/2006	12/8/2011	0.5698	P	0.4803	0.5733	0.6662
LB4110R - C4	Beta	11/24/2006	12/8/2011	0.5159	P	0.4456	0.5350	0.6243
LB4110R - D1	Beta	11/24/2006	12/8/2011	0.5448	P	0.4634	0.5454	0.6273
LB4110R - D2	Beta	11/24/2006	12/8/2011	0.6109	P	0.5230	0.6110	0.6990
LB4110R - D3	Beta	11/24/2006	12/8/2011	0.6065	P	0.5081	0.5909	0.6738
LB4110R - D4	Beta	11/24/2006	12/8/2011	0.4635	P	0.4039	0.4921	0.5803
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

SECTION XI

BARIUM-133 ANALYTICAL TRACER DATA

VAX/VMS Peak Search Report Generated 1-DEC-2011 12:28:52.02

12/11m

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114001_GE5_BAFIL_171594.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 12:13:29.
Sample ID : 1111140-01 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.16	86	34	0.58	208.54	201	16	9.51E-02	19.5	
2	0	25.57	38	10	1.05	250.81	240	19	4.27E-02	25.1	
3	0	30.98	2371	127	0.70	302.67	285	28	2.63E+00	2.4	
4	1	35.08	441	19	0.66	342.06	329	33	4.90E-01	5.6	1.43E+00
5	1	36.02	122	17	0.60	351.00	329	33	1.36E-01	17.5	
6	0	61.94	294	16	1.00	599.54	586	33	3.27E-01	6.8	
7	0	65.89	69	80	0.58	637.42	624	22	7.64E-02	32.0	
8	1	79.77	39	8	0.76	770.48	760	36	4.38E-02	41.4	1.30E+00
9	1	81.23	925	18	0.69	784.47	760	36	1.03E+00	3.4	
10	0	96.84	9	14	0.51	934.11	927	14	1.00E-02	82.9	
11	0	102.27	17	14	0.50	986.24	981	14	1.89E-02	46.9	
12	0	112.17	218	40	0.60	1081.14	1070	22	2.43E-01	9.2	
13	0	161.30	28	28	1.63	1552.18	1534	23	3.09E-02	45.4	
14	0	239.07	26	4	0.65	2297.75	2287	19	2.86E-02	24.9	
15	0	276.87	49	13	0.38	2660.26	2644	25	5.39E-02	20.6	
16	3	303.41	92	3	1.03	2914.69	2901	25	1.03E-01	13.2	5.46E+00
17	3	303.96	64	0	0.86	2919.91	2901	25	7.16E-02	14.0	
18	1	333.59	23	0	0.98	3204.00	3194	28	2.55E-02	32.6	1.87E+00
19	1	334.21	52	0	0.98	3210.00	3194	28	5.80E-02	15.7	
20	0	356.77	437	8	0.92	3426.23	3410	33	4.86E-01	5.0	
21	2	384.48	24	9	1.12	3691.97	3680	25	2.61E-02	47.7	3.16E-01
22	2	384.81	80	7	0.97	3695.05	3680	25	8.88E-02	13.5	
23	5	387.61	162	24	1.16	3721.93	3708	25	1.80E-01	9.6	1.39E+00
24	5	388.14	34	20	1.02	3727.00	3708	25	3.81E-02	36.0	
25	0	415.79	21	7	0.11	3992.14	3978	21	2.29E-02	33.9	

Sample ID : 1111140-01 Acquisition date : 1-DEC-2011 12:13:29

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.668E+02	4.669E+02	0.781E+02	16.73	
		Total Activity :	4.668E+02	4.669E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.660E+02	2.660E+02	0.378E+02	14.23	
		Total Activity :	2.660E+02	2.660E+02			

Grand Total Activity : 7.328E+02 7.329E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-01
Acquisition date : 1-DEC-2011 12:13:29

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.668E+02	4.669E+02	16.73	OK
	302.84	17.80	2.575E+00	6.043E+02	6.044E+02	37.29	OK
	356.01	60.00	4.312E+00	5.072E+02	5.073E+02	17.59	OK

Final Mean for 3 Valid Peaks = 4.669E+02+/- 7.813E+01 (16.73%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.660E+02	2.660E+02	14.23	OK

Final Mean for 1 Valid Peaks = 2.660E+02+/- 3.785E+01 (14.23%)

Flag: "*" = Keyline

Sample ID : 1111140-01 Acquisition date : 1-DEC-2011 12:13:29

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.669E+02	7.813E+01	1.309E+01	1.928E+00	35.658
TH-234	2.660E+02	3.785E+01	2.489E+01	3.202E-01	10.686

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.815E+00		1.636E+01	2.910E+01	9.866E+00	-0.131
CD-109	1.212E+02		1.113E+02	2.240E+02	2.156E+01	0.541
PA-231	2.028E-01		1.119E+00	2.053E+00	2.311E-02	0.099
PA-234	3.961E+00	+	1.557E+00	2.099E+00	2.363E-02	1.887
NP-237	-1.531E+01		3.099E+01	5.265E+01	4.644E+00	-0.291
AM-241	-2.846E-01		1.760E+00	2.565E+00	2.888E-02	-0.111

VAX/VMS Peak Search Report Generated 1-DEC-2011 12:45:33.95

12/1/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114002_GE5_BAFIL_171596.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 12:30:16.
Sample ID : 1111140-02 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	19.84	26	24	0.67	195.86	186	30	2.88E-02	44.3	1.38E+00
2	2	21.07	96	8	0.62	207.71	186	30	1.07E-01	13.4	
3	0	30.98	2348	106	0.72	302.67	288	28	2.61E+00	2.4	
4	1	35.13	469	33	0.66	342.49	333	28	5.21E-01	5.7	1.70E+00
5	1	35.96	101	11	0.66	350.42	333	28	1.12E-01	25.2	
6	0	53.41	53	48	0.49	517.74	507	24	5.86E-02	33.3	
7	0	61.90	256	47	1.00	599.19	586	26	2.85E-01	8.8	
8	0	66.18	137	33	0.62	640.20	628	28	1.52E-01	13.1	
9	5	79.81	69	7	1.11	770.83	760	35	7.69E-02	22.5	1.29E+00
10	5	81.22	980	6	0.64	784.39	760	35	1.09E+00	3.3	
11	0	112.21	194	63	0.75	1081.47	1071	19	2.16E-01	11.0	
12	0	116.64	75	28	0.57	1123.99	1115	22	8.34E-02	19.3	
13	0	127.23	15	7	0.41	1225.53	1217	15	1.68E-02	42.3	
14	0	156.15	14	4	0.76	1502.77	1496	13	1.57E-02	37.1	
15	0	161.03	28	5	0.81	1549.54	1542	14	3.15E-02	23.4	
16	0	276.80	54	2	0.54	2659.50	2646	22	5.99E-02	14.8	
17	0	303.52	117	15	0.75	2915.74	2902	23	1.30E-01	11.2	
18	1	333.90	35	4	0.98	3207.00	3195	29	3.93E-02	25.4	2.40E+00
19	1	334.42	50	7	0.98	3212.00	3195	29	5.58E-02	18.7	
20	0	356.83	469	11	0.65	3426.82	3412	31	5.21E-01	4.9	
21	0	384.67	95	3	0.20	3693.80	3679	26	1.06E-01	10.9	
22	3	387.30	81	9	1.02	3719.00	3708	26	8.98E-02	16.3	1.39E+00
23	3	388.15	73	4	0.83	3727.11	3708	26	8.10E-02	15.9	
24	0	391.70	43	3	0.31	3761.14	3743	32	4.73E-02	18.5	
25	0	415.87	18	10	0.41	3992.86	3975	23	2.00E-02	43.5	

Summary of Nuclide Activity
Sample ID : 1111140-02 Acquisition date : 1-DEC-2011 12:30:16

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.948E+02	4.948E+02	0.821E+02	16.59	
			---	---			
Total Activity :			4.948E+02	4.948E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.313E+02	2.313E+02	0.419E+02	18.13	
			---	---			
Total Activity :			2.313E+02	2.313E+02			

Grand Total Activity :	7.260E+02	7.261E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-02
Acquisition date : 1-DEC-2011 12:30:16

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.948E+02	4.948E+02	16.59	OK
	302.84	17.80	2.575E+00	7.677E+02	7.678E+02	34.67	OK
	356.01	60.00	4.312E+00	5.439E+02	5.440E+02	17.46	OK

Final Mean for 3 Valid Peaks = 4.948E+02+/- 8.210E+01 (16.59%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.313E+02	2.313E+02	18.13	OK

Final Mean for 1 Valid Peaks = 2.313E+02+/- 4.192E+01 (18.13%)

Flag: "*" = Keyline

Sample ID : 1111140-02 Acquisition date : 1-DEC-2011 12:30:16

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.948E+02	8.210E+01	1.261E+01	1.857E+00	39.225
TH-234	2.313E+02	4.192E+01	2.611E+01	3.359E-01	8.859

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.945E+00		1.445E+01	2.743E+01	9.297E+00	0.071
CD-109	6.285E+01		1.031E+02	2.012E+02	1.936E+01	0.312
PA-231	8.027E-02		7.735E-01	1.473E+00	1.658E-02	0.054
PA-234	4.439E+00	+	1.203E+00	2.137E+00	2.406E-02	2.077
NP-237	-1.122E+01		3.053E+01	5.277E+01	4.654E+00	-0.213
AM-241	2.155E+00		1.691E+00	3.035E+00	3.416E-02	0.710

12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 13:05:35.53

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114003_GE5_BAFIL_171600.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 12:50:18.
Sample ID : 1111140-03 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3.67	13	47	0.29	40.87	38	10	1.47E-02	117.4	
2	0	8.37	6	7	0.23	85.94	80	8	6.75E-03	88.6	
3	0	16.31	12	8	0.69	162.08	156	11	1.33E-02	54.7	
4	0	21.13	76	46	0.55	208.31	197	21	8.42E-02	25.4	
5	0	30.99	2200	119	0.81	302.84	293	30	2.44E+00	2.6	
6	3	35.08	453	29	0.69	342.05	330	30	5.04E-01	5.8	1.26E+00
7	3	36.02	90	7	0.60	351.00	330	30	1.00E-01	24.4	
8	0	53.53	46	20	0.64	518.88	509	17	5.13E-02	24.0	
9	0	61.95	303	43	0.69	599.61	584	34	3.37E-01	8.1	
10	0	66.08	48	51	0.56	639.26	626	18	5.31E-02	34.4	
11	2	79.86	67	31	0.84	771.36	754	48	7.43E-02	27.6	1.09E+00
12	2	81.24	881	15	0.68	784.60	754	48	9.79E-01	3.5	
13	0	84.15	25	6	0.45	812.50	803	19	2.74E-02	29.0	
14	0	112.20	207	32	0.80	1081.40	1069	26	2.30E-01	9.5	
15	0	116.37	49	30	1.02	1121.39	1107	30	5.44E-02	30.9	
16	0	172.28	10	13	0.27	1657.48	1643	20	1.07E-02	85.0	
17	0	276.86	39	10	0.27	2660.12	2647	24	4.29E-02	23.9	
18	1	302.92	10	1	0.95	2910.00	2902	24	1.07E-02	86.4	2.38E+00
19	1	303.44	112	3	1.05	2914.91	2902	24	1.24E-01	9.9	
20	3	334.21	63	3	0.98	3210.00	3196	26	6.97E-02	13.2	8.03E-01
21	3	335.11	14	2	0.73	3218.55	3196	26	1.58E-02	29.7	
22	0	356.78	408	3	1.05	3426.33	3412	26	4.53E-01	5.0	
23	3	383.95	29	1	1.11	3686.87	3680	24	3.19E-02	24.4	9.01E-01
24	3	384.79	69	5	0.79	3694.89	3680	24	7.65E-02	14.8	
25	1	387.41	93	8	1.02	3720.00	3706	28	1.04E-01	14.5	1.10E+00
26	1	388.03	49	3	1.02	3726.00	3706	28	5.44E-02	25.2	

Sample ID : 1111140-03 Acquisition date : 1-DEC-2011 12:50:18

Total number of lines in spectrum	26	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	7	26.92%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.447E+02	4.448E+02	0.747E+02	16.79	
			---	---			
Total Activity :			4.447E+02	4.448E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	4.345E-01	4.345E-01	7.703E-01	177.28	
PA-234	4.47E+09Y	1.00	3.507E+00	3.507E+00	1.786E+00	50.93	
TH-234	4.47E+09Y	1.00	2.738E+02	2.738E+02	0.458E+02	16.74	
			---	---			
Total Activity :			2.777E+02	2.777E+02			

Grand Total Activity : 7.225E+02 7.225E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-03 Acquisition date : 1-DEC-2011 12:50:18

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.447E+02	4.448E+02	16.79	OK
	302.84	17.80	2.575E+00	6.324E+01	6.325E+01	174.74	OK
	356.01	60.00	4.312E+00	4.737E+02	4.738E+02	17.62	OK

Final Mean for 3 Valid Peaks = 4.448E+02+/- 7.466E+01 (16.79%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	4.345E-01	4.345E-01	177.28	OK
	10.11	20.20	1.000E+02	9.034E-01	9.034E-01	177.28	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	4.902E+02	4.902E+02	174.45	OK

Final Mean for 3 Valid Peaks = 4.345E-01+/- 7.703E-01 (177.28%)

PA-234	9.89	89.00	1.000E+02	2.050E-01	2.050E-01	177.28	OK
	21.72	64.90*	1.000E+02	3.507E+00	3.507E+00	50.93	OK
	37.93	23.75	1.000E+02	1.141E+01	1.141E+01	48.90	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.507E+00+/- 1.786E+00 (50.93%)

TH-234	63.29	3.80*	8.750E+01	2.738E+02	2.738E+02	16.74	OK

Final Mean for 1 Valid Peaks = 2.738E+02+/- 4.582E+01 (16.74%)

Flag: "*" = Keyline

Sample ID : 1111140-03 Acquisition date : 1-DEC-2011 12:50:18

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.448E+02	7.466E+01	1.277E+01	1.880E+00	34.832
PA-231	4.345E-01	7.703E-01	1.621E+00	1.825E-02	0.268
PA-234	3.507E+00	1.786E+00	1.314E+00	1.479E-02	2.669
TH-234	2.738E+02	4.582E+01	2.836E+01	3.649E-01	9.653

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-8.158E+00		1.342E+01	2.228E+01	7.552E+00	-0.366
CD-109	7.635E+00		7.640E+01	1.464E+02	1.409E+01	0.052
NP-237	3.770E+00		2.322E+01	4.023E+01	3.549E+00	0.094
AM-241	1.074E+00		1.479E+00	2.542E+00	2.862E-02	0.423

VAX/VMS Peak Search Report Generated 1-DEC-2011 13:30:30.18

12114

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114004_GE5_BAFIL_171601.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 13:15:11.
Sample ID : 1111140-04 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	9.66	7	12	0.15	98.29	90	12	7.78E-03	105.9	
2	0	21.12	112	32	0.70	208.20	196	21	1.24E-01	15.7	
3	0	25.38	35	8	0.37	249.00	242	15	3.83E-02	24.3	
4	0	30.98	2199	109	0.76	302.69	292	22	2.44E+00	2.5	
5	1	35.07	371	30	0.61	341.94	331	27	4.12E-01	6.7	9.35E-01
6	1	35.96	105	12	0.66	350.42	331	27	1.17E-01	19.0	
7	0	39.64	8	10	0.77	385.72	377	14	9.01E-03	91.2	
8	0	53.45	52	24	0.48	518.19	511	17	5.79E-02	23.3	
9	0	61.88	291	25	0.96	598.94	586	25	3.24E-01	7.0	
10	0	66.23	130	22	0.67	640.64	628	27	1.44E-01	12.3	
11	2	79.76	54	16	0.84	770.39	758	39	5.95E-02	31.4	6.67E-01
12	2	81.23	899	16	0.68	784.45	758	39	9.99E-01	3.5	
13	0	84.22	16	11	0.49	813.20	807	13	1.77E-02	44.5	
14	0	112.20	203	50	0.70	1081.41	1069	26	2.25E-01	11.0	
15	6	116.31	72	17	0.74	1120.79	1112	17	8.05E-02	15.1	4.09E+00
16	6	116.85	8	9	0.75	1126.00	1112	17	8.46E-03	65.7	
17	0	161.06	27	5	0.15	1549.89	1543	15	3.00E-02	24.7	
18	0	276.98	50	6	0.63	2661.23	2648	22	5.50E-02	16.9	
19	1	302.92	10	4	0.95	2910.00	2902	25	1.07E-02	90.9	1.11E+00
20	1	303.44	105	6	0.93	2914.91	2902	25	1.16E-01	11.3	
21	4	334.21	103	3	0.98	3210.00	3196	26	1.15E-01	8.7	5.24E+00
22	4	335.12	12	1	0.77	3218.65	3196	26	1.37E-02	32.0	
23	0	356.83	423	7	0.75	3426.85	3412	28	4.70E-01	5.0	
24	1	384.28	28	10	1.02	3690.00	3675	33	3.08E-02	42.3	1.73E+00
25	1	384.80	86	10	1.02	3695.00	3675	33	9.52E-02	13.6	
26	0	387.65	148	16	1.04	3722.34	3708	26	1.64E-01	10.0	

Sample ID : 1111140-04 Acquisition date : 1-DEC-2011 13:15:11

Total number of lines in spectrum	26	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	7	26.92%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.537E+02	4.538E+02	0.761E+02	16.77	
			---	---			
Total Activity :			4.537E+02	4.538E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	5.005E-01	5.005E-01	10.61E-01	211.93	
PA-234	4.47E+09Y	1.00	5.174E+00	5.174E+00	1.642E+00	31.73	
TH-234	4.47E+09Y	1.00	2.631E+02	2.631E+02	0.386E+02	14.69	
			---	---			
Total Activity :			2.687E+02	2.687E+02			

Grand Total Activity :	7.225E+02	7.225E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-04 Acquisition date : 1-DEC-2011 13:15:11

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.537E+02	4.538E+02	16.77	OK
	302.84	17.80	2.575E+00	6.324E+01	6.325E+01	183.74	OK
	356.01	60.00	4.312E+00	4.910E+02	4.911E+02	17.63	OK

Final Mean for 3 Valid Peaks = 4.538E+02+/- 7.608E+01 (16.77%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	5.005E-01	5.005E-01	211.93	OK
	10.11	20.20	1.000E+02	1.041E+00	1.041E+00	211.93	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	4.902E+02	4.902E+02	183.46	OK

Final Mean for 3 Valid Peaks = 5.005E-01+/- 1.061E+00 (211.93%)

PA-234	9.89	89.00	1.000E+02	2.362E-01	2.362E-01	211.93	OK
	21.72	64.90*	1.000E+02	5.174E+00	5.174E+00	31.73	OK
	37.93	23.75	1.000E+02	1.026E+00	1.026E+00	182.50	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 5.174E+00+/- 1.642E+00 (31.73%)

TH-234	63.29	3.80*	8.750E+01	2.631E+02	2.631E+02	14.69	OK

Final Mean for 1 Valid Peaks = 2.631E+02+/- 3.864E+01 (14.69%)

Flag: "*" = Keyline

Sample ID : 1111140-04 Acquisition date : 1-DEC-2011 13:15:11

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.538E+02	7.608E+01	1.237E+01	1.821E+00	36.693
PA-231	5.005E-01	1.061E+00	1.641E+00	1.847E-02	0.305
PA-234	5.174E+00	1.642E+00	9.407E-01	1.059E-02	5.500
TH-234	2.631E+02	3.864E+01	2.224E+01	2.861E-01	11.828

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.634E+00		1.331E+01	2.316E+01	7.851E+00	-0.243
CD-109	1.114E+02		9.634E+01	2.007E+02	1.932E+01	0.555
NP-237	-1.849E+01		3.005E+01	4.557E+01	4.019E+00	-0.406
AM-241	1.040E+00		1.311E+00	2.335E+00	2.628E-02	0.445

ICB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 13:48:20.37

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114005_GE5_BAFIL_171603.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-7
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 13:32:59.
Sample ID : 1111140-05 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.13	16	13	0.51	74.02	65	13	1.81E-02	51.8	
2	0	8.09	14	0	0.21	83.21	79	9	1.56E-02	26.7	
3	0	11.21	13	1	0.49	113.16	110	8	1.39E-02	33.8	
4	0	21.20	76	52	0.43	208.93	195	23	8.48E-02	27.0	
5	0	30.97	1946	85	0.73	302.60	289	25	2.16E+00	2.6	
6	1	35.14	353	4	0.66	342.58	334	28	3.92E-01	5.9	1.50E+00
7	1	36.02	89	7	0.60	351.00	334	28	9.86E-02	20.7	
8	0	53.50	36	31	0.45	518.61	508	17	4.02E-02	34.4	
9	1	61.53	70	65	0.72	595.63	584	33	7.74E-02	30.0	4.19E+00
10	1	61.94	186	52	0.73	599.51	584	33	2.06E-01	11.3	
11	1	65.64	55	24	0.67	635.00	627	28	6.14E-02	20.4	2.50E+00
12	1	66.37	47	19	0.67	642.00	627	28	5.20E-02	29.1	
13	2	79.81	40	18	0.84	770.83	762	33	4.47E-02	29.8	1.05E+00
14	2	81.25	757	18	0.64	784.69	762	33	8.41E-01	3.8	
15	0	112.18	186	37	0.73	1081.24	1071	21	2.06E-01	10.2	
16	0	116.43	60	18	0.45	1122.02	1110	27	6.67E-02	21.0	
17	0	139.11	12	6	0.56	1339.45	1332	13	1.30E-02	48.2	
18	0	155.51	15	9	0.46	1496.69	1485	18	1.65E-02	48.1	
19	4	160.83	25	16	1.07	1547.69	1536	23	2.79E-02	38.8	4.48E-01
20	4	161.72	11	0	0.53	1556.22	1536	23	1.18E-02	29.3	
21	8	276.43	15	3	0.93	2656.00	2649	22	1.70E-02	41.2	1.44E+00
22	8	276.99	39	2	0.89	2661.35	2649	22	4.37E-02	18.2	
23	1	302.82	20	7	0.95	2909.00	2897	30	2.17E-02	57.3	5.43E+00
24	1	303.76	100	8	0.95	2918.00	2897	30	1.12E-01	11.1	
25	0	334.67	32	15	1.06	3214.35	3195	26	3.61E-02	29.1	
26	6	356.71	317	3	0.97	3425.72	3411	30	3.52E-01	6.1	1.46E+00
27	6	357.39	54	4	0.98	3432.19	3411	30	6.06E-02	31.8	
28	0	384.62	77	8	0.72	3693.25	3681	23	8.57E-02	13.6	
29	1	387.51	72	16	1.02	3721.00	3708	27	8.04E-02	18.3	2.57E+00
30	1	388.45	40	6	1.02	3730.00	3708	27	4.41E-02	18.8	
31	0	391.91	27	2	0.79	3763.13	3750	22	2.97E-02	22.6	

Sample ID : 1111140-05 Acquisition date : 1-DEC-2011 13:32:59

Total number of lines in spectrum	31	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	9	29.03%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.820E+02	3.820E+02	0.652E+02	17.07	
			---	---			
Total Activity :			3.820E+02	3.820E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.001E+00	1.001E+00	0.537E+00	53.61	
PA-234	4.47E+09Y	1.00	3.531E+00	3.531E+00	1.915E+00	54.23	
TH-234	4.47E+09Y	1.00	1.677E+02	1.677E+02	0.387E+02	23.05	
AM-241	432.20Y	1.00	5.829E+00	5.829E+00	3.501E+00	60.06	
			---	---			
Total Activity :			1.781E+02	1.781E+02			

Grand Total Activity :	5.601E+02	5.601E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-05
Acquisition date : 1-DEC-2011 13:32:59

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.820E+02	3.820E+02	17.07	OK
	302.84	17.80	2.575E+00	1.281E+02	1.282E+02	117.67	OK
	356.01	60.00	4.312E+00	3.675E+02	3.675E+02	18.97	OK

Final Mean for 3 Valid Peaks = 3.820E+02+/- 6.523E+01 (17.07%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.001E+00	1.001E+00	53.61	OK
	10.11	20.20	1.000E+02	1.864E+00	1.864E+00	67.82	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	9.932E+02	9.932E+02	117.25	OK

Final Mean for 3 Valid Peaks = 1.001E+00+/- 5.367E-01 (53.61%)

PA-234	9.89	89.00	1.000E+02	4.230E-01	4.230E-01	67.82	OK
	21.72	64.90*	1.000E+02	3.531E+00	3.531E+00	54.23	OK
	37.93	23.75	1.000E+02	1.122E+01	1.122E+01	41.53	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.531E+00+/- 1.915E+00 (54.23%)

TH-234	63.29	3.80*	8.750E+01	1.677E+02	1.677E+02	23.05	OK

Final Mean for 1 Valid Peaks = 1.677E+02+/- 3.866E+01 (23.05%)

AM-241	59.54	35.90*	1.000E+02	5.829E+00	5.829E+00	60.06	OK

Final Mean for 1 Valid Peaks = 5.829E+00+/- 3.501E+00 (60.06%)

Flag: "*" = Keyline

Sample ID : 1111140-05 Acquisition date : 1-DEC-2011 13:32:59

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.820E+02	6.523E+01	1.309E+01	1.928E+00	29.177
PA-231	1.001E+00	5.367E-01	1.470E+00	1.655E-02	0.681
PA-234	3.531E+00	1.915E+00	1.037E+00	1.167E-02	3.405
TH-234	1.677E+02	3.866E+01	2.563E+01	3.297E-01	6.545
AM-241	5.829E+00	3.501E+00	2.076E+00	2.336E-02	2.808

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	4.682E-02		1.521E+01	2.820E+01	9.560E+00	0.002
CD-109	1.033E+02		9.920E+01	2.033E+02	1.956E+01	0.508
NP-237	4.746E+00		2.760E+01	5.141E+01	4.534E+00	0.092

KB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 14:05:38.35

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114006_GE5_BAFIL_171607.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-8
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 13:49:49.
Sample ID : 1111140-06 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.77	5	17	0.46	108.94	98	14	5.48E-03	185.0	
2	0	15.99	25	0	0.40	159.00	153	12	2.78E-02	20.0	
3	1	20.48	48	10	0.56	202.00	195	23	5.34E-02	23.2	1.91E+00
4	1	21.00	50	7	0.56	207.00	195	23	5.61E-02	24.7	
5	0	31.00	1954	71	0.77	302.86	290	27	2.17E+00	2.6	
6	3	35.11	449	21	0.75	342.32	330	32	4.99E-01	5.7	1.00E+00
7	3	36.12	80	17	0.60	352.00	330	32	8.84E-02	25.1	
8	0	53.43	38	23	0.54	517.99	510	14	4.22E-02	28.3	
9	0	61.92	232	56	0.94	599.36	585	28	2.58E-01	10.1	
10	1	66.12	84	33	0.73	639.64	627	26	9.32E-02	19.0	1.33E+00
11	1	67.03	44	6	0.60	648.36	627	26	4.86E-02	18.6	
12	1	79.44	26	37	0.76	767.34	759	36	2.84E-02	44.9	2.09E+00
13	1	80.03	35	44	0.69	773.00	759	36	3.92E-02	52.9	
14	1	81.24	745	27	0.65	784.59	759	36	8.27E-01	4.0	
15	0	83.97	11	9	0.28	810.74	803	12	1.19E-02	58.8	
16	0	88.49	11	11	0.54	854.09	843	17	1.19E-02	69.0	
17	0	112.17	187	42	0.76	1081.12	1067	24	2.08E-01	10.6	
18	1	116.38	19	17	0.82	1121.47	1111	19	2.14E-02	55.8	2.71E+00
19	1	116.75	33	9	0.75	1125.00	1111	19	3.68E-02	24.1	
20	0	160.81	31	13	0.51	1547.45	1536	20	3.41E-02	30.7	
21	0	239.28	23	5	1.05	2299.78	2289	20	2.58E-02	27.5	
22	0	276.96	44	8	0.63	2661.05	2648	23	4.85E-02	20.1	
23	1	302.67	18	0	0.85	2907.59	2903	23	2.03E-02	20.5	1.49E+00
24	1	303.54	82	0	0.86	2915.91	2903	23	9.08E-02	12.6	
25	1	334.01	48	3	0.98	3208.00	3195	28	5.32E-02	17.9	1.93E+00
26	1	334.53	46	3	0.98	3213.00	3195	28	5.11E-02	18.0	
27	0	356.77	394	9	0.84	3426.23	3411	33	4.38E-01	5.3	
28	0	384.67	77	0	0.85	3693.75	3679	25	8.56E-02	11.4	
29	0	387.60	145	7	1.18	3721.88	3707	28	1.61E-01	9.2	
30	0	392.22	21	20	1.07	3766.16	3749	25	2.36E-02	49.2	
31	0	415.52	24	5	1.05	3989.57	3976	23	2.70E-02	27.7	

Sample ID : 1111140-06 Acquisition date : 1-DEC-2011 13:49:49

Total number of lines in spectrum	31	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	8	25.81%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
CD-109	464.00D	1.00	7.468E+01	7.474E+01	10.34E+01	138.32	
BA-133	10.50Y	1.00	3.759E+02	3.760E+02	0.647E+02	17.21	
NP-237	2.14E+06Y	1.00	2.014E+01	2.014E+01	2.785E+01	138.27	
			---	---			
	Total Activity :		4.707E+02	4.708E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	3.526E-01	3.526E-01	13.05E-01	370.03	
PA-234	4.47E+09Y	1.00	2.334E+00	2.334E+00	1.156E+00	49.53	
TH-234	4.47E+09Y	1.00	2.100E+02	2.100E+02	0.432E+02	20.60	
			---	---			
	Total Activity :		2.127E+02	2.127E+02			

Grand Total Activity : 6.834E+02 6.835E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-06 Acquisition date : 1-DEC-2011 13:49:49

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
CD-109	88.03	3.72*	1.153E+01	7.468E+01	7.474E+01	138.32	OK
Final Mean for 1 Valid Peaks = 7.474E+01+/- 1.034E+02 (138.32%)							
BA-133	81.00	33.00*	1.802E+01	3.759E+02	3.760E+02	17.21	OK
	302.84	17.80	2.575E+00	1.197E+02	1.197E+02	48.74	OK
	356.01	60.00	4.312E+00	4.576E+02	4.576E+02	17.94	OK
Final Mean for 3 Valid Peaks = 3.760E+02+/- 6.471E+01 (17.21%)							
NP-237	86.50	12.60*	1.262E+01	2.014E+01	2.014E+01	138.27	OK
Final Mean for 1 Valid Peaks = 2.014E+01+/- 2.785E+01 (138.27%)							

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	3.526E-01	3.526E-01	370.03	OK
	10.11	20.20	1.000E+02	7.332E-01	7.332E-01	370.03	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	9.274E+02	9.274E+02	47.70	OK
Final Mean for 3 Valid Peaks = 3.526E-01+/- 1.305E+00 (370.03%)							
PA-234	9.89	89.00	1.000E+02	1.664E-01	1.664E-01	370.03	OK
	21.72	64.90*	1.000E+02	2.334E+00	2.334E+00	49.53	OK
	37.93	23.75	1.000E+02	1.006E+01	1.006E+01	50.32	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent
Final Mean for 3 Valid Peaks = 2.334E+00+/- 1.156E+00 (49.53%)							
TH-234	63.29	3.80*	8.750E+01	2.100E+02	2.100E+02	20.60	OK
Final Mean for 1 Valid Peaks = 2.100E+02+/- 4.325E+01 (20.60%)							

Flag: "*" = Keyline

Sample ID : 1111140-06 Acquisition date : 1-DEC-2011 13:49:49

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CD-109	7.474E+01	1.034E+02	1.694E+02	1.630E+01	0.441
BA-133	3.760E+02	6.471E+01	1.296E+01	1.908E+00	29.004
PA-231	3.526E-01	1.305E+00	1.942E+00	2.186E-02	0.182
PA-234	2.334E+00	1.156E+00	8.314E-01	9.359E-03	2.808
TH-234	2.100E+02	4.325E+01	2.836E+01	3.649E-01	7.403
NP-237	2.014E+01	2.785E+01	4.460E+01	3.934E+00	0.452

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	6.356E+00		1.306E+01	2.614E+01	8.861E+00	0.243
AM-241	1.801E+00		1.560E+00	2.810E+00	3.163E-02	0.641

ICB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 14:21:28.52

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114007_GE5_BAFIL_171608.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-9
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 14:06:10.
Sample ID : 1111140-07 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.00	9	9	0.27	72.78	67	10	9.75E-03	74.7	
2	0	9.65	34	7	2.46	98.25	83	29	3.78E-02	28.4	
3	0	21.19	88	47	0.48	208.88	200	19	9.80E-02	22.2	
4	0	30.97	2138	125	0.75	302.59	290	25	2.38E+00	2.6	
5	3	35.08	377	29	0.57	341.98	331	28	4.18E-01	6.3	1.63E+00
6	3	36.01	93	25	0.69	350.91	331	28	1.04E-01	21.3	
7	0	53.38	41	29	0.32	517.45	509	16	4.60E-02	29.4	
8	0	61.97	234	56	0.75	599.85	588	24	2.60E-01	9.8	
9	0	66.27	145	47	0.71	641.01	628	26	1.61E-01	13.8	
10	2	79.89	43	17	0.74	771.69	763	34	4.74E-02	28.3	7.89E-01
11	2	81.23	800	24	0.64	784.52	763	34	8.89E-01	3.8	
12	0	84.30	24	14	0.36	813.94	804	17	2.66E-02	37.0	
13	0	112.20	178	44	0.67	1081.44	1071	24	1.98E-01	11.4	
14	0	116.14	48	8	0.54	1119.19	1111	16	5.37E-02	18.2	
15	0	152.38	12	13	0.38	1466.68	1455	19	1.37E-02	65.4	
16	0	157.23	23	3	0.97	1513.14	1501	22	2.52E-02	27.7	
17	0	161.17	20	15	0.23	1550.95	1544	13	2.22E-02	41.1	
18	0	276.85	40	12	0.73	2660.05	2650	20	4.44E-02	22.8	
19	0	303.49	127	4	0.49	2915.44	2901	24	1.42E-01	9.3	
20	1	334.01	55	23	0.98	3208.00	3196	24	6.11E-02	21.4	4.10E-01
21	1	334.74	26	12	0.98	3215.00	3196	24	2.88E-02	28.0	
22	1	356.43	164	11	0.99	3423.00	3411	26	1.82E-01	12.9	2.80E+00
23	1	356.95	312	10	1.00	3428.00	3411	26	3.46E-01	6.4	
24	1	384.38	123	12	1.02	3691.00	3679	25	1.37E-01	9.8	3.41E+00
25	1	384.80	10	13	1.02	3695.00	3679	25	1.15E-02	112.1	
26	2	387.45	203	22	1.18	3720.41	3707	28	2.26E-01	7.4	4.20E+00
27	2	387.97	26	12	1.12	3725.43	3707	28	2.88E-02	53.4	
28	0	415.66	38	0	1.22	3990.84	3979	23	4.22E-02	16.2	

Sample ID : 1111140-07 Acquisition date : 1-DEC-2011 14:06:10

Total number of lines in spectrum	28	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	7	25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.037E+02	4.038E+02	0.687E+02	17.02	
			---	---			
Total Activity :			4.037E+02	4.038E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	2.434E+00	2.434E+00	1.387E+00	56.99	
PA-234	4.47E+09Y	1.00	4.081E+00	4.081E+00	1.819E+00	44.58	
TH-234	4.47E+09Y	1.00	2.115E+02	2.115E+02	0.425E+02	20.11	
			---	---			
Total Activity :			2.180E+02	2.180E+02			

Grand Total Activity :	6.217E+02	6.218E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-07 Acquisition date : 1-DEC-2011 14:06:10

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.037E+02	4.038E+02	17.02	OK
	302.84	17.80	2.575E+00	8.348E+02	8.349E+02	32.28	OK
	356.01	60.00	4.312E+00	1.903E+02	1.904E+02	29.54	OK

Final Mean for 3 Valid Peaks = 4.038E+02+/- 6.870E+01 (17.02%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	2.434E+00	2.434E+00	56.99	OK
	10.11	20.20	1.000E+02	5.060E+00	5.060E+00	56.99	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	6.471E+03	6.471E+03	30.69	OK

Final Mean for 3 Valid Peaks = 2.434E+00+/- 1.387E+00 (56.99%)

PA-234	9.89	89.00	1.000E+02	1.148E+00	1.148E+00	56.99	OK
	21.72	64.90*	1.000E+02	4.081E+00	4.081E+00	44.58	OK
	37.93	23.75	1.000E+02	1.179E+01	1.179E+01	42.89	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 4.081E+00+/- 1.819E+00 (44.58%)

TH-234	63.29	3.80*	8.750E+01	2.115E+02	2.115E+02	20.11	OK

Final Mean for 1 Valid Peaks = 2.115E+02+/- 4.252E+01 (20.11%)

Flag: "*" = Keyline

Sample ID : 1111140-07 Acquisition date : 1-DEC-2011 14:06:10

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.038E+02	6.870E+01	1.383E+01	2.036E+00	29.197
PA-231	2.434E+00	1.387E+00	1.565E+00	1.762E-02	1.555
PA-234	4.081E+00	1.819E+00	9.901E-01	1.115E-02	4.122
TH-234	2.115E+02	4.252E+01	2.361E+01	3.037E-01	8.958

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.500E+00		1.543E+01	2.933E+01	9.942E+00	0.119
CD-109	8.907E+01		9.701E+01	1.973E+02	1.899E+01	0.451
NP-237	-3.771E+00		3.048E+01	4.941E+01	4.358E+00	-0.076
AM-241	3.585E-01		1.690E+00	2.630E+00	2.961E-02	0.136

ICB 12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 14:40:52.16

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114008_GE5_BAFIL_171611.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6A
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 14:25:36.
Sample ID : 1111140-08 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	20.58	50	18	0.56	203.00	200	22	5.58E-02	14.5	3.61E+00
2	1	21.17	44	33	0.62	208.62	200	22	4.91E-02	37.3	
3	0	25.36	24	19	0.41	248.79	241	19	2.67E-02	48.1	
4	0	30.97	2258	100	0.72	302.61	289	30	2.51E+00	2.5	
5	1	35.11	422	29	0.64	342.34	331	29	4.68E-01	5.9	8.21E-01
6	1	36.06	109	19	0.66	351.42	331	29	1.21E-01	19.5	
7	0	38.29	25	9	0.65	372.82	362	22	2.74E-02	39.4	
8	0	53.36	63	14	0.55	517.32	510	14	7.00E-02	16.6	
9	0	61.95	268	66	0.63	599.61	584	28	2.98E-01	9.4	
10	0	66.26	140	29	1.04	640.97	627	33	1.56E-01	13.4	
11	0	75.58	13	12	0.51	730.30	719	15	1.40E-02	59.5	
12	0	81.20	928	67	0.63	784.22	768	27	1.03E+00	3.8	
13	0	84.48	13	8	0.51	815.61	809	11	1.43E-02	47.6	
14	0	112.16	177	49	0.77	1081.07	1067	27	1.97E-01	12.0	
15	4	115.09	14	3	0.49	1109.10	1107	22	1.61E-02	25.8	1.23E+00
16	4	116.28	42	29	0.98	1120.55	1107	22	4.65E-02	29.1	
17	0	161.03	28	21	0.66	1549.62	1541	16	3.07E-02	37.2	
18	0	276.99	63	0	0.60	2661.33	2649	21	7.00E-02	12.6	
19	3	303.02	40	11	0.94	2910.91	2902	26	4.49E-02	26.3	9.92E-01
20	3	303.57	93	12	1.10	2916.22	2902	26	1.03E-01	13.5	
21	1	334.21	52	0	0.98	3210.00	3196	28	5.81E-02	13.7	1.95E+00
22	1	334.74	16	0	0.98	3215.00	3196	28	1.77E-02	41.1	
23	0	356.74	377	20	0.99	3425.97	3412	30	4.19E-01	5.7	
24	0	384.67	89	10	0.78	3693.78	3679	28	9.85E-02	13.1	
25	0	387.71	147	25	0.55	3722.95	3707	28	1.64E-01	10.9	
26	0	391.63	23	7	0.53	3760.49	3748	22	2.54E-02	31.7	

Sample ID : 1111140-08 Acquisition date : 1-DEC-2011 14:25:36

Total number of lines in spectrum	26	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	6	23.08%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.687E+02	4.688E+02	0.800E+02	17.06	
			---	---			
Total Activity :			4.687E+02	4.688E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.419E+02	2.419E+02	0.468E+02	19.34	
			---	---			
Total Activity :			2.419E+02	2.419E+02			

Grand Total Activity :	7.106E+02	7.107E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-08 Acquisition date : 1-DEC-2011 14:25:36

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.687E+02	4.688E+02	17.06	OK
	302.84	17.80	2.575E+00	2.646E+02	2.646E+02	58.90	OK
	356.01	60.00	4.312E+00	4.379E+02	4.380E+02	18.45	OK

Final Mean for 3 Valid Peaks = 4.688E+02+/- 7.999E+01 (17.06%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.419E+02	2.419E+02	19.34	OK

Final Mean for 1 Valid Peaks = 2.419E+02+/- 4.678E+01 (19.34%)

Flag: "*" = Keyline

Sample ID : 1111140-08
Acquisition date : 1-DEC-2011 14:25:36

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.688E+02	7.999E+01	1.400E+01	2.061E+00	33.492
TH-234	2.419E+02	4.678E+01	3.311E+01	4.260E-01	7.304

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.308E+00		1.548E+01	3.005E+01	1.019E+01	0.243
CD-109	5.181E+01		8.893E+01	1.773E+02	1.707E+01	0.292
PA-231	9.454E-02		1.000E+00	1.839E+00	2.070E-02	0.051
PA-234	2.045E+00	+	1.529E+00	2.015E+00	2.268E-02	1.015
NP-237	-9.872E+00		2.458E+01	3.912E+01	3.450E+00	-0.252
AM-241	8.683E-01		1.740E+00	2.815E+00	3.169E-02	0.308

ICB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 14:59:28.79

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114009_GE5_BAFIL_171612.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6B
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 14:44:12.
Sample ID : 1111140-09 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.12	76	35	0.69	208.18	201	17	8.39E-02	21.2	
2	0	25.39	40	0	0.66	249.12	241	18	4.44E-02	15.8	
3	0	30.98	2271	137	0.74	302.71	289	28	2.52E+00	2.6	
4	1	35.12	439	25	0.66	342.38	328	31	4.88E-01	5.7	1.70E+00
5	1	35.97	126	12	0.65	350.53	328	31	1.40E-01	17.4	
6	0	53.80	43	38	0.88	521.49	506	22	4.73E-02	35.5	
7	8	61.16	23	7	0.28	592.06	590	21	2.52E-02	24.9	1.04E+00
8	8	61.93	232	35	0.73	599.43	590	21	2.57E-01	8.6	
9	2	66.06	148	22	0.67	639.00	627	24	1.64E-01	10.2	1.83E+00
10	2	66.93	20	8	0.54	647.41	627	24	2.18E-02	26.5	
11	2	79.76	40	31	0.84	770.39	758	36	4.45E-02	39.4	7.65E-01
12	2	81.23	859	12	0.66	784.53	758	36	9.54E-01	3.5	
13	0	112.15	181	35	0.68	1080.94	1070	22	2.01E-01	10.4	
14	0	116.20	32	27	0.80	1119.75	1109	19	3.53E-02	38.5	
15	0	276.95	44	6	0.64	2660.93	2650	22	4.83E-02	18.4	
16	6	302.71	10	9	0.95	2908.00	2899	26	1.07E-02	97.8	2.52E+00
17	6	303.37	128	11	0.92	2914.27	2899	26	1.42E-01	9.6	
18	0	308.10	20	3	0.24	2959.61	2945	23	2.19E-02	28.4	
19	0	334.38	60	0	0.21	3211.58	3197	26	6.67E-02	12.9	
20	4	356.79	414	11	1.00	3426.45	3411	30	4.60E-01	5.1	1.67E+00
21	4	357.26	10	11	1.00	3431.00	3411	30	1.12E-02	192.4	
22	4	384.41	72	0	1.04	3691.27	3680	24	7.95E-02	12.1	2.62E+00
23	4	385.10	36	0	0.70	3697.86	3680	24	3.99E-02	20.1	
24	0	387.64	138	5	0.54	3722.28	3707	26	1.53E-01	9.3	

Sample ID : 1111140-09 Acquisition date : 1-DEC-2011 14:44:12

Total number of lines in spectrum	24	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	7	29.17%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.336E+02	4.336E+02	0.729E+02	16.82	
			---	---			
Total Activity :			4.336E+02	4.336E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.092E+02	2.092E+02	0.369E+02	17.64	
AM-241	432.20Y	1.00	1.898E+00	1.898E+00	0.948E+00	49.96	
			---	---			
Total Activity :			2.111E+02	2.111E+02			

Grand Total Activity :	6.446E+02	6.447E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-09
Acquisition date : 1-DEC-2011 14:44:12

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.336E+02	4.336E+02	16.82	OK
	302.84	17.80	2.575E+00	6.323E+01	6.323E+01	197.33	OK
	356.01	60.00	4.312E+00	4.807E+02	4.808E+02	17.70	OK

Final Mean for 3 Valid Peaks = 4.336E+02+/- 7.292E+01 (16.82%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.092E+02	2.092E+02	17.64	OK

Final Mean for 1 Valid Peaks = 2.092E+02+/- 3.689E+01 (17.64%)

AM-241	59.54	35.90*	1.000E+02	1.898E+00	1.898E+00	49.96	OK

Final Mean for 1 Valid Peaks = 1.898E+00+/- 9.480E-01 (49.96%)

Flag: "*" = Keyline

Sample ID : 1111140-09 Acquisition date : 1-DEC-2011 14:44:12

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.336E+02	7.292E+01	1.132E+01	1.666E+00	38.315
TH-234	2.092E+02	3.689E+01	2.077E+01	2.672E-01	10.070
AM-241	1.898E+00	9.480E-01	2.294E+00	2.582E-02	0.827

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	8.877E-01		1.568E+01	2.918E+01	9.890E+00	0.030
CD-109	-8.123E+01		1.089E+02	1.783E+02	1.716E+01	-0.455
PA-231	-5.021E-01		1.068E+00	1.806E+00	2.033E-02	-0.278
PA-234	3.495E+00	+	1.486E+00	2.195E+00	2.471E-02	1.592
NP-237	-8.395E+00		2.791E+01	4.891E+01	4.314E+00	-0.172

KB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 15:15:29.27

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114010_GE5_BAFIL_171614.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6C
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 15:00:10.
Sample ID : 1111140-10 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.15	107	14	0.55	208.43	201	15	1.19E-01	12.4	
2	2	29.71	29	95	0.64	290.56	280	35	3.27E-02	100.0	2.57E+00
3	2	30.98	2104	105	0.71	302.73	280	35	2.34E+00	2.5	
4	2	35.12	439	33	0.69	342.42	328	35	4.88E-01	6.0	1.43E+00
5	2	36.12	88	13	0.60	352.00	328	35	9.74E-02	24.0	
6	0	53.33	43	16	0.42	516.97	510	14	4.76E-02	23.0	
7	0	61.86	270	35	0.70	598.80	586	26	3.00E-01	7.9	
8	1	65.43	39	6	0.67	633.00	629	22	4.35E-02	17.6	1.95E+00
9	1	66.16	50	41	0.67	640.00	629	22	5.53E-02	33.0	
10	1	79.51	26	28	0.76	767.95	761	38	2.88E-02	40.8	1.74E+00
11	1	80.03	44	38	0.69	773.00	761	38	4.92E-02	44.5	
12	1	81.25	933	24	0.67	784.64	761	38	1.04E+00	3.4	
13	6	111.64	133	34	0.74	1076.00	1068	24	1.47E-01	11.9	1.29E+01
14	6	112.28	156	31	0.72	1082.21	1068	24	1.73E-01	12.2	
15	0	116.40	29	41	0.83	1121.70	1110	22	3.21E-02	51.2	
16	0	276.94	47	8	0.68	2660.85	2647	23	5.21E-02	19.1	
17	0	303.52	136	3	0.55	2915.75	2902	26	1.51E-01	9.0	
18	0	334.30	67	3	0.83	3210.84	3195	26	7.50E-02	13.3	
19	0	356.77	408	14	1.01	3426.29	3411	27	4.53E-01	5.3	
20	1	384.17	56	6	1.02	3689.00	3678	27	6.24E-02	18.1	1.83E+00
21	1	384.70	28	12	1.02	3694.00	3678	27	3.14E-02	39.0	
22	0	387.68	143	27	0.80	3722.57	3708	24	1.58E-01	11.1	
23	0	391.63	23	9	0.55	3760.45	3748	19	2.59E-02	31.6	
24	0	415.65	39	0	1.02	3990.82	3978	22	4.33E-02	16.0	

Sample ID : 1111140-10 Acquisition date : 1-DEC-2011 15:00:10

Total number of lines in spectrum	24	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	6	25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.712E+02	4.713E+02	0.789E+02	16.73	
		Total Activity :	4.712E+02	4.713E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.440E+02	2.440E+02	0.399E+02	16.34	
		Total Activity :	2.440E+02	2.440E+02			

Grand Total Activity : 7.153E+02 7.153E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-10 Acquisition date : 1-DEC-2011 15:00:10

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.712E+02	4.713E+02	16.73	OK
	302.84	17.80	2.575E+00	8.883E+02	8.884E+02	31.97	OK
	356.01	60.00	4.312E+00	4.730E+02	4.731E+02	17.93	OK

Final Mean for 3 Valid Peaks = 4.713E+02+/- 7.886E+01 (16.73%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.440E+02	2.440E+02	16.34	OK

Final Mean for 1 Valid Peaks = 2.440E+02+/- 3.988E+01 (16.34%)

Flag: "*" = Keyline

Sample ID : 1111140-10 Acquisition date : 1-DEC-2011 15:00:10

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.713E+02	7.886E+01	1.309E+01	1.928E+00	35.993
TH-234	2.440E+02	3.988E+01	2.323E+01	2.988E-01	10.507

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	5.261E+00		1.321E+01	2.617E+01	8.871E+00	0.201
CD-109	5.000E+01		7.647E+01	1.583E+02	1.524E+01	0.316
PA-231	4.049E-01		1.022E+00	1.946E+00	2.191E-02	0.208
PA-234	4.952E+00	+	1.249E+00	2.269E+00	2.554E-02	2.182
NP-237	-1.976E+01		2.284E+01	3.652E+01	3.221E+00	-0.541
AM-241	1.894E-01		1.628E+00	2.504E+00	2.819E-02	0.076

KB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 15:31:32.77

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114011_GE5_BAFIL_171615.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6D
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 15:15:43.
Sample ID : 1111140-11 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.03	18	8	1.28	101.81	92	15	2.01E-02	40.6	
2	1	20.68	24	17	0.56	204.00	200	18	2.63E-02	37.8	1.31E+01
3	1	21.31	125	20	0.56	210.00	200	18	1.39E-01	11.6	
4	0	30.98	2235	71	0.74	302.69	291	24	2.48E+00	2.3	
5	2	35.11	375	49	0.61	342.29	333	25	4.16E-01	6.9	1.07E+00
6	2	36.04	94	23	0.58	351.27	333	25	1.04E-01	18.6	
7	7	51.83	43	19	1.25	502.63	492	37	4.76E-02	29.5	8.45E-01
8	7	53.11	28	11	0.32	514.93	492	37	3.11E-02	29.4	
9	7	53.64	24	26	0.64	520.00	492	37	2.66E-02	50.5	
10	0	59.53	24	24	0.12	576.47	563	24	2.66E-02	50.1	
11	0	61.91	266	34	0.91	599.27	587	30	2.95E-01	8.2	
12	0	66.11	145	43	0.85	639.55	624	32	1.61E-01	14.1	
13	0	81.24	850	70	0.63	784.55	771	28	9.44E-01	4.2	
14	0	112.20	187	73	0.54	1081.37	1067	24	2.08E-01	12.5	
15	0	116.51	36	33	1.19	1122.75	1109	22	4.02E-02	38.1	
16	0	276.98	31	13	0.58	2661.24	2650	18	3.47E-02	27.6	
17	0	303.45	121	2	0.85	2915.02	2901	24	1.34E-01	9.5	
18	0	307.89	25	11	0.34	2957.62	2944	22	2.78E-02	32.6	
19	0	334.58	39	19	0.77	3213.56	3202	22	4.30E-02	27.2	
20	0	356.73	436	14	0.94	3425.87	3411	35	4.85E-01	5.2	
21	1	384.07	10	6	1.02	3688.00	3679	24	1.15E-02	87.7	8.88E-01
22	1	384.59	63	10	1.02	3693.00	3679	24	7.05E-02	16.8	
23	1	387.09	10	14	1.02	3717.00	3708	26	1.15E-02	116.5	2.05E+00
24	1	387.72	164	20	1.02	3723.00	3708	26	1.83E-01	9.0	
25	0	415.74	17	12	1.06	3991.63	3972	24	1.88E-02	50.8	

Sample ID : 1111140-11 Acquisition date : 1-DEC-2011 15:15:43

Total number of lines in spectrum	25	
Number of unidentified lines	17	
Number of lines tentatively identified by NID	8	32.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.290E+02	4.290E+02	0.747E+02	17.41	
			---	---			
Total Activity :			4.290E+02	4.290E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.295E+00	1.295E+00	1.053E+00	81.33	
PA-234	4.47E+09Y	1.00	5.806E+00	5.806E+00	1.366E+00	23.52	
TH-234	4.47E+09Y	1.00	2.401E+02	2.401E+02	0.406E+02	16.93	
AM-241	432.20Y	1.00	2.005E+00	2.005E+00	2.009E+00	100.20	
			---	---			
Total Activity :			2.492E+02	2.492E+02			

Grand Total Activity : 6.782E+02 6.783E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-11
Acquisition date : 1-DEC-2011 15:15:43

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.290E+02	4.290E+02	17.41	OK
	302.84	17.80	2.575E+00	7.894E+02	7.895E+02	32.57	OK
	356.01	60.00	4.312E+00	5.064E+02	5.064E+02	17.77	OK

Final Mean for 3 Valid Peaks = 4.290E+02+/- 7.469E+01 (17.41%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.295E+00	1.295E+00	81.33	OK
	10.11	20.20	1.000E+02	2.693E+00	2.693E+00	81.33	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	6.119E+03	6.119E+03	31.00	OK

Final Mean for 3 Valid Peaks = 1.295E+00+/- 1.053E+00 (81.33%)

PA-234	9.89	89.00	1.000E+02	6.112E-01	6.112E-01	81.33	OK
	21.72	64.90*	1.000E+02	5.806E+00	5.806E+00	23.52	OK
	37.93	23.75	1.000E+02	1.189E+01	1.189E+01	37.35	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 5.806E+00+/- 1.366E+00 (23.52%)

TH-234	63.29	3.80*	8.750E+01	2.401E+02	2.401E+02	16.93	OK

Final Mean for 1 Valid Peaks = 2.401E+02+/- 4.064E+01 (16.93%)

AM-241	59.54	35.90*	1.000E+02	2.005E+00	2.005E+00	100.20	OK

Final Mean for 1 Valid Peaks = 2.005E+00+/- 2.009E+00 (100.20%)

Flag: "*" = Keyline

Sample ID : 1111140-11 Acquisition date : 1-DEC-2011 15:15:43

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.290E+02	7.469E+01	1.601E+01	2.358E+00	26.791
PA-231	1.295E+00	1.053E+00	1.942E+00	2.186E-02	0.667
PA-234	5.806E+00	1.366E+00	1.124E+00	1.265E-02	5.166
TH-234	2.401E+02	4.064E+01	2.077E+01	2.672E-01	11.560
AM-241	2.005E+00	2.009E+00	2.076E+00	2.336E-02	0.966

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.680E+00		1.308E+01	2.418E+01	8.196E+00	-0.069
CD-109	-3.347E+01		9.548E+01	1.668E+02	1.606E+01	-0.201
NP-237	-4.961E+00		2.624E+01	4.691E+01	4.137E+00	-0.106

ICB
12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 15:46:44.71

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114012_GE5_BAFIL_171618.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB3-6E
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 15:31:27.
Sample ID : 1111140-12 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.18 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.80	16	12	0.65	109.21	101	14	1.78E-02	54.8	
2	0	13.03	20	4	0.92	130.65	123	15	2.28E-02	30.1	
3	0	15.22	9	10	0.37	151.62	144	10	1.01E-02	73.3	
4	1	20.27	36	9	0.56	200.00	193	26	3.96E-02	30.1	2.52E+00
5	1	21.05	102	19	0.62	207.46	193	26	1.14E-01	14.4	
6	0	30.98	2252	99	0.74	302.71	290	24	2.50E+00	2.4	
7	1	35.10	460	15	0.66	342.26	332	27	5.11E-01	5.4	1.33E+00
8	1	36.06	111	8	0.66	351.42	332	27	1.23E-01	15.6	
9	0	53.45	53	23	0.47	518.11	510	20	5.92E-02	23.3	
10	0	61.95	252	30	1.02	599.60	589	25	2.80E-01	8.3	
11	2	65.91	115	18	0.73	637.64	626	30	1.28E-01	11.7	2.87E+00
12	2	66.81	45	5	0.54	646.26	626	30	4.98E-02	26.3	
13	2	67.31	18	1	0.60	650.99	626	30	1.96E-02	43.6	
14	2	79.65	44	16	0.84	769.34	757	39	4.84E-02	33.8	9.85E-01
15	2	81.21	887	16	0.67	784.31	757	39	9.85E-01	3.5	
16	0	102.51	10	16	0.13	988.48	980	15	1.10E-02	84.5	
17	0	104.63	17	6	0.76	1008.86	997	17	1.84E-02	37.7	
18	0	112.23	178	95	0.76	1081.73	1069	23	1.98E-01	14.2	
19	0	116.57	30	34	0.76	1123.28	1109	20	3.37E-02	43.7	
20	0	160.98	50	12	0.82	1549.14	1535	25	5.55E-02	21.4	
21	0	276.98	47	6	0.33	2661.31	2649	22	5.17E-02	17.6	
22	2	302.83	18	1	1.15	2909.09	2902	25	1.98E-02	48.9	1.43E+00
23	2	303.55	121	6	0.95	2916.00	2902	25	1.34E-01	9.8	
24	0	334.31	71	3	1.22	3210.96	3196	26	7.92E-02	12.9	
25	1	356.42	302	2	1.09	3422.95	3411	28	3.36E-01	6.7	1.06E+01
26	1	357.26	148	3	1.00	3431.00	3411	28	1.65E-01	11.7	
27	8	384.50	78	6	0.95	3692.12	3679	25	8.64E-02	13.5	5.23E-01
28	8	385.13	19	3	1.21	3698.17	3679	25	2.08E-02	39.2	
29	1	387.09	116	15	1.02	3717.00	3708	24	1.29E-01	10.3	4.40E+00
30	1	387.93	63	16	1.02	3725.00	3708	24	7.03E-02	20.2	

Sample ID : 1111140-12 Acquisition date : 1-DEC-2011 15:31:27

Total number of lines in spectrum	30	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	7	23.33%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.476E+02	4.476E+02	0.751E+02	16.78	
			---	---			
Total Activity :			4.476E+02	4.476E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.144E+00	1.144E+00	1.256E+00	109.77	
PA-234	4.47E+09Y	1.00	4.730E+00	4.730E+00	1.380E+00	29.19	
TH-234	4.47E+09Y	1.00	2.275E+02	2.275E+02	0.390E+02	17.15	
			---	---			
Total Activity :			2.334E+02	2.334E+02			

Grand Total Activity : 6.809E+02 6.810E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-12 Acquisition date : 1-DEC-2011 15:31:27

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.476E+02	4.476E+02	16.78	OK
	302.84	17.80	2.575E+00	1.168E+02	1.168E+02	101.31	OK
	356.01	60.00	4.312E+00	3.507E+02	3.508E+02	19.78	OK

Final Mean for 3 Valid Peaks = 4.476E+02+/- 7.510E+01 (16.78%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.144E+00	1.144E+00	109.77	OK
	10.11	20.20	1.000E+02	2.379E+00	2.379E+00	109.77	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	9.052E+02	9.052E+02	100.82	OK

Final Mean for 3 Valid Peaks = 1.144E+00+/- 1.256E+00 (109.77%)

PA-234	9.89	89.00	1.000E+02	5.399E-01	5.399E-01	109.77	OK
	21.72	64.90*	1.000E+02	4.730E+00	4.730E+00	29.19	OK
	37.93	23.75	1.000E+02	1.399E+01	1.399E+01	31.45	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 4.730E+00+/- 1.380E+00 (29.19%)

TH-234	63.29	3.80*	8.750E+01	2.275E+02	2.275E+02	17.15	OK

Final Mean for 1 Valid Peaks = 2.275E+02+/- 3.901E+01 (17.15%)

Flag: "*" = Keyline

Sample ID : 1111140-12
Acquisition date : 1-DEC-2011 15:31:27

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.476E+02	7.510E+01	1.186E+01	1.746E+00	37.757
PA-231	1.144E+00	1.256E+00	1.883E+00	2.119E-02	0.608
PA-234	4.730E+00	1.380E+00	8.880E-01	9.996E-03	5.326
TH-234	2.275E+02	3.901E+01	2.294E+01	2.951E-01	9.919

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.367E+00		1.386E+01	2.462E+01	8.344E+00	-0.177
CD-109	-1.457E+01		9.399E+01	1.692E+02	1.628E+01	-0.086
NP-237	-2.765E+00		2.543E+01	4.611E+01	4.067E+00	-0.060
AM-241	-2.713E-01		1.500E+00	2.269E+00	2.554E-02	-0.120

KB 12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 16:09:12.45

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114013_GE5_BAFIL_171620.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB4-1
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 15:53:54.
Sample ID : 1111140-13 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3.54	16	36	0.43	39.59	38	5	1.80E-02	63.3	
2	0	9.63	11	11	1.06	98.01	87	15	1.19E-02	75.0	
3	0	21.28	80	24	0.59	209.69	203	18	8.91E-02	20.3	
4	0	25.00	28	12	0.32	245.36	234	23	3.06E-02	37.3	
5	0	30.99	2114	107	0.69	302.83	292	25	2.35E+00	2.6	
6	1	35.12	459	25	0.66	342.42	328	32	5.10E-01	5.6	1.14E+00
7	1	36.08	93	12	0.60	351.65	328	32	1.04E-01	22.0	
8	0	51.70	38	23	0.68	501.41	490	20	4.17E-02	31.4	
9	0	53.39	53	16	0.85	517.55	510	16	5.89E-02	19.9	
10	0	61.90	260	39	0.80	599.12	586	24	2.89E-01	8.2	
11	0	66.24	115	38	1.07	640.81	628	26	1.28E-01	15.6	
12	1	79.75	61	28	0.76	770.34	758	38	6.74E-02	23.7	1.03E+00
13	1	81.22	838	16	0.71	784.42	758	38	9.31E-01	3.6	
14	0	112.15	189	38	0.67	1080.90	1072	18	2.10E-01	9.8	
15	7	276.63	42	3	1.02	2657.89	2648	22	4.71E-02	19.1	7.81E-01
16	7	277.54	14	0	0.44	2666.65	2648	22	1.59E-02	31.9	
17	0	303.44	97	14	0.67	2914.95	2904	22	1.08E-01	12.5	
18	0	334.20	66	3	0.19	3209.85	3195	26	7.36E-02	13.5	
19	0	356.74	395	11	0.91	3426.02	3411	28	4.39E-01	5.3	
20	4	384.57	39	10	1.01	3692.81	3678	29	4.33E-02	29.2	4.00E-01
21	4	385.01	41	8	1.02	3697.00	3678	29	4.54E-02	25.4	
22	1	387.30	54	14	1.02	3719.00	3708	26	6.03E-02	23.8	2.50E+00
23	1	387.93	120	11	1.02	3725.00	3708	26	1.34E-01	10.7	
24	0	415.62	27	2	1.09	3990.51	3975	24	2.98E-02	23.0	
25	0	418.58	18	9	0.72	4018.88	4007	22	1.95E-02	43.1	

Sample ID : 1111140-13 Acquisition date : 1-DEC-2011 15:53:54

Total number of lines in spectrum	25	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	7	28.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.232E+02	4.232E+02	0.714E+02	16.88	
			---	---			
Total Activity :			4.232E+02	4.232E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	7.638E-01	7.638E-01	11.46E-01	150.06	
PA-234	4.47E+09Y	1.00	3.709E+00	3.709E+00	1.517E+00	40.91	
TH-234	4.47E+09Y	1.00	2.350E+02	2.350E+02	0.399E+02	17.00	
			---	---			
Total Activity :			2.395E+02	2.395E+02			

Grand Total Activity : 6.626E+02 6.627E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-13 Acquisition date : 1-DEC-2011 15:53:54

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.232E+02	4.232E+02	16.88	OK
	302.84	17.80	2.575E+00	6.368E+02	6.369E+02	36.43	OK
	356.01	60.00	4.312E+00	4.588E+02	4.589E+02	17.96	OK

Final Mean for 3 Valid Peaks = 4.232E+02+/- 7.143E+01 (16.88%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	7.638E-01	7.638E-01	150.06	OK
	10.11	20.20	1.000E+02	1.588E+00	1.588E+00	150.06	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	4.936E+03	4.936E+03	35.03	OK

Final Mean for 3 Valid Peaks = 7.638E-01+/- 1.146E+00 (150.06%)

PA-234	9.89	89.00	1.000E+02	3.604E-01	3.604E-01	150.06	OK
	21.72	64.90*	1.000E+02	3.709E+00	3.709E+00	40.91	OK
	37.93	23.75	1.000E+02	1.181E+01	1.181E+01	44.27	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.709E+00+/- 1.517E+00 (40.91%)

TH-234	63.29	3.80*	8.750E+01	2.350E+02	2.350E+02	17.00	OK

Final Mean for 1 Valid Peaks = 2.350E+02+/- 3.994E+01 (17.00%)

Flag: "*" = Keyline

Sample ID : 1111140-13 Acquisition date : 1-DEC-2011 15:53:54

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.232E+02	7.143E+01	1.211E+01	1.784E+00	34.934
PA-231	7.638E-01	1.146E+00	1.600E+00	1.802E-02	0.477
PA-234	3.709E+00	1.517E+00	1.037E+00	1.167E-02	3.577
TH-234	2.350E+02	3.994E+01	3.237E+01	4.165E-01	7.259

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.374E-01		1.287E+01	2.418E+01	8.197E+00	-0.022
CD-109	3.950E+01		9.981E+01	1.913E+02	1.841E+01	0.207
NP-237	-3.187E+01		3.001E+01	4.683E+01	4.130E+00	-0.681
AM-241	1.461E-01		1.623E+00	2.487E+00	2.799E-02	0.059

KB 12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 16:25:50.44

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114014_GE5_BAFIL_171622.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB4-2
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 16:10:32.
Sample ID : 1111140-14 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	12.14	6	5	0.20	122.12	116	8	6.31E-03	84.4	
2	0	21.37	68	54	0.80	210.62	198	22	7.60E-02	31.2	
3	0	25.14	22	13	0.48	246.69	236	17	2.45E-02	42.8	
4	0	28.24	47	25	1.04	276.40	267	20	5.19E-02	30.0	
5	0	30.99	2209	99	0.66	302.78	291	24	2.45E+00	2.4	
6	1	35.14	387	29	0.66	342.58	331	27	4.30E-01	6.7	1.84E+00
7	1	35.96	130	24	0.63	350.42	331	27	1.44E-01	17.2	
8	0	51.92	19	22	0.78	503.48	493	15	2.08E-02	52.8	
9	0	53.52	46	18	0.61	518.82	511	14	5.06E-02	22.8	
10	0	61.88	240	55	0.90	599.01	584	25	2.67E-01	9.5	
11	0	66.36	161	32	0.85	641.90	628	34	1.79E-01	12.2	
12	2	79.76	46	27	0.84	770.39	760	33	5.10E-02	30.5	9.55E-01
13	2	81.25	874	24	0.64	784.71	760	33	9.72E-01	3.6	
14	0	84.10	27	10	0.17	812.01	804	15	3.00E-02	29.2	
15	0	112.14	220	40	0.47	1080.87	1069	21	2.45E-01	9.0	
16	1	115.91	30	10	0.75	1117.00	1105	34	3.38E-02	36.1	1.01E+00
17	1	116.54	29	12	0.75	1123.00	1105	34	3.27E-02	37.2	
18	0	146.76	21	3	1.45	1412.79	1403	20	2.28E-02	28.8	
19	0	276.94	41	4	0.74	2660.91	2646	25	4.61E-02	17.9	
20	3	302.75	12	0	0.77	2908.34	2903	22	1.33E-02	43.1	3.05E+00
21	3	303.34	105	2	0.95	2914.00	2903	22	1.17E-01	10.0	
22	3	303.83	15	2	0.69	2918.70	2903	22	1.70E-02	58.6	
23	1	307.51	28	3	0.95	2954.00	2946	22	3.17E-02	20.3	1.71E+00
24	1	308.24	43	1	0.95	2961.00	2946	22	4.72E-02	15.0	
25	0	334.48	71	9	0.79	3212.52	3197	25	7.92E-02	14.7	
26	0	356.78	430	14	0.92	3426.35	3412	28	4.78E-01	5.2	
27	7	384.08	81	6	1.35	3688.07	3677	27	9.02E-02	14.0	3.42E+00
28	7	384.49	10	8	1.02	3692.00	3677	27	1.15E-02	113.4	
29	7	384.90	36	7	0.49	3695.99	3677	27	3.95E-02	28.0	
30	0	387.66	128	12	0.82	3722.40	3709	24	1.42E-01	10.4	
31	0	391.91	32	14	0.76	3763.22	3748	25	3.53E-02	30.6	
32	1	415.05	14	2	1.04	3985.00	3973	26	1.60E-02	47.7	3.09E-01
33	1	415.57	33	3	1.04	3990.00	3973	26	3.70E-02	19.5	

Sample ID : 1111140-14 Acquisition date : 1-DEC-2011 16:10:32

Total number of lines in spectrum	33	
Number of unidentified lines	27	
Number of lines tentatively identified by NID	6	18.18%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.415E+02	4.415E+02	0.745E+02	16.86	
			---	---			
Total Activity :			4.415E+02	4.415E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.170E+02	2.170E+02	0.422E+02	19.45	
			---	---			
Total Activity :			2.170E+02	2.170E+02			

Grand Total Activity :	6.585E+02	6.586E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-14
Acquisition date : 1-DEC-2011 16:10:32

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.415E+02	4.415E+02	16.86	OK
	302.84	17.80	2.575E+00	7.835E+01	7.836E+01	90.14	OK
	356.01	60.00	4.312E+00	4.994E+02	4.994E+02	17.77	OK

Final Mean for 3 Valid Peaks = 4.415E+02+/- 7.446E+01 (16.86%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.170E+02	2.170E+02	19.45	OK

Final Mean for 1 Valid Peaks = 2.170E+02+/- 4.222E+01 (19.45%)

Flag: "*" = Keyline

Sample ID : 1111140-14
Acquisition date : 1-DEC-2011 16:10:32

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.415E+02	7.446E+01	1.355E+01	1.996E+00	32.577
TH-234	2.170E+02	4.222E+01	2.942E+01	3.785E-01	7.376

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.865E-01		1.442E+01	2.677E+01	9.073E+00	-0.018
CD-109	3.672E+01		1.034E+02	1.962E+02	1.888E+01	0.187
PA-231	5.683E-01		1.002E+00	1.952E+00	2.197E-02	0.291
PA-234	3.167E+00	+	1.978E+00	2.149E+00	2.419E-02	1.473
NP-237	-1.675E+01		3.063E+01	4.813E+01	4.245E+00	-0.348
AM-241	1.100E-01		1.666E+00	2.535E+00	2.853E-02	0.043

LCB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 16:44:09.77

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114015_GE5_BAFIL_171624.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB4-3
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 16:28:53.
Sample ID : 1111140-15 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.80	19	3	0.88	70.92	65	12	2.14E-02	28.9	
2	0	15.19	18	0	1.06	151.33	145	14	2.00E-02	23.6	
3	0	16.73	17	4	0.14	166.13	159	15	1.90E-02	34.6	
4	0	19.99	10	28	0.25	197.33	191	10	1.16E-02	99.1	
5	0	21.06	65	51	0.57	207.57	201	16	7.21E-02	27.8	
6	0	24.24	14	13	1.70	238.09	227	19	1.57E-02	68.7	
7	0	30.97	2074	104	0.74	302.57	292	22	2.30E+00	2.5	
8	1	35.13	354	40	0.66	342.51	333	26	3.93E-01	7.3	1.78E+00
9	1	36.06	112	24	0.66	351.42	333	26	1.24E-01	17.3	
10	0	61.95	248	45	0.87	599.67	584	31	2.75E-01	9.3	
11	0	66.14	120	33	1.44	639.80	627	25	1.33E-01	14.3	
12	4	79.86	54	26	0.91	771.36	763	32	6.01E-02	22.1	1.09E+00
13	4	81.24	860	25	0.66	784.63	763	32	9.56E-01	3.7	
14	0	112.14	180	42	0.66	1080.86	1068	22	2.00E-01	10.7	
15	6	116.19	60	22	0.82	1119.72	1109	22	6.66E-02	21.1	1.29E+00
16	6	117.05	8	6	0.40	1127.89	1109	22	8.79E-03	52.1	
17	0	161.27	16	15	0.80	1551.89	1545	14	1.79E-02	51.5	
18	2	276.84	39	5	0.92	2659.91	2652	19	4.31E-02	20.0	9.78E-01
19	2	277.37	11	1	0.93	2665.00	2652	19	1.20E-02	61.5	
20	0	303.47	126	2	0.39	2915.20	2901	23	1.40E-01	9.3	
21	0	308.12	20	3	0.41	2959.85	2948	22	2.26E-02	27.1	
22	1	333.59	24	0	0.98	3204.00	3197	26	2.72E-02	21.7	2.76E+00
23	1	334.53	66	3	0.98	3213.00	3197	26	7.30E-02	11.5	
24	4	356.67	353	17	0.98	3425.26	3411	29	3.92E-01	6.3	3.97E+00
25	4	357.34	86	12	0.86	3431.76	3411	29	9.60E-02	22.3	
26	0	384.76	82	10	0.61	3694.64	3681	25	9.16E-02	13.4	
27	0	387.69	136	12	0.36	3722.69	3708	26	1.51E-01	10.2	
28	0	415.97	19	13	0.71	3993.89	3980	20	2.14E-02	41.3	

Sample ID : 1111140-15 Acquisition date : 1-DEC-2011 16:28:53

Total number of lines in spectrum	28	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	6	21.43%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.343E+02	4.343E+02	0.736E+02	16.94	
		Total Activity :	4.343E+02	4.343E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.236E+02	2.236E+02	0.428E+02	19.12	
		Total Activity :	2.236E+02	2.236E+02			

Grand Total Activity : 6.579E+02 6.579E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-15 Acquisition date : 1-DEC-2011 16:28:53

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.343E+02	4.343E+02	16.94	OK
	302.84	17.80	2.575E+00	8.241E+02	8.242E+02	32.27	OK
	356.01	60.00	4.312E+00	4.096E+02	4.097E+02	19.14	OK

Final Mean for 3 Valid Peaks = 4.343E+02+/- 7.359E+01 (16.94%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.236E+02	2.236E+02	19.12	OK

Final Mean for 1 Valid Peaks = 2.236E+02+/- 4.276E+01 (19.12%)

Flag: "*" = Keyline

Sample ID : 1111140-15 Acquisition date : 1-DEC-2011 16:28:53

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.343E+02	7.359E+01	1.355E+01	1.996E+00	32.045
TH-234	2.236E+02	4.276E+01	3.084E+01	3.968E-01	7.251

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.539E+00		1.411E+01	2.796E+01	9.477E+00	0.270
CD-109	3.469E+01		9.707E+01	1.860E+02	1.790E+01	0.187
PA-231	4.508E-01		9.389E-01	1.829E+00	2.059E-02	0.246
PA-234	3.001E+00	+	1.670E+00	2.118E+00	2.385E-02	1.416
NP-237	-3.560E+01		2.858E+01	4.295E+01	3.788E+00	-0.829
AM-241	1.599E+00		1.487E+00	2.681E+00	3.018E-02	0.596

KQ 12/11/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 17:00:21.07

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114016_GE5_BAFIL_171626.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB4-4
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 16:45:04.
Sample ID : 1111140-16 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.58	6	10	0.10	78.37	72	9	6.63E-03	107.7	
2	0	21.07	89	35	0.65	207.68	199	19	9.85E-02	19.7	
3	0	30.96	2021	136	0.72	302.54	289	26	2.25E+00	2.7	
4	4	35.13	440	32	0.70	342.52	331	28	4.89E-01	5.8	7.96E-01
5	4	36.11	75	17	0.60	351.94	331	28	8.30E-02	24.9	
6	0	39.01	11	6	0.68	379.72	372	14	1.18E-02	60.8	
7	0	53.77	37	46	0.82	521.23	503	23	4.06E-02	44.1	
8	1	61.64	124	10	0.72	596.63	586	28	1.38E-01	13.1	1.09E+00
9	1	62.20	102	11	0.66	602.00	586	28	1.13E-01	15.7	
10	2	65.44	31	16	0.57	633.07	629	26	3.40E-02	23.9	4.26E+00
11	2	66.11	80	20	0.69	639.49	629	26	8.87E-02	17.3	
12	2	66.89	18	7	0.67	647.00	629	26	1.97E-02	67.6	
13	2	67.41	31	1	0.67	652.00	629	26	3.39E-02	15.4	
14	3	79.56	33	15	0.92	768.50	757	38	3.72E-02	34.5	6.66E-01
15	3	81.21	759	16	0.67	784.31	757	38	8.43E-01	3.8	
16	0	112.14	163	45	0.63	1080.83	1068	22	1.81E-01	11.8	
17	0	276.89	40	8	0.52	2660.43	2650	21	4.47E-02	20.6	
18	0	303.53	101	9	0.81	2915.84	2903	25	1.12E-01	11.7	
19	0	334.28	49	10	0.73	3210.65	3195	27	5.47E-02	19.6	
20	2	356.87	422	6	1.03	3427.24	3412	27	4.69E-01	4.7	4.55E+00
21	2	357.26	10	4	1.00	3431.00	3412	27	1.12E-02	171.2	
22	3	384.16	33	1	1.11	3688.87	3680	24	3.69E-02	25.0	1.06E+00
23	3	384.87	42	3	0.78	3695.69	3680	24	4.62E-02	21.2	
24	2	387.29	34	5	1.01	3718.90	3709	26	3.76E-02	33.3	3.87E+00
25	2	387.93	142	5	1.02	3725.00	3709	26	1.58E-01	8.3	

Sample ID : 1111140-16 Acquisition date : 1-DEC-2011 16:45:04

Total number of lines in spectrum	25	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	7	28.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.832E+02	3.833E+02	0.653E+02	17.04	
		Total Activity :	3.832E+02	3.833E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	9.172E+01	9.172E+01	2.899E+01	31.61	
		Total Activity :	9.172E+01	9.172E+01			

Grand Total Activity : 4.750E+02 4.750E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-16
Acquisition date : 1-DEC-2011 16:45:04

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.832E+02	3.833E+02	17.04	OK
	302.84	17.80	2.575E+00	6.597E+02	6.597E+02	35.31	OK
	356.01	60.00	4.312E+00	4.901E+02	4.901E+02	17.22	OK

Final Mean for 3 Valid Peaks = 3.833E+02+/- 6.532E+01 (17.04%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	9.172E+01	9.172E+01	31.61	OK

Final Mean for 1 Valid Peaks = 9.172E+01+/- 2.899E+01 (31.61%)

Flag: "*" = Keyline

Sample ID : 1111140-16 Acquisition date : 1-DEC-2011 16:45:04

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.833E+02	6.532E+01	1.286E+01	1.893E+00	29.812
TH-234	9.172E+01	2.899E+01	2.836E+01	3.649E-01	3.234

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.785E+00		1.445E+01	2.615E+01	8.864E+00	-0.107
CD-109	3.076E+01		8.061E+01	1.595E+02	1.535E+01	0.193
PA-231	4.268E-01	+	9.193E-01	1.629E+00	1.834E-02	0.262
PA-234	4.101E+00	+	1.624E+00	2.084E+00	2.346E-02	1.968
NP-237	9.142E+00		2.182E+01	4.338E+01	3.827E+00	0.211
AM-241	8.398E-01		1.161E+00	2.101E+00	2.365E-02	0.400

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VAX/VMS Peak Search Report Generated 1-DEC-2011 17:16:31.44

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114017_GE5_BAFIL_171628.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : IB4-5
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 17:01:16.
Sample ID : 1111140-17 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.10 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	2	21.10	57	44	0.58	207.95	200	18	6.29E-02	31.3	2.01E+00
2	2	21.52	20	20	0.56	212.05	200	18	2.21E-02	67.9	
3	0	28.60	37	34	0.16	279.91	271	17	4.10E-02	39.8	
4	0	30.98	1932	59	0.74	302.68	289	26	2.15E+00	2.5	
5	3	35.10	439	25	0.64	342.23	333	25	4.88E-01	5.7	1.09E+00
6	3	36.05	58	8	0.52	351.34	333	25	6.42E-02	25.8	
7	0	53.21	63	15	0.70	515.87	503	22	6.97E-02	18.3	
8	0	59.30	8	17	0.48	574.27	566	16	8.99E-03	101.6	
9	0	61.94	217	65	0.81	599.57	588	22	2.41E-01	10.6	
10	0	66.18	108	25	1.01	640.19	625	26	1.20E-01	14.5	
11	1	79.75	72	15	0.76	770.34	759	35	7.99E-02	18.3	2.14E+00
12	1	81.24	804	13	0.67	784.59	759	35	8.94E-01	3.6	
13	0	112.10	188	30	0.93	1080.47	1063	29	2.08E-01	10.1	
14	0	116.52	54	12	0.49	1122.84	1110	25	5.96E-02	20.3	
15	5	141.93	14	2	0.63	1366.50	1363	19	1.57E-02	23.5	7.03E-01
16	5	143.07	18	1	0.49	1377.43	1363	19	1.97E-02	23.8	
17	2	276.64	24	13	0.93	2658.00	2644	26	2.66E-02	37.1	3.89E-01
18	2	277.26	29	6	0.80	2663.97	2644	26	3.19E-02	25.5	
19	2	302.93	19	4	1.15	2910.09	2902	24	2.12E-02	50.3	4.15E+00
20	2	303.65	156	5	0.95	2917.00	2902	24	1.74E-01	6.8	
21	0	356.83	377	4	0.92	3426.89	3412	35	4.19E-01	5.3	
22	1	384.48	28	0	1.12	3691.97	3680	25	3.13E-02	35.2	8.65E+00
23	1	385.11	119	0	1.02	3698.00	3680	25	1.32E-01	7.8	
24	1	387.87	144	6	1.12	3724.46	3707	27	1.60E-01	8.9	2.67E+00
25	1	388.45	36	4	1.02	3730.00	3707	27	4.01E-02	21.7	

Sample ID : 1111140-17 Acquisition date : 1-DEC-2011 17:01:16

Total number of lines in spectrum	25	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	7	28.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.060E+02	4.060E+02	0.686E+02	16.90	
			---	---			
Total Activity :			4.060E+02	4.060E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.956E+02	1.956E+02	0.422E+02	21.56	
AM-241	432.20Y	1.00	6.770E-01	6.770E-01	13.76E-01	203.32	
			---	---			
Total Activity :			1.962E+02	1.962E+02			

Grand Total Activity :	6.022E+02	6.023E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-17
Acquisition date : 1-DEC-2011 17:01:16

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.060E+02	4.060E+02	16.90	OK
	302.84	17.80	2.575E+00	1.250E+02	1.250E+02	103.97	OK
	356.01	60.00	4.312E+00	4.380E+02	4.380E+02	17.93	OK

Final Mean for 3 Valid Peaks = 4.060E+02+/- 6.862E+01 (16.90%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.956E+02	1.956E+02	21.56	OK

Final Mean for 1 Valid Peaks = 1.956E+02+/- 4.216E+01 (21.56%)

AM-241	59.54	35.90*	1.000E+02	6.770E-01	6.770E-01	203.32	OK

Final Mean for 1 Valid Peaks = 6.770E-01+/- 1.376E+00 (203.32%)

Flag: "*" = Keyline

Sample ID : 1111140-17 Acquisition date : 1-DEC-2011 17:01:16

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.060E+02	6.862E+01	1.333E+01	1.962E+00	30.471
TH-234	1.956E+02	4.216E+01	2.361E+01	3.037E-01	8.283
AM-241	6.770E-01	1.376E+00	3.808E+00	4.286E-02	0.178

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-5.011E+00		1.523E+01	2.679E+01	9.082E+00	-0.187
CD-109	6.514E+01		9.542E+01	1.900E+02	1.829E+01	0.343
PA-231	-3.585E-02		9.353E-01	1.701E+00	1.915E-02	-0.021
PA-234	9.191E-01	+	1.249E+00	2.085E+00	2.347E-02	0.441
NP-237	-3.281E+01		2.683E+01	4.023E+01	3.549E+00	-0.816

KB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 17:33:46.89

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114018_GE5_BAFIL_171629.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-1
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 17:18:29.
Sample ID : 1111140-18 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	20.97	133	23	0.62	206.77	194	23	1.48E-01	12.8	
2	0	31.00	2160	123	0.78	302.93	293	23	2.40E+00	2.6	
3	1	35.12	427	24	0.66	342.38	332	29	4.74E-01	5.9	1.18E+00
4	1	36.12	61	18	0.60	352.00	332	29	6.78E-02	32.6	
5	0	49.23	10	8	0.28	477.67	464	16	1.07E-02	65.3	
6	0	53.40	42	26	0.47	517.71	509	14	4.70E-02	26.7	
7	0	61.92	190	77	0.66	599.37	587	22	2.11E-01	12.4	
8	2	65.84	73	40	0.81	636.94	625	28	8.16E-02	23.3	3.68E-01
9	2	66.33	24	41	0.73	641.64	625	28	2.68E-02	68.5	
10	0	73.87	17	12	0.51	713.90	701	18	1.89E-02	47.4	
11	2	79.93	60	23	0.84	772.05	763	31	6.66E-02	21.4	1.37E+00
12	2	81.22	859	15	0.67	784.43	763	31	9.54E-01	3.5	
13	10	112.10	211	24	0.70	1080.42	1072	22	2.34E-01	8.3	3.73E+00
14	10	112.68	69	14	0.74	1086.00	1072	22	7.68E-02	25.2	
15	0	116.30	38	30	0.65	1120.72	1109	19	4.19E-02	34.4	
16	0	160.70	34	20	0.58	1546.45	1531	24	3.74E-02	34.4	
17	0	276.98	46	10	0.80	2661.27	2649	21	5.14E-02	19.8	
18	0	303.50	137	0	0.67	2915.55	2901	24	1.52E-01	8.5	
19	0	308.07	17	4	0.14	2959.31	2950	16	1.88E-02	31.8	
20	0	334.36	62	0	0.73	3211.39	3197	24	6.89E-02	12.7	
21	0	356.81	409	3	0.87	3426.66	3412	27	4.54E-01	5.0	
22	0	365.41	14	4	0.30	3509.13	3499	18	1.53E-02	38.6	
23	1	384.07	54	0	1.02	3688.00	3680	26	5.95E-02	14.7	2.72E+00
24	1	384.70	54	0	1.02	3694.00	3680	26	5.96E-02	19.4	
25	3	387.20	48	3	1.02	3718.00	3708	26	5.33E-02	25.9	8.23E-01
26	3	387.90	116	8	0.77	3724.70	3708	26	1.29E-01	11.4	
27	1	415.26	11	0	1.04	3987.00	3975	23	1.17E-02	54.3	2.68E+00
28	1	415.84	57	0	0.94	3992.57	3975	23	6.34E-02	8.8	

Sample ID : 1111140-18 Acquisition date : 1-DEC-2011 17:18:29

Total number of lines in spectrum	28	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	6	21.43%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.334E+02	4.335E+02	0.728E+02	16.80	
		Total Activity :	4.334E+02	4.335E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.712E+02	1.712E+02	0.429E+02	25.09	
		Total Activity :	1.712E+02	1.712E+02			

Grand Total Activity : 6.046E+02 6.047E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-18 Acquisition date : 1-DEC-2011 17:18:29

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.334E+02	4.335E+02	16.80	OK
	302.84	17.80	2.575E+00	8.975E+02	8.976E+02	31.45	OK
	356.01	60.00	4.312E+00	4.747E+02	4.747E+02	17.62	OK

Final Mean for 3 Valid Peaks = 4.335E+02+/- 7.284E+01 (16.80%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.712E+02	1.712E+02	25.09	OK

Final Mean for 1 Valid Peaks = 1.712E+02+/- 4.294E+01 (25.09%)

Flag: "*" = Keyline

Sample ID : 1111140-18 Acquisition date : 1-DEC-2011 17:18:29

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.335E+02	7.284E+01	1.159E+01	1.706E+00	37.402
TH-234	1.712E+02	4.294E+01	3.044E+01	3.916E-01	5.624

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-9.656E+00		1.547E+01	2.551E+01	8.649E+00	-0.378
CD-109	2.604E+01		9.150E+01	1.752E+02	1.686E+01	0.149
PA-231	-6.879E-01		9.541E-01	1.553E+00	1.748E-02	-0.443
PA-234	6.154E+00	+	1.592E+00	2.309E+00	2.599E-02	2.665
NP-237	-3.621E+01		2.747E+01	4.048E+01	3.571E+00	-0.894
AM-241	1.673E+00		1.594E+00	2.821E+00	3.175E-02	0.593

ICB 12/1/14

VAX/VMS Peak Search Report Generated 1-DEC-2011 17:49:39.88

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114019_GE5_BAFIL_171631.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-2
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 17:34:18.
Sample ID : 1111140-19 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.19 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	20.89	161	22	0.77	205.98	189	28	1.79E-01	11.3	
2	0	25.50	40	41	2.83	250.19	235	32	4.49E-02	49.6	
3	0	30.98	2166	136	0.69	302.74	288	27	2.41E+00	2.6	
4	1	35.16	422	31	0.66	342.79	330	29	4.69E-01	6.0	2.91E+00
5	1	36.12	76	11	0.60	352.00	330	29	8.40E-02	25.0	
6	0	53.40	48	23	0.80	517.70	508	16	5.30E-02	24.3	
7	6	61.75	178	54	0.96	597.76	586	26	1.97E-01	12.6	1.67E+00
8	6	62.18	44	35	0.52	601.81	586	26	4.87E-02	42.6	
9	3	66.09	98	22	0.89	639.34	623	34	1.09E-01	16.3	1.31E+00
10	3	67.10	34	16	0.67	649.00	623	34	3.79E-02	33.2	
11	9	79.76	70	1	0.92	770.42	760	34	7.79E-02	16.7	3.27E+00
12	9	81.23	934	10	0.69	784.46	760	34	1.04E+00	3.3	
13	0	92.80	31	3	1.64	895.43	885	21	3.41E-02	22.2	
14	0	102.34	29	12	1.37	986.84	976	18	3.20E-02	30.4	
15	1	112.13	191	47	0.82	1080.71	1069	21	2.12E-01	10.6	1.81E+00
16	1	112.75	60	7	0.67	1086.70	1069	21	6.64E-02	17.1	
17	0	276.97	47	6	0.36	2661.19	2647	24	5.22E-02	17.9	
18	0	303.59	122	19	0.85	2916.35	2903	25	1.36E-01	11.6	
19	0	334.38	51	9	0.44	3211.56	3194	29	5.71E-02	19.4	
20	0	356.79	453	8	0.94	3426.48	3407	35	5.04E-01	4.9	
21	2	384.77	94	0	1.23	3694.76	3680	25	1.04E-01	10.1	7.41E-01
22	2	385.53	29	0	1.02	3702.00	3680	25	3.25E-02	18.1	
23	0	387.63	151	10	0.80	3722.16	3708	27	1.68E-01	9.3	
24	0	415.84	27	8	0.70	3992.61	3979	24	3.01E-02	29.0	

Sample ID : 1111140-19 Acquisition date : 1-DEC-2011 17:34:18

Total number of lines in spectrum	24	
Number of unidentified lines	18	
Number of lines tentatively identified by NID	6	25.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.714E+02	4.714E+02	0.785E+02	16.66	
			---	---			
	Total Activity :		4.714E+02	4.714E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	3.957E+01	3.957E+01	3.376E+01	85.32	
			---	---			
	Total Activity :		3.957E+01	3.957E+01			

Grand Total Activity : 5.110E+02 5.110E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111140-19 Acquisition date : 1-DEC-2011 17:34:18

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.714E+02	4.714E+02	16.66	OK
	302.84	17.80	2.575E+00	8.002E+02	8.003E+02	35.10	OK
	356.01	60.00	4.312E+00	5.262E+02	5.262E+02	17.50	OK

Final Mean for 3 Valid Peaks = 4.714E+02+/- 7.852E+01 (16.66%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	3.957E+01	3.957E+01	85.32	OK

Final Mean for 1 Valid Peaks = 3.957E+01+/- 3.376E+01 (85.32%)

Flag: "*" = Keyline

Sample ID : 1111140-19 Acquisition date : 1-DEC-2011 17:34:18

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.714E+02	7.852E+01	1.075E+01	1.582E+00	43.864
TH-234	3.957E+01	3.376E+01	3.419E+01	4.399E-01	1.157

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.699E+01		1.545E+01	2.174E+01	7.370E+00	-0.782
CD-109	2.751E+01		1.040E+02	1.954E+02	1.880E+01	0.141
PA-231	-4.974E-02		8.591E-01	1.573E+00	1.770E-02	-0.032
PA-234	7.443E+00	+	1.709E+00	2.440E+00	2.747E-02	3.051
NP-237	-5.068E+00		2.886E+01	5.129E+01	4.524E+00	-0.099
AM-241	1.033E+00		1.621E+00	2.705E+00	3.045E-02	0.382

ICB 12/1/11

VAX/VMS Peak Search Report Generated 1-DEC-2011 18:05:35.88

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114020_GE5_BAFIL_171633.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-3
Deposition Date :
Sample Date : 1-DEC-2011 00:00:00. Acquisition date : 1-DEC-2011 17:49:44.
Sample ID : 1111140-20 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.17	94	37	0.60	208.68	197	23	1.04E-01	20.3	
2	3	24.86	20	13	0.57	244.00	239	13	2.22E-02	38.5	1.21E+00
3	3	25.35	11	6	0.42	248.72	239	13	1.20E-02	47.3	
4	0	30.99	2088	128	0.71	302.78	285	28	2.32E+00	2.6	
5	1	35.14	427	20	0.66	342.58	332	26	4.75E-01	5.7	1.12E+00
6	1	35.97	101	11	0.63	350.58	332	26	1.12E-01	20.4	
7	0	51.83	31	11	0.93	502.66	493	17	3.39E-02	28.2	
8	0	53.45	50	20	0.42	518.19	510	17	5.60E-02	22.3	
9	0	61.91	260	53	0.77	599.26	589	24	2.89E-01	8.8	
10	3	65.74	34	25	0.67	636.00	629	32	3.74E-02	37.0	1.19E+00
11	3	66.33	62	25	0.49	641.61	629	32	6.90E-02	22.7	
12	3	67.10	26	33	0.67	649.00	629	32	2.90E-02	57.9	
13	0	81.22	867	34	0.65	784.35	767	31	9.63E-01	3.8	
14	0	102.54	25	20	0.51	988.76	976	22	2.73E-02	45.6	
15	0	112.15	187	50	0.79	1080.97	1070	23	2.07E-01	11.3	
16	1	116.02	23	36	0.75	1118.00	1109	28	2.60E-02	57.1	2.46E+00
17	1	116.43	33	34	0.75	1122.00	1109	28	3.68E-02	45.8	
18	0	276.85	43	2	0.92	2660.05	2646	23	4.75E-02	17.1	
19	0	303.50	112	17	0.71	2915.52	2901	24	1.25E-01	12.1	
20	0	334.60	54	11	0.41	3213.71	3197	27	5.97E-02	18.5	
21	0	356.82	368	18	0.87	3426.76	3412	29	4.09E-01	5.8	
22	0	384.82	74	14	0.73	3695.16	3679	28	8.22E-02	15.8	
23	1	387.30	24	13	1.02	3719.00	3707	26	2.69E-02	55.2	2.47E+00
24	1	387.93	150	11	1.02	3725.00	3707	26	1.67E-01	8.3	
25	0	415.49	25	12	0.18	3989.29	3975	25	2.83E-02	34.3	

Sample ID : 1111140-20 Acquisition date : 1-DEC-2011 17:49:44

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.377E+02	4.378E+02	0.745E+02	17.01	
		Total Activity :	4.377E+02	4.378E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.353E+02	2.353E+02	0.424E+02	18.02	
		Total Activity :	2.353E+02	2.353E+02			

Grand Total Activity : 6.730E+02 6.730E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.377E+02	4.378E+02	17.01	OK
	302.84	17.80	2.575E+00	7.340E+02	7.341E+02	35.78	OK
	356.01	60.00	4.312E+00	4.273E+02	4.274E+02	18.51	OK

Final Mean for 3 Valid Peaks = 4.378E+02+/- 7.445E+01 (17.01%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.353E+02	2.353E+02	18.02	OK

Final Mean for 1 Valid Peaks = 2.353E+02+/- 4.240E+01 (18.02%)

Flag: "*" = Keyline

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.378E+02	7.445E+01	1.132E+01	1.666E+00	38.681
TH-234	2.353E+02	4.240E+01	3.264E+01	4.199E-01	7.208

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-6.896E+00		1.538E+01	2.640E+01	8.949E+00	-0.261
CD-109	-1.834E+01		8.441E+01	1.520E+02	1.463E+01	-0.121
PA-231	-5.023E-01		9.112E-01	1.530E+00	1.722E-02	-0.328
PA-234	4.336E+00	+	1.771E+00	2.188E+00	2.463E-02	1.982
NP-237	-1.007E+01		2.182E+01	3.783E+01	3.337E+00	-0.266
AM-241	7.597E-01		1.570E+00	2.630E+00	2.961E-02	0.289

FOXFIRE SCIENTIFIC

Alcoa – TT ESL

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #11-11141-OR

December 14, 2011

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

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Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 11-11141

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		11.22.11	JWM	Sample Log-In
		12/9/11	KBS	Data Compilation
		12-12-11	MLT	First Technical Data Review
		12/18/11	[illegible]	Second Technical Data Review
		12/14/11	[illegible]	Data Entry/Electronic Deliverable
		12/14/11	[illegible]	Case Narrative
		12/14/11	KBS	Electronic Deliverable Proof
		12/14/11	[illegible]	Samples Analyzed within Holding Time Yes? [ ] No? [ ] Yes
		12/14/11	[illegible]	QA/QC Review
		12/07/11	[illegible]	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: [illegible] 12/14/11

Laboratory Manager Date

Copy No. _____

Radiochemistry Services

SECTION I

CHAIN OF CUSTODY

EBERLINE SERVICES — Richmond Laboratory

Chain of Custody

CLIENT: Foxfire Scientific

ADDRESS:

PROJECT: Alcoa - TT ESL

SAMPLERS SIGNATURE:

PURCHASE ORDER NO.

DATE 11/21 PAGE 4 OF 4

TAT (IN DAYS) 14

PARAMETERS: 11-11141

SAMPLE NO.	DATE	TIME	LOCATION	Ra-226	Ra-228	total U									SAMPLE TYPE OR MATRIX	# CONTAINERS	OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST
BK6-4	11/18	—	4	X	X	X									soil	1	See pg. 2
BK6-5		—	5													1	
BK6-5C		—	6													1	
BK6-5N		—	7													1	
BK6-5S		—	8													1	
BK6-5W		—	9													1	
BK6-5E		—	10													1	

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
11/21/11	11-22-11 11:19		
COMPANY: Foxfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 7

METHOD OF SHIPMENT:

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

REC'D NOV 22 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11141
		Lab Deadline	12/2/2011
		Analysis	UUISO - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	42	L1.3
	05	39	L1.3
	06	47	L1.3
	07	43	L1.3
	08	38	L1.3
	09	48	L1.3
	10	53	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenyseg	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0905	Kenyseg	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0905
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 2010
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JPD	11/23/11 2010
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	RM	11/30/11 0815
Received by	Sample Storage	Rough Prep	Prep	Separations	~~Count Room~~	Cell room only	
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	11/30/11 1515
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11141
		Lab Deadline	12/2/2011
		Analysis	Ra226 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	42	L1.3
	05	39	L1.3
	06	47	L1.3
	07	43	L1.3
	08	38	L1.3
	09	48	L1.3
	10	53	L1.3

11/25/11

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kenyseis	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0905	Kenyseis	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/23/11 0905
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JW	11/28/11 1425
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-29-11 [illegible]
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-1-11 1620
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/1/11 1625
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/2/11 1610
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11141
		Lab Deadline	12/2/2011
		Analysis	Ra228 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	42	L1.3
	05	39	L1.3
	06	47	L1.3
	07	43	L1.3
	08	38	L1.3
	09	48	L1.3
	10	53	L1.3

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1200	Kerry Sells	11-22-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0905	Kerry Sells	11-23-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JBS	11/23/11 0905 ~~0805~~
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	JBS	11/28/11 1425
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11-29-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-1-11 1620
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/1/11 1625
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/2/11 1610
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-5-11 0900
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-9-11 0926
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	12/9/11 0900
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	KCB	12/9/11 1329
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Foxfire Scientific, Inc.	ALCOA - TT ESL	Environmental	11/22/2011	14	11-11141
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
ALCOA - TT ESL	ALCOA - TT ESL	H	12/02/2011	12/06/2011	12/06/2011

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra228	Ra226	UUISO	Tot
01	LCS	11/22/11	SO	L1.3	X	X	X	3
02	BLANK	11/22/11	SO	L1.3	X	X	X	3
03	DUP	11/22/11	SO	L1.3	X	X	X	3
04	BKG-4	11/18/11 00:00	SO	L1.3	X	X	X	3
05	BKG-5	11/18/11 00:00	SO	L1.3	X	X	X	3
06	BKG-5C	11/18/11 00:00	SO	L1.3	X	X	X	3
07	BKG-5N	11/18/11 00:00	SO	L1.3	X	X	X	3
08	BKG-5S	11/18/11 00:00	SO	L1.3	X	X	X	3
09	BKG-5W	11/18/11 00:00	SO	L1.3	X	X	X	3
10	BKG-5E	11/18/11 00:00	SO	L1.3	X	X	X	3
								0
								0
								0
								0
								0
								0
								0
								0
								0
								0
	Totals Per Analysis (non QA samples)				7	7	7	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice
Accounts Payable
Foxfire Scientific, Inc.
4621 S. Cooper St #131-332
Arlington, TX 76017
Voice 817-995-6762
Fax

Contact Matthew Arno
Voice 817-563-0579
Fax 877-433-2029

Report Data Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017
Voice 817-563-0579
Fax 877-433-2029

Printed: 11/22/2011 1:13 PM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 11-11141

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	Y	N	
If aqueous, properly preserved	Y	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	Y	N
Unbroken on outside of package?	Y	N
Present on samples?	Y	N
Unbroken on samples?	Y	N
Was chain of custody present upon sample receipt?	Y	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: (7) bags of soil.

SIGNATURE: Justin McKamey DATE: 11.22.11

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-33137

December 14, 2011

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

CASE NARRATIVE
Work Order # 11-11141-OR

SAMPLE RECEIPT

This work order contains seven soil samples received 11/22/2011. Samples were analyzed for Isotopic Uranium, Total Uranium by Alpha and Radium-226/228.

CLIENT ID	LAB ID
BKG-4	11-11141-04
BKG-5	11-11141-05
BKG-5C	11-11141-06
BKG-5N	11-11141-07
BKG-5S	11-11141-08
BKG-5W	11-11141-09
BKG-5E	11-11141-10

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

Samples demonstrated acceptable results for Uranium-234, Uranium-235 and Uranium-238 activity. Total Uranium results were calculated by mass conversion of Isotopic Uranium activity. Chemical recovery was acceptable for all samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234, Uranium-235 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were prepared by drying, pulverizing and homogenization. Representative aliquots were removed and digested using mixed acids. Radium-226 was precipitated as Radium sulfate using elemental Barium and Lead as carriers. Sulfates were dissolved in alkaline EDTA. Radium-226 was selectively precipitated from slightly acidic EDTA. Precipitates were then mounted by semi-micro-precipitations onto micro-porous filters. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated acceptable results for Radium-226 activity. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for Radium-228 activity. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 12/14/2011

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11141**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11141-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.02E+01	4.71E-01			pCi/g
11-11141-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	9.80E+00	1.17E+00	2.38E+00	1.41E-01	pCi/g
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	2.14E-02	6.53E-02	6.55E-02	1.55E-01	pCi/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	2.96E+00	7.71E-01	9.93E-01	3.85E-01	pCi/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.93E+00	5.59E-01	6.92E-01	2.31E-01	pCi/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.35E+00	4.57E-01	5.39E-01	1.66E-01	pCi/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.43E+00	9.48E-01	9.95E-01	5.98E-01	pCi/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.48E+00	4.86E-01	5.78E-01	2.40E-01	pCi/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.35E+00	4.65E-01	5.46E-01	1.71E-01	pCi/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	2.60E+00	6.92E-01	8.84E-01	2.79E-01	pCi/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	12/2/2011	11-11141	Radium-226	EPA 903.0 Modified	1.70E+00	5.70E-01	6.74E-01	2.72E-01	pCi/g
11-11141-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	8.51E+00	4.34E-01			pCi/g
11-11141-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	7.35E+00	9.66E-01	1.92E+00	1.38E+00	pCi/g
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	5.84E-01	5.89E-01	6.04E-01	1.19E+00	pCi/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.34E+00	7.53E-01	8.13E-01	1.46E+00	pCi/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.43E+00	6.27E-01	7.05E-01	1.17E+00	pCi/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.69E+00	6.64E-01	7.66E-01	1.22E+00	pCi/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	2.01E+00	8.19E-01	9.37E-01	1.54E+00	pCi/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.92E+00	6.50E-01	7.82E-01	1.16E+00	pCi/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	2.05E+00	6.86E-01	8.28E-01	1.25E+00	pCi/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.49E+00	6.77E-01	7.57E-01	1.28E+00	pCi/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	12/9/2011	11-11141	Radium-228	EPA 904.0 Modified	1.24E+00	7.34E-01	7.87E-01	1.44E+00	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11141**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.00E-02	1.04E-01	1.04E-01	2.61E-01	ug/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.74E+00	7.11E-01	7.41E-01	2.04E-01	ug/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	3.02E+00	7.09E-01	7.46E-01	1.88E-01	ug/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	3.33E+00	8.09E-01	8.49E-01	2.79E-01	ug/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.97E+00	7.06E-01	7.42E-01	2.10E-01	ug/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.31E+00	6.13E-01	6.38E-01	2.43E-01	ug/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	3.19E+00	8.22E-01	8.58E-01	3.06E-01	ug/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.99E+00	7.87E-01	8.20E-01	2.97E-01	ug/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Total Uranium	EML U-02 Modified	2.31E+00	6.69E-01	6.93E-01	2.94E-01	ug/g
11-11141-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	8.13E+00	2.93E-01			pCi/g
11-11141-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	6.83E+00	8.94E-01	1.02E+00	4.89E-02	pCi/g
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	3.03E-02	4.64E-02	4.64E-02	6.91E-02	pCi/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	9.46E-01	2.46E-01	2.55E-01	8.08E-02	pCi/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	9.50E-01	2.31E-01	2.40E-01	4.97E-02	pCi/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	1.07E+00	2.67E-01	2.77E-01	8.30E-02	pCi/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	9.61E-01	2.33E-01	2.43E-01	6.27E-02	pCi/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	8.43E-01	2.18E-01	2.26E-01	7.22E-02	pCi/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	7.96E-01	2.36E-01	2.42E-01	8.58E-02	pCi/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	9.26E-01	2.52E-01	2.61E-01	6.15E-02	pCi/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-234	EML U-02 Modified	5.88E-01	1.94E-01	1.98E-01	8.60E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11141**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11141-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	2.89E-01	1.33E-01	1.35E-01	8.67E-02	pCi/g
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	6.13E-02	8.04E-02	8.05E-02	1.22E-01	pCi/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	6.09E-02	6.60E-02	6.62E-02	7.96E-02	pCi/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	5.87E-02	6.46E-02	6.48E-02	8.80E-02	pCi/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	9.96E-02	8.29E-02	8.32E-02	7.13E-02	pCi/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	2.95E-02	5.01E-02	5.02E-02	8.83E-02	pCi/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	5.69E-02	5.88E-02	5.89E-02	6.20E-02	pCi/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	1.84E-01	1.18E-01	1.19E-01	7.83E-02	pCi/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	5.15E-02	6.23E-02	6.24E-02	7.59E-02	pCi/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-235	EML U-02 Modified	2.94E-02	4.99E-02	4.99E-02	8.46E-02	pCi/g
11-11141-01	LCS	KNOWN	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	7.92E+00	2.85E-01			pCi/g
11-11141-01	LCS	SPIKE	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	6.54E+00	8.62E-01	9.81E-01	7.00E-02	pCi/g
11-11141-02	MBL	BLANK	11/22/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	-2.80E-03	3.28E-02	3.28E-02	6.88E-02	pCi/g
11-11141-03	DUP	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	9.11E-01	2.39E-01	2.47E-01	5.61E-02	pCi/g
11-11141-04	DO	BKG-4	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	1.01E+00	2.38E-01	2.49E-01	4.95E-02	pCi/g
11-11141-05	TRG	BKG-5	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	1.10E+00	2.72E-01	2.83E-01	8.27E-02	pCi/g
11-11141-06	TRG	BKG-5C	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	9.95E-01	2.37E-01	2.48E-01	5.69E-02	pCi/g
11-11141-07	TRG	BKG-5N	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	7.68E-01	2.06E-01	2.13E-01	7.19E-02	pCi/g
11-11141-08	TRG	BKG-5S	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	1.04E+00	2.76E-01	2.86E-01	9.08E-02	pCi/g
11-11141-09	TRG	BKG-5W	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	9.98E-01	2.64E-01	2.74E-01	8.80E-02	pCi/g
11-11141-10	TRG	BKG-5E	11/18/11 00:00	11/22/2011	11/30/2011	11-11141	Uranium-238	EML U-02 Modified	7.72E-01	2.25E-01	2.32E-01	8.57E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

SECTION V

ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials [illegible]

U-8

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities

Refer to attached technical data sheet

Radioactive Daughters

Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±3.0%

b. Random uncertainty in assay: ±0.0%

c. Random uncertainty in weighing(s): ±2.0%

d. Total uncertainty at the 99% confidence level: ±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03

Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11 MC

CURRENT DATE: 10/12/2010 0:00

SOLUTION REFERENCE #: IPL 479-50

SOLUTION #: U-8

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide: $^{234,235,238}U$

Reference Date: 1/1/1995 0:00

Certified Activity: 8.016E+00 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution

Uranyl nitrate in dilute HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 8.0160 µCi Which Equals 1.780E+07 dpm at the date listed above

And after dilution the activity of this solution is 1.77985E+04 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Teller Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # IPL 479-50 | Date 10/12/2010 0:00 | Solution # U-8a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide of interest $^{234,235,238}U$ | Reference Date 1/1/1996 0:00
Parent Solution Conc. 1.7796E+04 dpm/ml

Chemical Composition of Standard Solution
Uranly Nitrate in 1M HNO_3

Dilution Instructions: | Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 4.0000 ml
Total Activity: 7.1182E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1182E+01 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00
Verified & Approved By Martin R. Kelly Date: 9/27/2011
QC Approval _____ Date: 9/27/2011

RECORD COPY

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67
Measurement	Reference date:		01 March 2000
	Radioactive concentration U-232		6.739E+03 becquerels per gram of solution
	which is equivalent to		1.821E-01 microcuries per gram of solution
	Mass of solution		5.356 grams
	Volume of solution		5.035 millilitres
	Total activity of U-232		3.61E+04 becquerels
	which is equivalent to		9.76E-01 microcuries

Method of measurement (see reverse of this certificate)

Accuracy Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Roger Wiltshire

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

0024

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11

CURRENT DATE: 10/18/2010 0:00

SOLUTION REFERENCE #: AEA/Amersham 92/232/67

SOLUTION #: U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide: ^{232}U

Reference Date: 3/1/2000 0:00

Certified Activity: 0.760E-01 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams

Empty Ampoule: Weight, Grams

Solution Net: Weight, Grams

Total Activity in Ampoule: 0.9760 µCi

Chemical Composition of Standard Solution

$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used: 2M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.9760 µCi Which Equals 2.167E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.167E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Martin R. Kelly Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # AEA/Amersham 92/232/67

Date 11/9/2009 0:00
Solution # U-10a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide of Interest: ^{232}U
Parent Solution Conc. 2.167E+03 dpm/ml

Reference Date 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Kelley Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

0026

Ba-6
(& 6a)

National Institute of Standards & Technology

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

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EBERLINE SERVICES

QUALITY CONTROL PROGRAM
QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 9/30/2011 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium

Reference Date: 9/1/1993 0:00

Certified Activity: µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross	9.3081	Weight, Grams
Empty Ampoule	4.2582	Weight, Grams
Solution Net	5.0499	Weight, Grams
Total Activity in Ampoule	66.5577	µCi

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin R. Keller Date: 10/10/11

QC Approval _____ Date: 10/10/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.6; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS

SECONDARY DILUTION RECERTIFICATION

Solution Reference # QCP-009-1-A NIST SRM4251C

Date 9/30/11

Solution # Ba-Ba

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.046E+01	3.828E+03

Radionuclide of Interest ^{133}Ba

Reference Date 9/1/1993 0:00

Parent Solution Conc. 1.48E+05 dpm/ml

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml

Total Activity: 3.6950E+06 dpm

Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin A. Keller Date: 10/10/11

QC Approval _____ Date: 10/10/11

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Ra-5
QA/QC REVIEWED
Date 2/8/94 Initials WT

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution: 5.1864 g (in a 5 ml Flame Sealed Ampoule)

b. Chemical form: Ra(NO3)2 in 1 N HNO3

c. Carrier content: None added

d. Density: 1.0318 g/ml @ 20°C.

Radioimpurities None detected(other than daughters)

Radioactive Daughters

Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration: ±3.4%

b. Random uncertainty in assay: ±3.1%

c. Random uncertainty in weighing(s): ±0.2%

d. Total uncertainty at the 99% confidence level: ±4.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Ana U. Ruiz
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/30/2011 0:00

SOLUTION REFERENCE #: IPL 453-26 SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 30, 2012

Diluted By: Date: 11/30/2011

Verified & Approved By: Martin R. Kella Date: 11/30/11

QC Approval: Date: 11/30/11

EBERLINE SERVICES | **QUALITY CONTROL PROGRAM**
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009
Solution Reference # IPL-453-26

Date 11/30/2011 0:00
Solution # Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest ^{226}Radium
Parent Solution Conc. 2.22E+03 dpm/ml

Reference Date 2/1/1994 0:00

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 20.0000 ml
Total Activity: 4.4440E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml
This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: November 30, 2012

Recertified By _____ Date: 11/30/2011 0:00

Verified & Approved By Martin R. Kelley Date: 11/30/11

QC Approval _____ Date: 11/30/11

RA-11

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 µg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: 11/7/01

New vial from the 6/11/01 shipment.
P.S. Different activity level 8/19/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 4/13/2011 0:00

SOLUTION REFERENCE #: Analytics 62680-416 SOLUTION #: Ra-11

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Ra	5.750E+00	2.100E+03

Radionuclide: ^{226}Ra
Reference Date: 11/7/2001 0:00
Certified Activity: 6.986E-02 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: 9.4982 Weight, Grams
Empty Ampoule: 4.4895 Weight, Grams
Solution Net: 5.0087 Weight, Grams
Total Activity in Ampoule: 0.0699 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 13, 2012

Recertified By _____ Date: 4/20/11

Verified & Approved By _____ Date: 8/9/11

QC Approval _____ Date: 8/9/11

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	UUISO	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	2.45	84.05%	14.91%	100.00%	3.60%	8.13E+00	2.93E-01	6.83E+00	1.02E+00	U-8a	3.52E+01	3.60E+00	5.12E-01
U-238	2.72	82.49%	15.00%	100.00%	3.60%	7.92E+00	2.85E-01	6.54E+00	9.81E-01	U-8a	3.44E+01	3.60E+00	5.12E-01

Matrix Spike

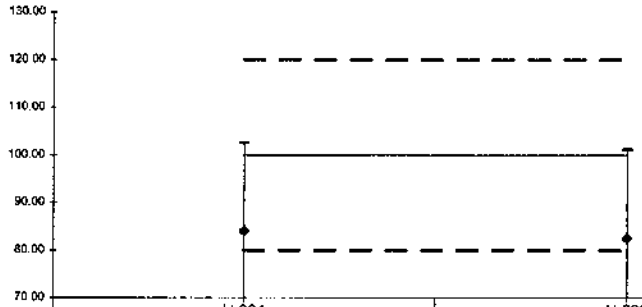
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample / QC Summary

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
U-234	0.02	0.38	9.50E-01	2.40E-01	9.46E-01	2.55E-01	0.84	OK	OK			OK	OK
U-238	0.53	9.81	1.01E+00	2.49E-01	9.11E-01	2.47E-01	0.82	OK	OK			OK	OK
U-235	0.05	3.66	5.87E-02	6.48E-02	6.09E-02	6.62E-02		OK	OK			NA	OK

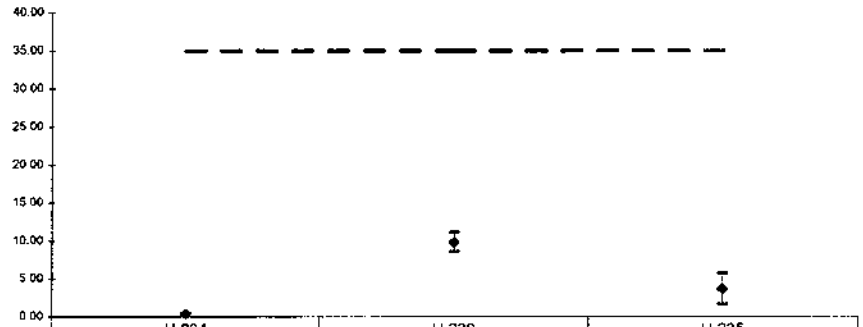
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	UUISO	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



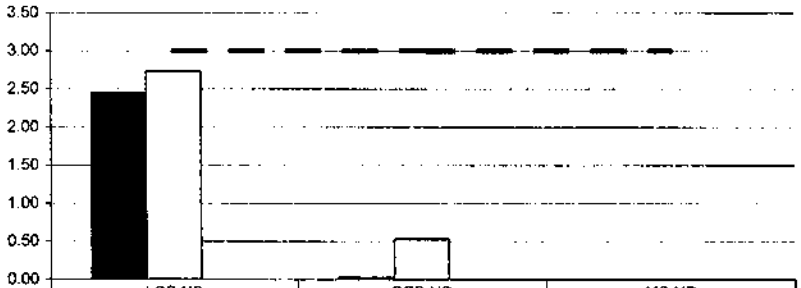
	U-234	U-238
Lower Error	65.54	63.89
Upper Error	102.56	101.09
%R	84.05	82.49
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	0.43	11.08	5.67
Upper Error	0.33	8.54	1.66
RPD	0.38	9.81	3.66
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	2.45	0.02	0.00
U-238	2.72	0.53	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	Ra226	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.35	95.80%	24.28%	100.00%	4.60%	1.02E+01	4.71E-01	9.80E+00	2.38E+00	Ra-5b	4.41E+01	4.60E+00	5.15E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-226	1.67	42.06	1.93E+00	6.92E-01	2.96E+00	9.93E-01

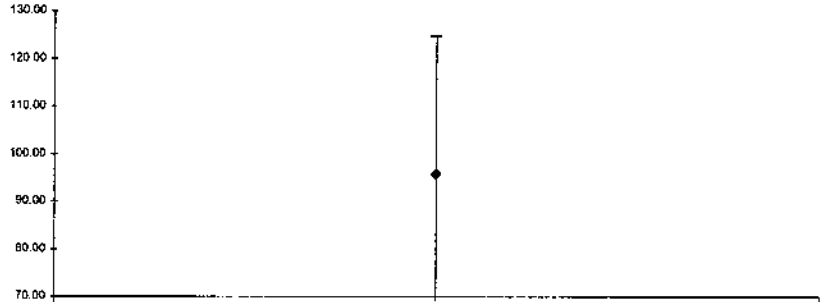
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
0.96	OK	OK			INV	OK

Version

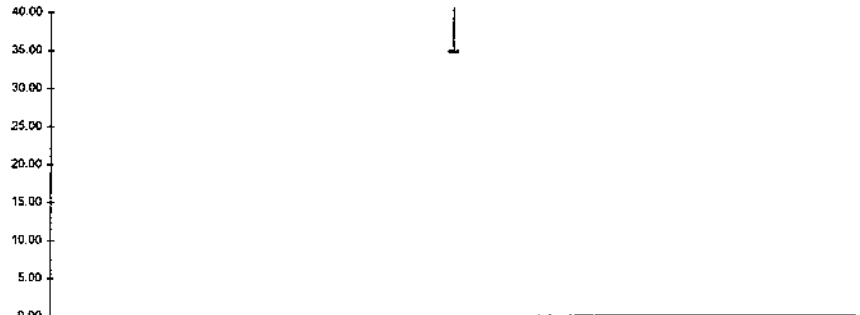
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	Ra226	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



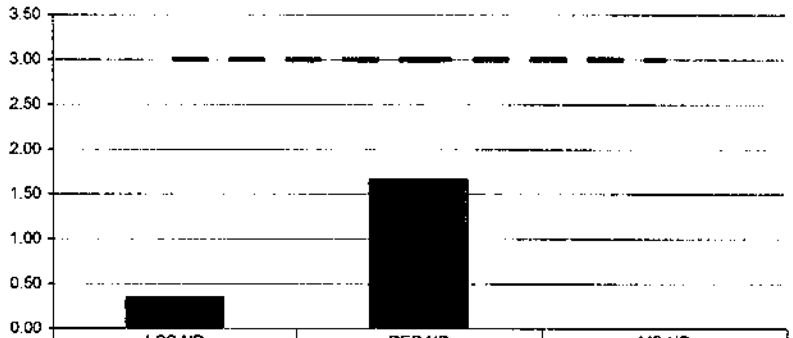
	RA-226
Lower Error	66.92
Upper Error	124.68
%R	95.80
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	49.29
Upper Error	34.82
RPD	42.06
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.35	1.67	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	Ra228	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	1.17	86.35%	26.18%	100.00%	5.10%	8.51E+00	4.34E-01	7.35E+00	1.92E+00	Ra-11	4.62E+01	5.10E+00	4.09E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-228	0.16	6.15	1.43E+00	7.05E-01	1.34E+00	8.13E-01

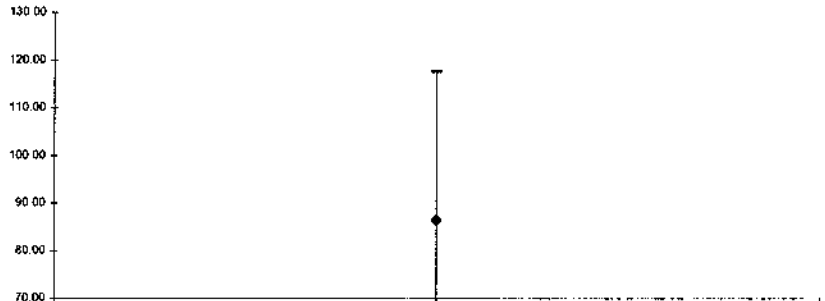
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
0.86	OK	OK			NA	OK

Version

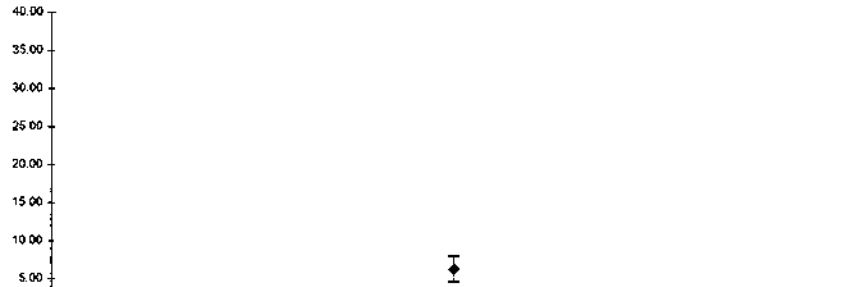
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11141	Ra228	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



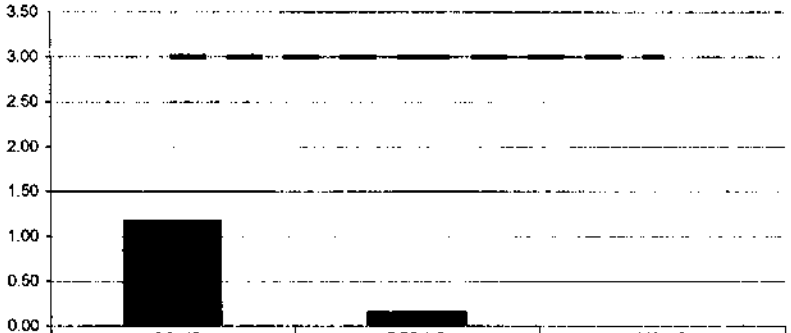
	RA-228
Lower Error	55.07
Upper Error	117.62
%R	86.35
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-228
Lower Error	7.84
Upper Error	4.47
RPD	6.15
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-228	1.17	0.16	0.00
UCL	3	3	3

No Matrix Spike

Version

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO-U NOTES

EBERLINE SERVICES **Work Order Analysis Notes**	**Oak Ridge Laboratory** **601 Scarboro Rd.** **Oak Ridge, TN 37830** **Voice: 865.481.0683** **www.eberlineservices.com**	Internal Work Order	11-11141
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPES TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11141
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPES TO SEPARATIONS
2	11/29/11 18:25	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.

John DeMelas
11/29/11

EBERLINE SERVICES **Work Order Analysis Notes**	**Oak Ridge Laboratory** **601 Scarboro Rd.** **Oak Ridge, TN 37830** **Voice: 865.481.0683** **www.eberlineservices.com**	Internal Work Order	11-11141
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED SAMPES TO SEPARATIONS
2	11/29/11 18:25	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6 5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.
3	11/30/11 06:03	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES; LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES. REMOVED FILTERS, LET DRY. COMPLETED PAPERWORK & SENT SET TO COUNT ROOM.

RM 11/30/11

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11141	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011745P	Anion Exchange Resin	Reagent Grade	JDEMELAS	11/29/2011
011812S	HCl - HF	6.5N - 0.04N	JDEMELAS	11/29/2011
011831S	HCl - NH4I	8N - 0.1M	JDEMELAS	11/29/2011
011783S	Hydrochloric Acid	0.5N	JDEMELAS	11/29/2011
011733S	Hydrochloric Acid	6.5N	JDEMELAS	11/29/2011
011819S	Hydrochloric Acid	8N	JDEMELAS	11/29/2011
011824S	Hydrochloric Acid	8N	JDEMELAS	11/29/2011
011707P	Hydrochloric Acid	Reagent Grade	JDEMELAS	11/29/2011
011816S	Carbon substrate	Solution	RMARTZ	11/30/2011
011507P	Hydrofluoric Acid	Reagent Grade	RMARTZ	11/30/2011
011549S	Neodymium Carrier	1 mg/ml	RMARTZ	11/30/2011
011433P	Reagent Alcohol	Reagent Grade	RMARTZ	11/30/2011
011655P	Titanous Chloride	Reagent Grade	RMARTZ	11/30/2011

Alpha #3

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U4Z50	C
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U4N7	C
11/28/11	1110138A(1,2)	USA	0825	2hr50m	U4Z50	C
11/28/11	1110002A(1-14)	USA	1055	2hr50m	U4Z50	C
11/28/11	1110074A(13,14)	USA	1207	2hr50m	Th Z50	C
	~~1110074A~~					
11/28/11	1110138A(15-20)	USA	1351	2hr50m	Th	KB
11/28/11	1111027A(1-4)	United	1404	2hr50m	Th	KB
11/28/11	1110138A(1-16)	USA	1740	2hr50m	Th	KB
11/25/11	Daily Pulse	LAN	0522	10min	N/A	C
11/25/11	1111147A(1-4,6,8,10)	UCOR	0808	2hr50m	Am-241	C
11/25/11	1111147A(1-4,6,8,10)	UCOR	0811	2hr50m	Am-241	C
11/25/11	1111138A(13-20)	Foxfire	1105	2hr50m	U4Z50	C
11/25/11	1111147A(1-4,6,8,10,13)	UCOR	1113	2hr50m	Pu-Z50	C
11/29/11	1110002A(4-19)	USA	1536	2hr50m	Th	KB
~~11/29/11~~	~~1111113A(4,6,8,10)~~	~~UCOR~~ KB 11/29/11	~~1527~~	~~2hr50m~~	~~PUNT~~	~~KB~~
11/30/11	Daily Pulser	LAN	0517	10min	N/A	C
11/30/11	1110062A(1-4,6,8)	UCOR	0748	2hr50m	Am-241	C
11/30/11	1111140A(13-20)	Foxfire	0847	2hr50m	U4Z50	C
11/30/11	1111141A(1-8)	Foxfire	1052	2hr50m	U4Z50	C

Alpha #3

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U-234	C
11/28/11	1110057A(1-4)	UCOR	0802	2hr50m	U-238	C
11/28/11	1110138A(1,2)	USA	0835	2hr50m	U-234	C
11/28/11	1110002A(1-14)	USA	0955	2hr50m	U-234	C
11/28/11	1110074A(13,14)	USA	1207	2hr50m	Th-230	C
	~~1110074A~~					
11/28/11	1110138A(15-20)	USA	1351	2hr50m	Th	KB
11/28/11	1111027A(1-4)	United	1404	2hr50m	Th	KB
11/28/11	1110138A(1-16)	USA	1740	2hr50m	Th	KB
11/29/11	Daily Pulse	LAN	0522	10min	N/A	C
11/29/11	1111143A(1-4,6,8,10)	UCOR	0808	2hr50m	Am-241	C
11/29/11	1111147A(1-4,6,8,10)	UCOR	0811	2hr50m	Am-241	C
11/29/11	1111138A(13-20)	Foxfire	1105	2hr50m	U-234	C
11/29/11	1111143A(1-4,6,8,10,13)	UCOR	1113	2hr50m	Pu-239	C
11/29/11	1110002A(4-19)	USA	1536	2hr50m	Th	KB
~~11/29/11~~	~~1111143A(1,4,8,10)~~	~~UCOR~~ KB 11/29/11	~~1527~~	~~2hr50m~~	~~PUNT~~	~~KB~~
11/30/11	Daily Pulse	LAN	0517	10min	N/A	C
11/30/11	1111062A(1-4,6,8)	UCOR	0748	2hr50m	Am-241	C
11/30/11	1111140A(13-20)	Foxfire	0847	2hr50m	U-234	C
11/30/11	1111141A(1-8)	Foxfire	1052	2hr50m	U-234	C
11/30/11	1111141A(9,10)	Foxfire	1152	2hr50m	U-234	C
11/30/11	1110074A(1-6)	USA	1157	2hr50m	Th-230	C

RA-226 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11141
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:26	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11141
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:26	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/01/11 16:03	CHEM	TSMITH	Followed steps 12.2 to 12.8 in AP-006 rev. 9 . (Sringe filtered samples. Precipitated and filtered samples, obtained final weights, and took to count room)

12-1-11
JM

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11141	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011383P	Acetic Acid	Reagent Grade	TSMITH	12/1/2011
011381D03	Ammonium Sulfate	200 mg/ml	TSMITH	12/1/2011

Alpha # 3

DATE	Sample #	Client	Load Time	Ct Time	Analysis	Tech
12/24	DailyPulse	LAB	0526	10min	N/A	C
12/24	DailyPulse	LAB	0555	10min	N/A	C
12/24	11 111 40A(1-4)	FoxFire	0627	24hr	Ra6	C
12/24	111 010A(1-6)	USA	0627	24hr	Th230	C
12/24	11 111 674(4)	UCOR	0525	24hr	Ra6	C
12/24	11111 57A(1-4)	UCOR	0527	24hr	NP-237	C
12/24	111167A(1-4)	UCOR	0526	24hr	NP-237	C
12/24	111 012A(1-4)	UCOR	0527	24hr	Am-241	C
12/24	11 111 41A(1-4)	FoxFire	1303	24hr	Ra6	C
12/24	11111 67A(1-4)	UCOR	1256	24hr	Pu230	C
12/24	111167AM(4)	UCOR	1259	24hr	PuNT	C

011

RA-228 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11141
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:26	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP. VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB
11/23/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11141
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/23/11 12:26	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH BA AND PB CARRIERS AND POTASSIUM SULFATE- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/05/11 18:08	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to samples and swirled.
3	12/06/11 17:02	CHEM	TSMITH	Followed steps 12.2 to 12.9 in AP-007 rev. 14 . (Chemical cleanup for Ra 228)
4	12/09/11 08:53	CHEM	TSMITH	Followed steps 12.10 to 12.18 in AP-007 rev. 14 . (Precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated samples, hot bathed, centrifuged, and discarded supernate. Dissolved precip, precipitated and filtered samples, obtained final weights, covered with aluminum foil, and took to count room)

12-9-11
JM

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11141	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/23/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/23/2011
011719S	EDTA	0.25M	JBARNARD	11/23/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/23/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/23/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/23/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/23/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/23/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/23/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/23/2011
011851S	EDTA	0.25M	TSMITH	12/5/2011
011283D02	Lead Carrier	1.5 mg/ml	TSMITH	12/6/2011
011708P	Nitric Acid	Reagent Grade	TSMITH	12/6/2011
011314S	Yttrium Carrier	9 mg/ml	TSMITH	12/6/2011
010689D32	Ammonium Sulfide	2%	TSMITH	12/6/2011
011660S	Ammonium Oxalate	5%	TSMITH	12/9/2011
011382D12	Nitric Acid	1N	TSMITH	12/9/2011
011708D02	Nitric Acid	6N	TSMITH	12/9/2011
010411D15	Sodium Hydroxide	10M	TSMITH	12/9/2011
010411D16	Sodium Hydroxide	18M	TSMITH	12/9/2011

LB 4110 Red

DATE	Sample#	Client	Load Time	CT Time	Analyte	Tech
12/06/11	BLKGD QC	LAB	0600	60min	αLB	[illegible]
12/6/11	111170NP(1-7,5)	UCOR	0801	10min	NP-237	[illegible]
12/6/11	111108NP(1-4)	UCOR	0801	10min	NP-237	[illegible]
12/6/11	1111139RA(1-12)	Foxfire	1117	2 hrs	Ra8	KB
12/6/11	1111150Pb(1-11)	GeoSyntec	1401	2 hrs	Pb210	KB
12/7/11	EFF QC	LAB	0509	30min	αLB	[illegible]
12/7/11	BLKGD QC	LAB	0556	60min	αLB	[illegible]
12/7/11	1112005NP(1-4)	UCOR	0803	10min	NP-237	[illegible]
12/7/11	1112006NP(1-6)	UCOR	0804	10min	NP-237	[illegible]
12/7/11	111101NP(1-4)	UCOR	0805	10min	NP-237	[illegible]
12/7/11	1112006SR(1-4,6,8)	UCOR	0845	2hr	SR Tot	[illegible]
12/7/11	1112033AB(1-6)	Universal	0852	2hr	αLB	[illegible]
12/7/11	1112006CL(1-3,5,7)	UCOR	1051	30min	CL 36	KB
12/7/11	111101RA(1-4)	UCOR	1058	2 hrs	Ra8	KB
12/7/11	1111119RA(2-12)	UCOR	1333	2hrs	Ra8	KB
12/7/11	1111119RA1(1)	UCOR	1333	30mins	Ra8	KB
12/8/11	EFF QC	LAB	0504	30min	αLB	[illegible]
12/8/11	BLKGD QC	LAB	0545	60min	αLB	[illegible]
12/8/11	1112040AB(1-4)	Seaman	0814	2hr	αLB	[illegible]
12/8/11	1112005SR(1-5)	UCOR	0821	2hr	SR Tot	[illegible]
12/8/11	111119NP(4-7)	UCOR	0904	10min	NP-237	[illegible]
12/8/11	111119NP1(8-11)	UCOR	0946	10min	NP-237	[illegible]
12/8/11	1112005AB(1-5)	UCOR	1042	2hr	αLB	[illegible]
12/8/11	111140RA(10-20)	Foxfire	1153	2hrs	Ra8	KB
12/8/11	111119Pb(2-12)	UCOR	1452	2hrs	Pb210	KB
12/8/11	111119Pb1(1)	UCOR	1452	30min	Pb210	KB
12/9/11	Daily Std/QC	Lab	0624/0728	1 HR/30min	αB	AC
12/9/11	111120NP(1-11)	UCOR	0841	10min	NP	AG
12/9/11	1112036SR(1-4,6,8)	UCOR	0912	2 HR	Total Sr	AG
12/9/11	111090AB(2-5)	Univ. Mich	0920	2HR	GAB	AG
12/9/11	111090AB1(1)	Univ. Mich	0921	30min	AB	AC
12/9/11	1112026RA(2-4)	UCOR	0958	2hrs	Ra8	KB
12/9/11	111141RA(1-10)	Foxfire	1125	2hrs	Ra8	KB

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

11-11141
UUISO
Run 1

Work Order	11-11141
Analysis Code	UUISO
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML U-02 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.356
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	BKG-4	42	11/18/11 00:00	1.0027E+00
04	DO	BKG-4	42	11/18/11 00:00	1.0037E+00
05	TRG	BKG-5	39	11/18/11 00:00	1.0008E+00
06	TRG	BKG-5C	47	11/18/11 00:00	1.0071E+00
07	TRG	BKG-5N	43	11/18/11 00:00	1.0064E+00
08	TRG	BKG-5S	38	11/18/11 00:00	1.0080E+00
09	TRG	BKG-5W	48	11/18/11 00:00	1.0015E+00
10	TRG	BKG-5E	53	11/18/11 00:00	1.0098E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11141
UUISO
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6110	11.8		0.00								
02	MBL	0.6111	11.8		0.00								
03	DUP	0.6112	11.8		0.00								
04	DO	0.6116	11.8		0.00								
05	TRG	0.6106	11.8		0.00								
06	TRG	0.6075	11.8		0.00								
07	TRG	0.6097	11.8		0.00								
08	TRG	0.6108	11.8		0.00								
09	TRG	0.6100	11.8		0.00								
10	TRG	0.6099	11.8		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11141
UUISO
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 12:15	JBARNARD				
02	MBL			11/23/11 12:15	JBARNARD				
03	DUP			11/23/11 12:15	JBARNARD				
04	DO	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
05	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
06	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
07	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
08	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
09	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				
10	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:15	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/g	6.83E+00	8.94E-01	4.89E-02	8.13E+00	84.05	OK		OK	
02	U-234	MBL	BLANK	pCi/g	3.03E-02	4.64E-02	6.91E-02					OK	OK
03	U-234	DUP	BKG-4	pCi/g	9.46E-01	2.46E-01	8.08E-02				OK	OK	
04	U-234	DO	BKG-4	pCi/g	9.50E-01	2.31E-01	4.97E-02					OK	
05	U-234	TRG	BKG-5	pCi/g	1.07E+00	2.67E-01	8.30E-02					OK	
06	U-234	TRG	BKG-5C	pCi/g	9.61E-01	2.33E-01	6.27E-02					OK	
07	U-234	TRG	BKG-5N	pCi/g	8.43E-01	2.18E-01	7.22E-02					OK	
08	U-234	TRG	BKG-5S	pCi/g	7.96E-01	2.36E-01	8.58E-02					OK	
09	U-234	TRG	BKG-5W	pCi/g	9.26E-01	2.52E-01	6.15E-02					OK	
10	U-234	TRG	BKG-5E	pCi/g	5.88E-01	1.94E-01	8.60E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	11/22/11 00:00	1.00E+00	113.72	0.00	0.00			
02	U-234	MBL	11/22/11 00:00	1.00E+00	85.93	0.00	0.00			
03	U-234	DUP	11/18/11 00:00	1.00E+00	111.43	0.00	0.00			
04	U-234	DO	11/18/11 00:00	1.00E+00	115.96	0.00	0.00			
05	U-234	TRG	11/18/11 00:00	1.00E+00	106.11	0.00	0.00			
06	U-234	TRG	11/18/11 00:00	1.01E+00	138.78	0.00	0.00			
07	U-234	TRG	11/18/11 00:00	1.01E+00	127.73	0.00	0.00			
08	U-234	TRG	11/18/11 00:00	1.01E+00	104.90	0.00	0.00			
09	U-234	TRG	11/18/11 00:00	1.00E+00	97.36	0.00	0.00			
10	U-234	TRG	11/18/11 00:00	1.01E+00	95.75	0.00	0.00			

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	11/30/11 10:52		A_Spec	Alpha_033	170	5.83 E+02	1.00 E-03	19.9
02	U-234	MBL	11/30/11 10:52		A_Spec	Alpha_034	170	1.83 E+00	1.00 E-03	18.7
03	U-234	DUP	11/30/11 10:52		A_Spec	Alpha_035	170	7.02 E+01	5.00 E-03	17.6
04	U-234	DO	11/30/11 10:52		A_Spec	Alpha_036	170	7.98 E+01	1.00 E-03	19.2
05	U-234	TRG	11/30/11 10:52		A_Spec	Alpha_037	170	7.70 E+01	0.00 E+00	18.1
06	U-234	TRG	11/30/11 10:52		A_Spec	Alpha_038	170	8.05 E+01	3.00 E-03	15.9
07	U-234	TRG	11/30/11 10:52		A_Spec	Alpha_047	170	7.00 E+01	0.00 E+00	17.1
08	U-234	TRG	11/30/11 10:52		A_Spec	Alpha_048	170	5.23 E+01	4.00 E-03	16.5
09	U-234	TRG	11/30/11 11:52		A_Spec	Alpha_039	170	6.28 E+01	1.00 E-03	18.5
10	U-234	TRG	11/30/11 11:52		A_Spec	Alpha_040	170	4.10 E+01	0.00 E+00	19.1

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/g	6.54E+00	8.62E-01	7.00E-02	7.92E+00	82.49	OK		OK	
02	U-238	MBL	BLANK	pCi/g	-2.80E-03	3.28E-02	6.88E-02					OK	OK
03	U-238	DUP	BKG-4	pCi/g	9.11E-01	2.39E-01	5.61E-02				OK	OK	
04	U-238	DO	BKG-4	pCi/g	1.01E+00	2.38E-01	4.95E-02					OK	
05	U-238	TRG	BKG-5	pCi/g	1.10E+00	2.72E-01	8.27E-02					OK	
06	U-238	TRG	BKG-5C	pCi/g	9.95E-01	2.37E-01	5.69E-02					OK	
07	U-238	TRG	BKG-5N	pCi/g	7.68E-01	2.06E-01	7.19E-02					OK	
08	U-238	TRG	BKG-5S	pCi/g	1.04E+00	2.76E-01	9.08E-02					OK	
09	U-238	TRG	BKG-5W	pCi/g	9.98E-01	2.64E-01	8.80E-02					OK	
10	U-238	TRG	BKG-5E	pCi/g	7.72E-01	2.25E-01	8.57E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	11/22/11 00:00	1.00E+00	113.72	0.00	0.00			
02	U-238	MBL	11/22/11 00:00	1.00E+00	85.93	0.00	0.00			
03	U-238	DUP	11/18/11 00:00	1.00E+00	111.43	0.00	0.00			
04	U-238	DO	11/18/11 00:00	1.00E+00	115.96	0.00	0.00			
05	U-238	TRG	11/18/11 00:00	1.00E+00	106.11	0.00	0.00			
06	U-238	TRG	11/18/11 00:00	1.01E+00	138.78	0.00	0.00			
07	U-238	TRG	11/18/11 00:00	1.01E+00	127.73	0.00	0.00			
08	U-238	TRG	11/18/11 00:00	1.01E+00	104.90	0.00	0.00			
09	U-238	TRG	11/18/11 00:00	1.00E+00	97.36	0.00	0.00			
10	U-238	TRG	11/18/11 00:00	1.01E+00	95.75	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	11/30/11 10:52		A_Spec	Alpha_033	170	5.60 E+02	0.00 E+00	19.9
02	U-238	MBL	11/30/11 10:52		A_Spec	Alpha_034	170	-1.70 E-01	1.00 E-03	18.7
03	U-238	DUP	11/30/11 10:52		A_Spec	Alpha_035	170	6.78 E+01	1.00 E-03	17.6
04	U-238	DO	11/30/11 10:52		A_Spec	Alpha_036	170	8.48 E+01	1.00 E-03	19.2
05	U-238	TRG	11/30/11 10:52		A_Spec	Alpha_037	170	8.00 E+01	0.00 E+00	18.1
06	U-238	TRG	11/30/11 10:52		A_Spec	Alpha_038	170	8.37 E+01	2.00 E-03	15.9
07	U-238	TRG	11/30/11 10:52		A_Spec	Alpha_047	170	6.40 E+01	0.00 E+00	17.1
08	U-238	TRG	11/30/11 10:52		A_Spec	Alpha_048	170	6.90 E+01	0.00 E+00	16.5
09	U-238	TRG	11/30/11 11:52		A_Spec	Alpha_039	170	6.80 E+01	0.00 E+00	18.5
10	U-238	TRG	11/30/11 11:52		A_Spec	Alpha_040	170	5.40 E+01	0.00 E+00	19.1

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/g	2.89E-01	1.33E-01	8.67E-02					OK	
02	U-235	MBL	BLANK	pCi/g	6.13E-02	8.04E-02	1.22E-01					OK	OK
03	U-235	DUP	BKG-4	pCi/g	6.09E-02	6.60E-02	7.96E-02				NA	OK	
04	U-235	DO	BKG-4	pCi/g	5.87E-02	6.46E-02	8.80E-02					OK	
05	U-235	TRG	BKG-5	pCi/g	9.96E-02	8.29E-02	7.13E-02					OK	
06	U-235	TRG	BKG-5C	pCi/g	2.95E-02	5.01E-02	8.83E-02					OK	
07	U-235	TRG	BKG-5N	pCi/g	5.69E-02	5.88E-02	6.20E-02					OK	
08	U-235	TRG	BKG-5S	pCi/g	1.84E-01	1.18E-01	7.83E-02					OK	
09	U-235	TRG	BKG-5W	pCi/g	5.15E-02	6.23E-02	7.59E-02					OK	
10	U-235	TRG	BKG-5E	pCi/g	2.94E-02	4.99E-02	8.46E-02					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	11/22/11 00:00	1.00E+00	113.72	0.00	0.00			
02	U-235	MBL	11/22/11 00:00	1.00E+00	85.93	0.00	0.00			
03	U-235	DUP	11/18/11 00:00	1.00E+00	111.43	0.00	0.00			
04	U-235	DO	11/18/11 00:00	1.00E+00	115.96	0.00	0.00			
05	U-235	TRG	11/18/11 00:00	1.00E+00	106.11	0.00	0.00			
06	U-235	TRG	11/18/11 00:00	1.01E+00	138.78	0.00	0.00			
07	U-235	TRG	11/18/11 00:00	1.01E+00	127.73	0.00	0.00			
08	U-235	TRG	11/18/11 00:00	1.01E+00	104.90	0.00	0.00			
09	U-235	TRG	11/18/11 00:00	1.00E+00	97.36	0.00	0.00			
10	U-235	TRG	11/18/11 00:00	1.01E+00	95.75	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-UUISO-1

Run: 1
Analysis Code: UUISO
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	11/30/11 10:52		A_Spec	Alpha_033	170	2.00 E+01	0.00 E+00	19.9
02	U-235	MBL	11/30/11 10:52		A_Spec	Alpha_034	170	3.00 E+00	0.00 E+00	18.7
03	U-235	DUP	11/30/11 10:52		A_Spec	Alpha_035	170	3.66 E+00	2.00 E-03	17.6
04	U-235	DO	11/30/11 10:52		A_Spec	Alpha_036	170	4.00 E+00	0.00 E+00	19.2
05	U-235	TRG	11/30/11 10:52		A_Spec	Alpha_037	170	5.83 E+00	1.00 E-03	18.1
06	U-235	TRG	11/30/11 10:52		A_Spec	Alpha_038	170	2.00 E+00	0.00 E+00	15.9
07	U-235	TRG	11/30/11 10:52		A_Spec	Alpha_047	170	3.83 E+00	1.00 E-03	17.1
08	U-235	TRG	11/30/11 10:52		A_Spec	Alpha_048	170	9.83 E+00	1.00 E-03	16.5
09	U-235	TRG	11/30/11 11:52		A_Spec	Alpha_039	170	2.83 E+00	1.00 E-03	18.5
10	U-235	TRG	11/30/11 11:52		A_Spec	Alpha_040	170	1.66 E+00	2.00 E-03	19.1

Count Room Report
Client: Foxfire Scientific, Inc.

11-11141-UUISO-1 (pCi/g) in SO
Tracer ID: U-10a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.6110	11.8265		0.00		
02	MBL	BLANK	11/22/11 00:00	1.0000	0.6111	11.8285		0.00		
03	DUP	BKG-4	11/18/11 00:00	1.0027	0.6112	11.8304		0.00		
04	DO	BKG-4	11/18/11 00:00	1.0037	0.6116	11.8381		0.00		
05	TRG	BKG-5	11/18/11 00:00	1.0008	0.6106	11.8188		0.00		
06	TRG	BKG-5C	11/18/11 00:00	1.0071	0.6075	11.7588		0.00		
07	TRG	BKG-5N	11/18/11 00:00	1.0064	0.6097	11.8014		0.00		
08	TRG	BKG-5S	11/18/11 00:00	1.0080	0.6108	11.8226		0.00		
09	TRG	BKG-5W	11/18/11 00:00	1.0015	0.6100	11.8072		0.00		
10	TRG	BKG-5E	11/18/11 00:00	1.0098	0.6099	11.8052		0.00		

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 12:15 PM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11141	1	UUISO	11/23/2011 12:14	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
U-234	U-8a	35.240	11/23/2011	0.500	0.5121				8.13	0.293	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	11/23/2011	0.500	0.5121				7.92	0.285	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	U-232	U-10a	19.356	11/23/2011	0.6110	0.6200
02	U-232	U-10a	19.356	11/23/2011	0.6111	0.6200
03	U-232	U-10a	19.356	11/23/2011	0.6112	0.6200
04	U-232	U-10a	19.356	11/23/2011	0.6116	0.6200
05	U-232	U-10a	19.356	11/23/2011	0.6106	0.6200
06	U-232	U-10a	19.356	11/23/2011	0.6075	0.6200
07	U-232	U-10a	19.356	11/23/2011	0.6097	0.6200
08	U-232	U-10a	19.356	11/23/2011	0.6108	0.6200
09	U-232	U-10a	19.356	11/23/2011	0.6100	0.6200
10	U-232	U-10a	19.356	11/23/2011	0.6099	0.6200

Balance Printer Tapes

Tracer	LCS
0.6110 g 0.6111 g 0.6112 g 0.6116 g 0.6106 g 0.6075 g 0.6097 g 0.6108 g 0.6100 g 0.6099 g	0.5121 g

Matrix Spike

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11141	1	UUISO	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	BKG-4	DUP					1.0027E+00	1.0027E+00				
04	BKG-4	DO					1.0037E+00	1.0037E+00				
05	BKG-5	TRG					1.0008E+00	1.0008E+00				
06	BKG-5C	TRG					1.0071E+00	1.0071E+00				
07	BKG-5N	TRG					1.0064E+00	1.0064E+00				
08	BKG-5S	TRG					1.0080E+00	1.0080E+00				
09	BKG-5W	TRG					1.0015E+00	1.0015E+00				
10	BKG-5E	TRG					1.0098E+00	1.0098E+00				

1.0027 g
1.0037 g
1.0008 g
1.0071 g
1.0064 g
1.0080 g
1.0015 g
1.0098 g

Comments	

Technician: [signature] Date: 11 23 11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11141	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline	Foxfire Scientific, Inc.	Tare (g)	Gross (g)		Net (g)		Percent		Gamma		Special
Fraction	Client ID	Pan Wt	Wet Wt.	Dry Wt.	Wet Wt.	Dry Wt.	Liquid	Solid	Dry Wt.	LEPS Wt.	Info
04	BKG-4	13.6000	241.0500	195.5100	227.4500	181.9100	20.02%	79.98%	0.0000	0.0000	
05	BKG-5	13.5500	248.5500	196.1800	235.0000	182.6300	22.29%	77.71%	0.0000	0.0000	
06	BKG-5C	13.5200	220.9800	178.4500	207.4600	164.9300	20.50%	79.50%	0.0000	0.0000	
07	BKG-5N	13.5300	212.1500	167.3200	198.6200	153.7900	22.57%	77.43%	0.0000	0.0000	
08	BKG-5S	13.4400	233.1300	183.5900	219.6900	170.1500	22.55%	77.45%	0.0000	0.0000	
09	BKG-5W	13.4800	212.4000	170.2800	198.9200	156.8000	21.17%	78.83%	0.0000	0.0000	
10	BKG-5E	13.5800	211.4500	167.6000	197.8700	154.0200	22.16%	77.84%	0.0000	0.0000	

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kennyscey

Date: **Analysis: Rough Prep Logbook**

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010836.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_033
Chamber Serial Number: 06027396A
Detector Serial Number: 91132
Env. Background: System Bkgd 10011
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/30/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:42 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6110 mL
Effective Efficiency: 0.2265 +/- 0.0119
Counting Efficiency: 0.1992 +/- 0.0032 on 8/30/2011 7:34:55 PM
Chem. Recovery Factor: 1.1372 +/- 0.0623

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: 0.8041
Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	453.00	9.22	0.00	0.00E+000	38.6
U-234		4.732	582.83	8.12	0.17	0.00E+000	4.9
U-235		4.391	20.00	44.91	0.00	0.00E+000	5.2
U-238		4.156	560.00	8.29	0.00	0.00E+000	35.6

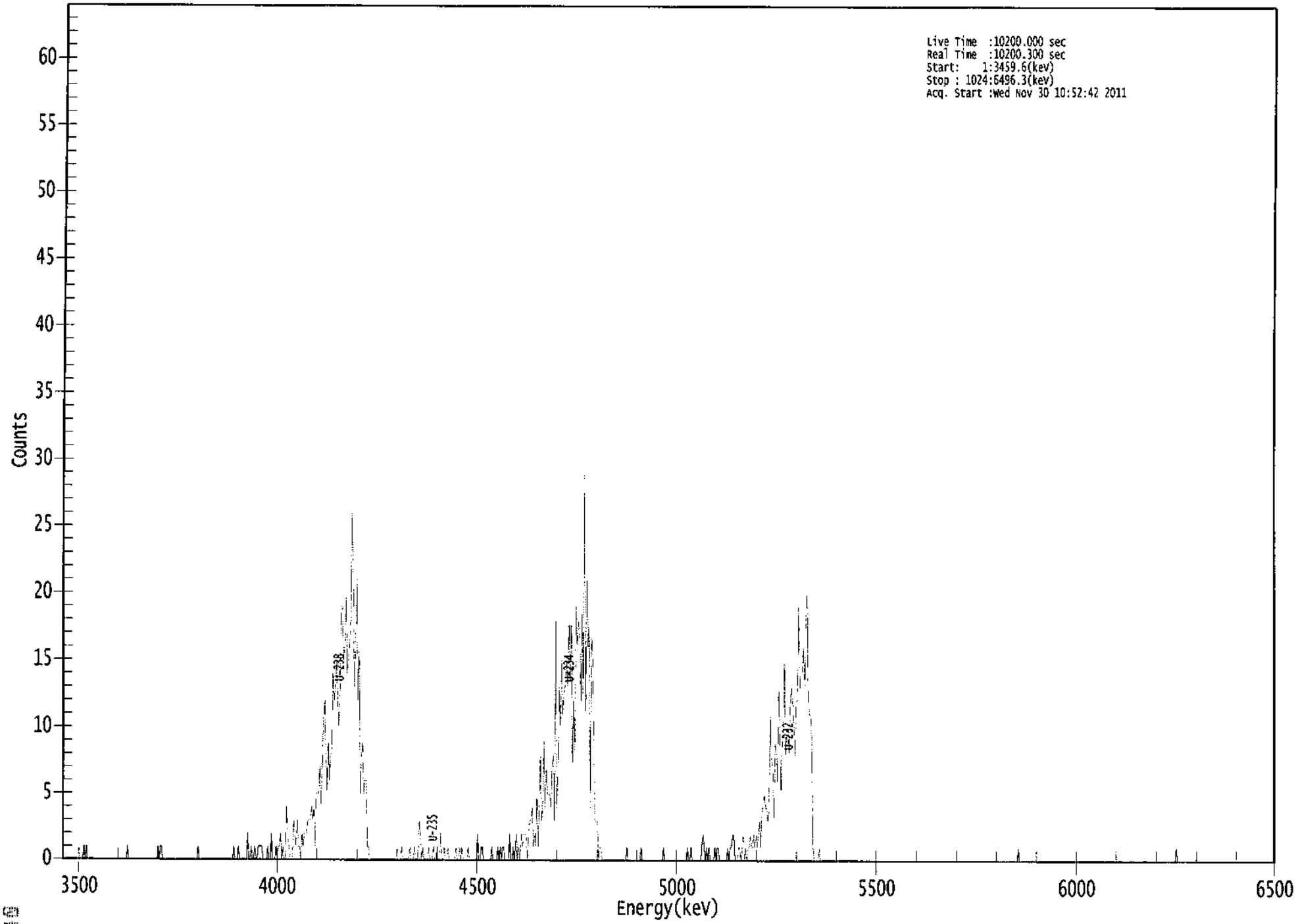
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.31E+000 +/- 5.45E-001	7.03E-002 +/- 7.21E-003
U-234	0.986	4761.50*	6.83E+000 +/- 8.94E-001	4.89E-002 +/- 5.02E-003
U-235	1.000	4385.50*	2.89E-001 +/- 1.33E-001	8.67E-002 +/- 8.90E-003
U-238	0.987	4184.40*	6.54E+000 +/- 8.62E-001	7.00E-002 +/- 7.18E-003

AG
12/1/11

0000010836.CNF



ROI Type: 1

ROI Type: 3

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	1	0	1	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	1
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	1	0	1	1	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	1	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	1	0	0	0	1	0	0
153:	0	0	0	0	0	2	0	0
161:	1	0	0	1	0	0	1	1
169:	1	1	0	0	0	0	1	0
177:	0	2	0	0	0	1	0	1
185:	1	2	0	1	0	0	4	2
193:	1	0	0	0	3	2	1	3
201:	1	1	0	2	1	2	2	2
209:	3	3	3	4	3	4	1	5
217:	5	5	7	4	7	10	12	9
225:	5	9	6	8	8	14	12	13
233:	15	12	10	13	19	19	15	16
241:	20	14	15	16	18	26	21	13
249:	16	21	12	16	5	8	9	5
257:	6	6	1	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	1	0
297:	0	0	1	0	0	0	3	2
305:	0	1	0	0	0	0	1	0
313:	0	0	1	0	0	1	0	0
321:	2	0	0	1	0	0	1	0
329:	0	0	0	0	0	1	0	0
337:	1	0	1	0	0	0	0	1
345:	0	0	0	0	0	0	0	2
353:	0	0	1	1	0	0	0	0
361:	0	0	0	1	0	0	0	0

369:	1	0	1	0	1	1	0	0

Sample Title: 01

Channel								
377:	0	0	2	0	0	1	0	1
385:	2	0	1	0	2	1	2	2
393:	2	0	2	3	3	4	1	2
401:	1	5	1	4	8	3	4	9
409:	4	7	5	5	5	4	7	8
417:	3	18	4	7	13	10	15	11
425:	13	13	15	13	18	13	18	7
433:	12	8	19	16	18	17	12	19
441:	12	29	11	21	16	18	4	17
449:	15	10	3	3	3	0	1	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	1	0	0
481:	0	0	0	0	0	0	0	0
489:	0	1	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	1	0	0	0	0
537:	0	0	0	0	1	2	1	0
545:	1	0	1	0	0	0	0	1
553:	0	1	1	0	0	0	0	0
561:	0	0	1	0	1	1	2	2
569:	0	0	0	1	1	0	1	2
577:	0	1	0	1	1	2	1	1
585:	2	1	2	1	2	3	1	4
593:	4	5	4	4	3	4	11	8
601:	7	3	9	8	6	13	10	5
609:	9	10	15	8	10	10	8	12
617:	13	12	10	8	12	12	19	13
625:	14	14	16	13	18	20	12	11
633:	11	9	1	0	0	0	0	1
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	1

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	1	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010841.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_034
Chamber Serial Number: 06027396B
Detector Serial Number: 91136
Env. Background: System Bkgd 10012
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/30/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:43 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6111 mL
Effective Efficiency: 0.1604 +/- 0.0097
Counting Efficiency: 0.1866 +/- 0.0030 on 8/30/2011 7:34:54 PM
Chem. Recovery Factor: 0.8593 +/- 0.0537

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.285	320.83	10.95	0.17	0.00E+000	5.3
U-234		4.665	1.83	152.56	0.17	0.00E+000	3.0
U-235		4.387	3.00	130.67	0.00	0.00E+000	3.0
U-238		4.132	-0.17	1169.4	0.17	0.00E+000	0.0

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.995	5302.50*	5.31E+000 +/- 6.29E-001	6.91E-002 +/- 8.18E-003
U-234	0.861	4761.50*	3.03E-002 +/- 4.64E-002	6.91E-002 +/- 8.18E-003
U-235	1.000	4385.50*	6.13E-002 +/- 8.04E-002	1.22E-001 +/- 1.45E-002
U-238	0.958	4184.40*	-2.80E-003 +/- 3.28E-002	6.88E-002 +/- 8.14E-003

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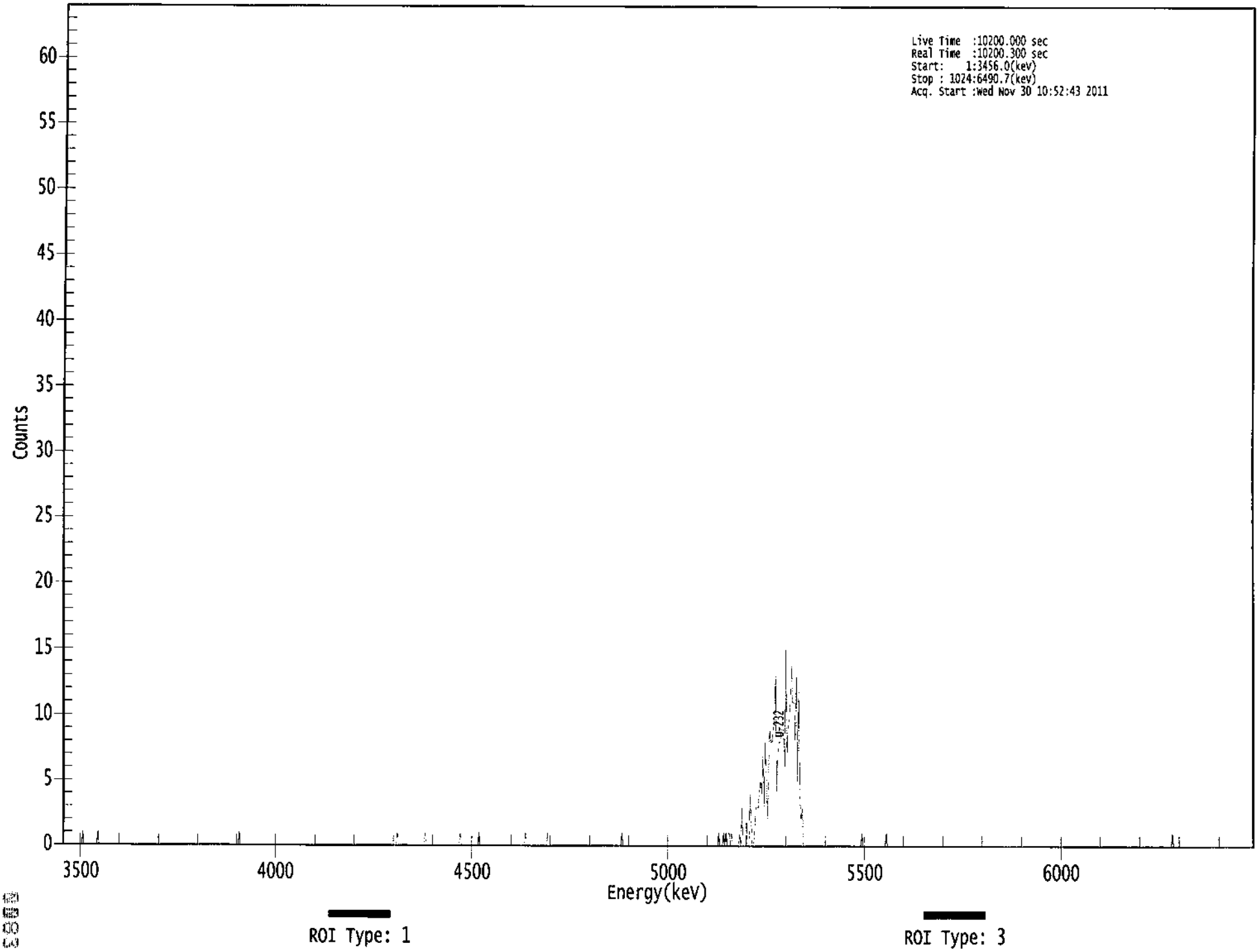
0000010841.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	1	0	0	0	0	0	0
25:	0	0	0	0	0	0	1	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	1	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	1	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	1	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	1	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	1	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	1	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	1	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	1	0	0	0
569:	1	0	1	0	1	1	0	1
577:	0	0	0	0	0	0	1	0
585:	3	0	0	0	2	0	0	4
593:	2	0	0	1	3	3	3	4
601:	5	4	7	3	8	5	2	6
609:	9	8	8	9	10	13	4	7
617:	8	8	9	9	9	6	15	7
625:	9	10	11	14	11	11	8	13
633:	5	12	4	2	3	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	1
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	1	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	1	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-4-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010840.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_035
Chamber Serial Number: 04026477A
Detector Serial Number: 58771
Env. Background: System Bkgd 10013
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:35 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6112 mL
Effective Efficiency: 0.1963 +/- 0.0109
Counting Efficiency: 0.1761 +/- 0.0028 on 8/30/2011 7:34:52 PM
Chem. Recovery Factor: 1.1143 +/- 0.0644

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.299	392.66	9.90	0.34	0.00E+000	27.6
U-234		4.754	70.15	23.57	0.85	0.00E+000	7.0
U-235		4.386	3.66	107.87	0.34	0.00E+000	3.0
U-238		4.178	67.83	23.83	0.17	0.00E+000	5.0

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.30E+000 +/- 5.76E-001	6.45E-002 +/- 7.02E-003
U-234	0.999	4761.50*	9.46E-001 +/- 2.46E-001	8.08E-002 +/- 8.78E-003
U-235	1.000	4385.50*	6.09E-002 +/- 6.60E-002	7.96E-002 +/- 8.65E-003
U-238	0.999	4184.40*	9.11E-001 +/- 2.39E-001	5.61E-002 +/- 6.10E-003

AG
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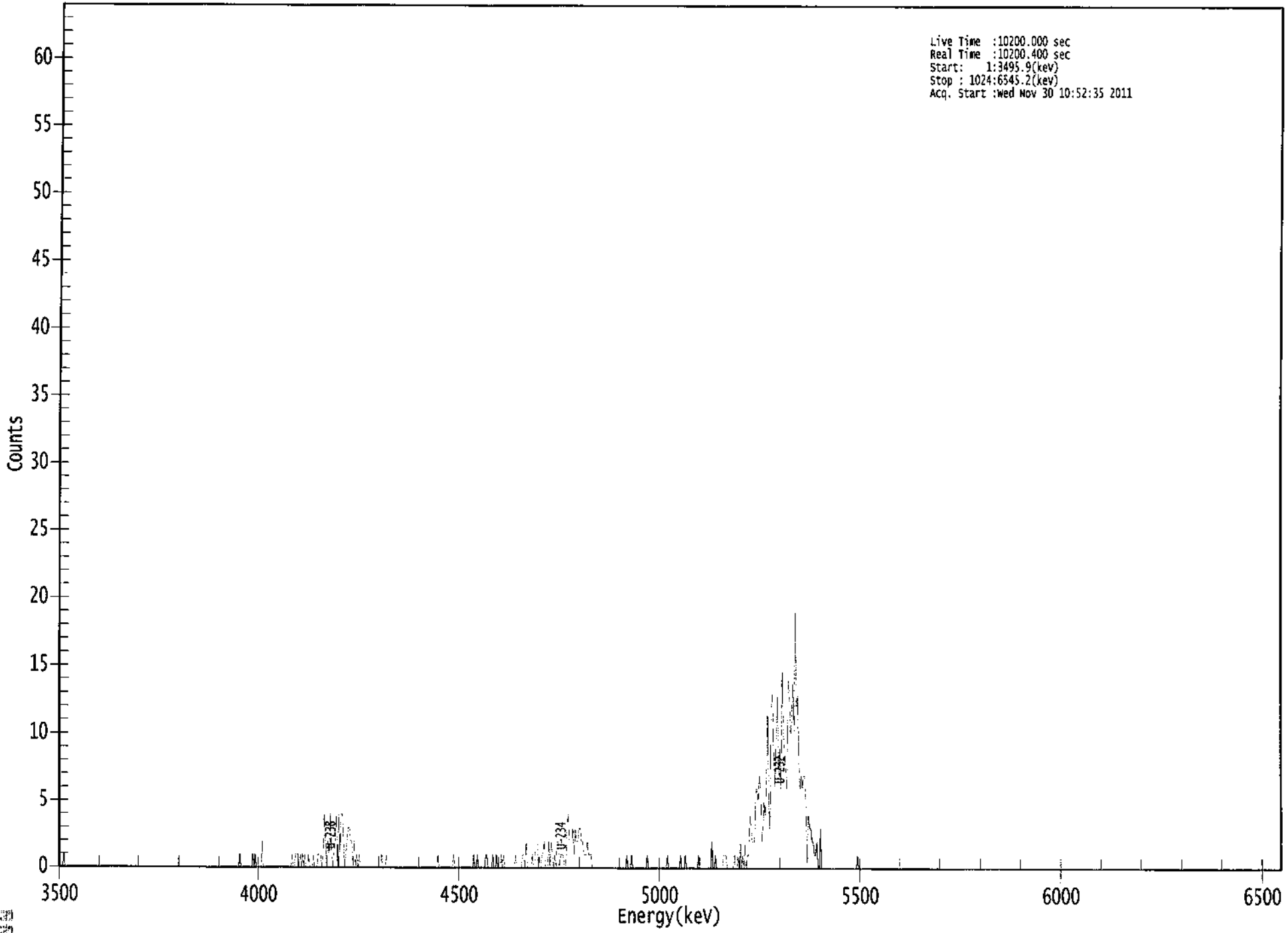
0000010840.CNF



0000

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	1	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	1	0	0	0	0	0	0	0
161:	0	0	0	1	0	1	0	0
169:	0	0	0	2	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	1	0	0	1
201:	1	1	0	1	0	1	0	1
209:	0	0	1	0	0	0	1	0
217:	0	0	1	1	1	0	1	4
225:	2	0	2	1	4	1	0	1
233:	2	4	0	4	1	4	4	2
241:	0	1	2	3	3	2	2	0
249:	2	0	1	0	1	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	1
273:	0	0	0	1	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	1	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	1	0	0	1
353:	0	0	0	0	0	0	1	1
361:	0	0	0	0	1	0	0	1

369:	0	0	0	1	0	1	0	0

Sample Title: 03

Channel								
377:	0	0	0	0	0	0	0	1
385:	0	0	0	0	0	1	1	0
393:	2	0	0	0	0	1	0	0
401:	2	2	0	0	0	1	1	2
409:	0	0	0	2	0	2	1	0
417:	1	0	2	2	0	1	1	1
425:	0	0	3	4	2	2	2	3
433:	1	3	2	2	3	3	2	2
441:	1	1	1	2	1	1	1	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	1	0	0	0	1	0	0
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	0	0	0	0
545:	0	0	0	2	0	0	1	0
553:	0	0	0	0	0	1	1	1
561:	0	0	0	0	0	0	1	0
569:	0	1	0	2	0	1	0	2
577:	0	1	1	4	3	2	2	2
585:	6	6	5	7	6	2	3	5
593:	4	6	12	5	3	12	13	9
601:	6	10	13	7	9	6	15	10
609:	9	7	6	14	13	10	11	14
617:	10	19	12	13	8	6	7	6
625:	7	7	5	0	4	3	3	2
633:	2	1	1	2	0	0	3	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	1	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010838.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_036
Chamber Serial Number: 04026477B
Detector Serial Number: 84167
Env. Background: System Bkgd 10014
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:37 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6116 mL
Effective Efficiency: 0.2223 +/- 0.0117
Counting Efficiency: 0.1917 +/- 0.0031 on 8/30/2011 7:34:51 PM
Chem. Recovery Factor: 1.1596 +/- 0.0639

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.284	445.00	9.30	0.00	0.00E+000	26.3
U-234		4.735	79.83	21.96	0.17	0.00E+000	11.5
U-235		4.370	4.00	109.57	0.00	0.00E+000	3.0
U-238		4.161	84.83	21.31	0.17	0.00E+000	5.2

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.30E+000 +/- 5.48E-001	7.14E-002 +/- 7.38E-003
U-234	0.989	4761.50*	9.50E-001 +/- 2.31E-001	4.97E-002 +/- 5.13E-003
U-235	0.996	4385.50*	5.87E-002 +/- 6.46E-002	8.80E-002 +/- 9.10E-003
U-238	0.992	4184.40*	1.01E+000 +/- 2.38E-001	4.95E-002 +/- 5.11E-003

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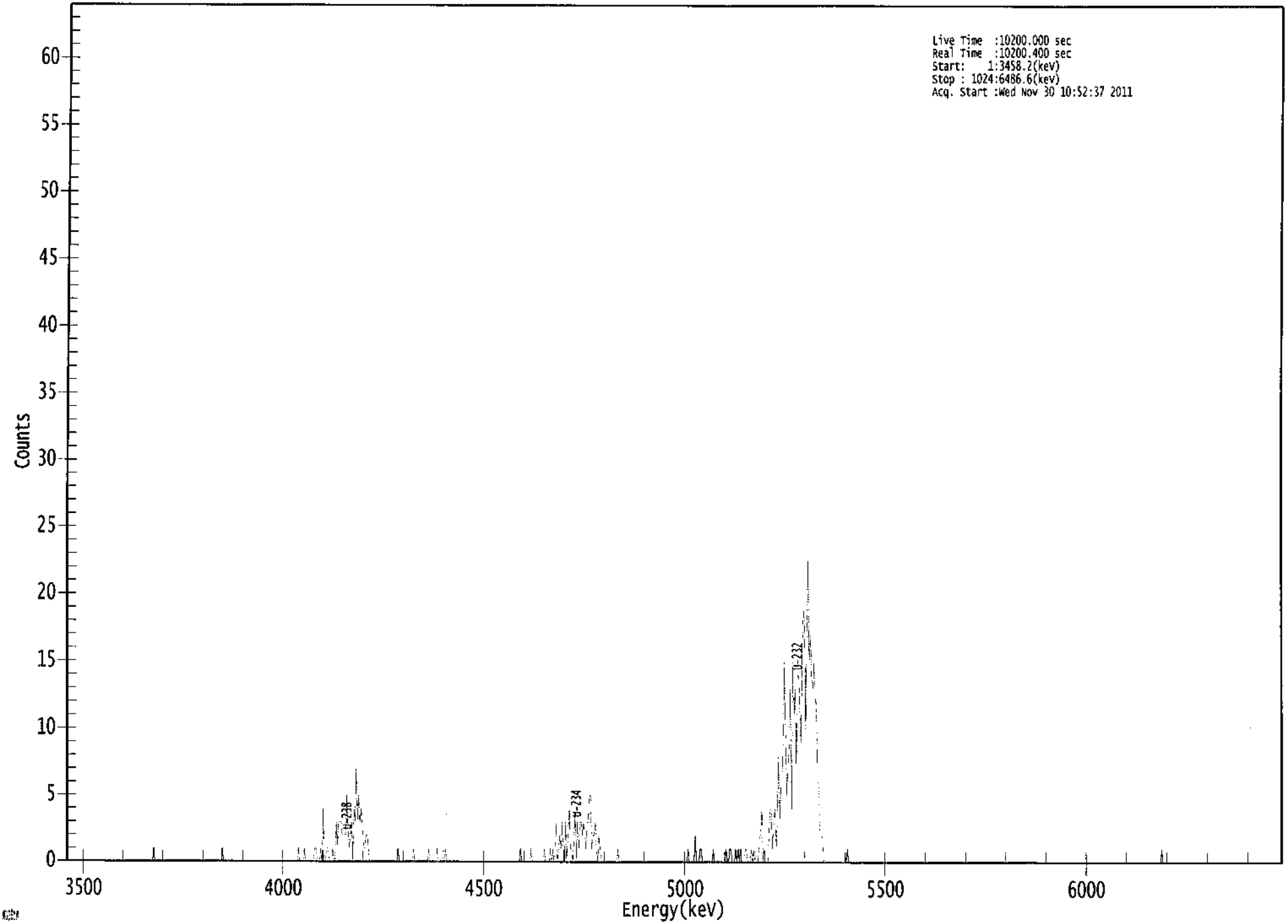
0000010838.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	1	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	1	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	1	0	0	0
201:	0	1	0	0	0	0	0	0
209:	0	0	1	1	0	0	0	1
217:	0	4	0	0	1	1	0	0
225:	0	1	0	0	3	1	3	3
233:	3	2	2	2	2	5	2	1
241:	2	3	0	4	3	7	3	5
249:	3	4	3	1	1	2	2	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	1	0	0	0	0	0	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	0
313:	0	1	0	0	0	0	0	0
321:	1	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
377:	0	0	0	0	0	0	0	1
385:	0	0	0	0	0	0	0	0
393:	1	0	0	0	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	1	0	1	0	1	3	0	1
417:	2	1	3	1	0	3	0	2
425:	4	1	1	0	2	4	0	3
433:	1	3	3	2	3	2	1	3
441:	3	5	5	1	2	2	3	1
449:	0	2	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	1	0	0	0
529:	0	0	2	0	0	0	1	1
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	1	0	0	1
561:	1	0	0	0	1	0	1	0
569:	1	0	0	0	1	1	0	0
577:	0	1	0	1	0	1	1	0
585:	2	2	4	0	1	0	0	0
593:	2	4	4	1	3	4	1	3
601:	8	3	6	6	10	15	9	5
609:	7	9	13	4	15	11	13	7
617:	14	14	11	9	16	19	18	10
625:	17	23	15	17	14	13	15	12
633:	12	6	6	2	2	2	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	1	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	1	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010835.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_037
Chamber Serial Number: 04026478A
Detector Serial Number: 91133
Env. Background: System Bkgd 10015
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:38 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6106 mL
Effective Efficiency: 0.1916 +/- 0.0107
Counting Efficiency: 0.1806 +/- 0.0029 on 8/30/2011 7:34:50 PM
Chem. Recovery Factor: 1.0611 +/- 0.0619

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.307	383.00	10.03	0.00	0.00E+000	31.9
U-234		4.746	77.00	22.48	0.00	0.00E+000	8.0
U-235		4.395	5.83	82.55	0.17	0.00E+000	3.0
U-238		4.183	80.00	22.05	0.00	0.00E+000	9.3

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.30E+000 +/- 5.83E-001	8.30E-002 +/- 9.13E-003
U-234	0.996	4761.50*	1.07E+000 +/- 2.67E-001	8.30E-002 +/- 9.13E-003
U-235	0.999	4385.50*	9.96E-002 +/- 8.29E-002	7.13E-002 +/- 7.84E-003
U-238	1.000	4184.40*	1.10E+000 +/- 2.72E-001	8.27E-002 +/- 9.09E-003

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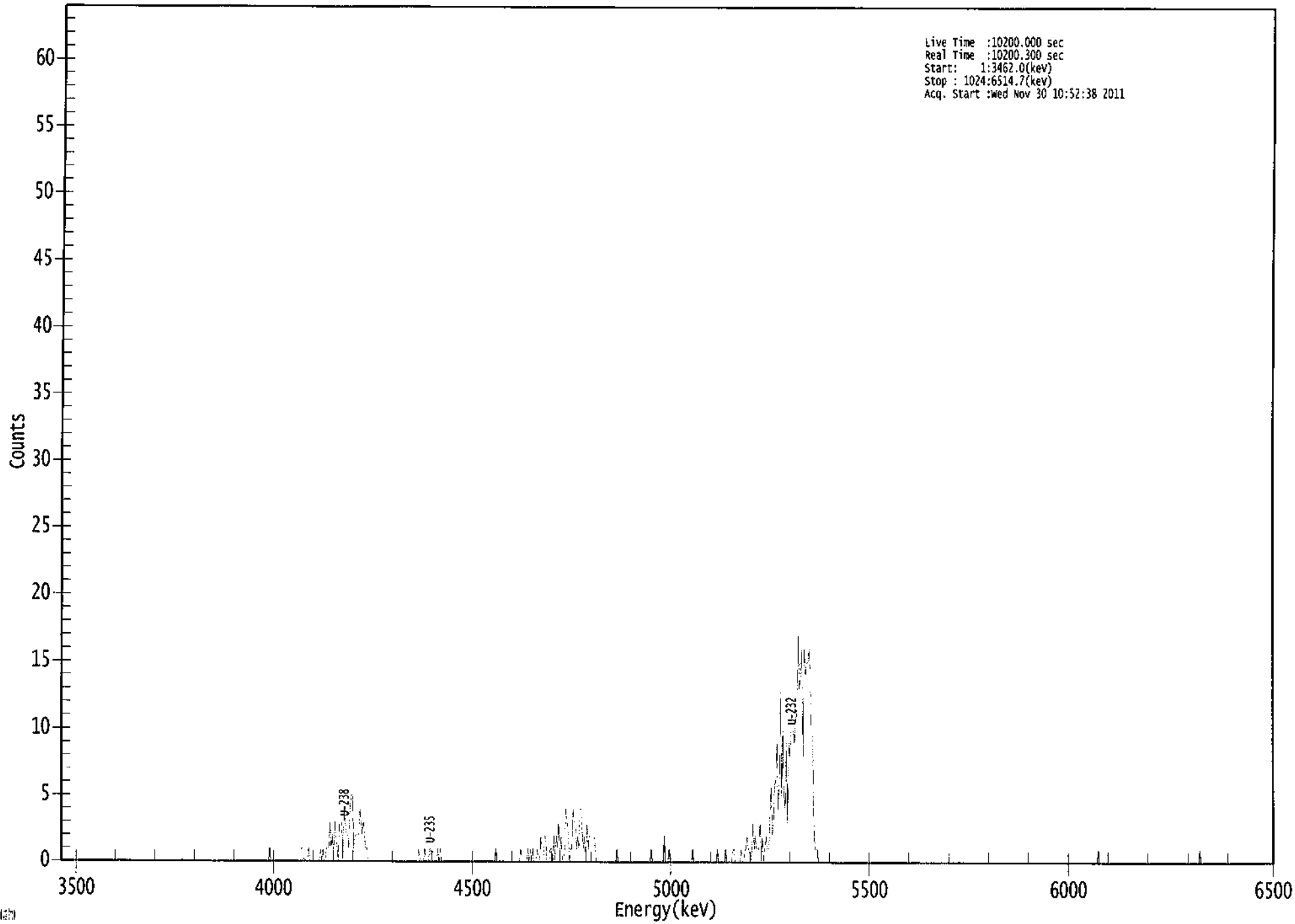
0000010835.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	1	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	1	1	0	0
209:	0	0	1	0	0	0	0	0
217:	0	0	0	0	1	0	1	0
225:	0	1	1	1	3	1	2	0
233:	3	2	1	0	3	3	3	0
241:	4	3	2	2	1	4	5	5
249:	1	2	2	2	2	4	3	2
257:	3	2	1	1	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	1
305:	0	0	0	0	1	0	0	0
313:	1	1	0	0	0	0	0	1
321:	0	1	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	1	0	0	0	0	0	0	0

Sample Title: 05

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	1	0	0
393:	0	0	0	1	0	1	0	1
401:	0	0	0	1	0	0	2	0
409:	0	2	2	0	0	0	1	1
417:	0	2	0	2	1	3	0	2
425:	0	0	1	4	3	2	0	1
433:	1	4	3	3	1	2	1	4
441:	4	2	1	2	0	3	1	2
449:	2	2	2	2	1	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	1	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	0
505:	0	0	0	0	0	0	2	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	1	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	0	0	0	0
561:	0	0	1	0	0	0	0	0
569:	1	1	0	0	0	0	0	1
577:	0	0	1	1	2	1	1	0
585:	1	3	1	2	1	1	1	3
593:	0	2	0	1	2	1	1	2
601:	6	2	3	6	6	9	4	6
609:	13	5	10	5	4	9	3	9
617:	8	10	10	10	9	11	11	17
625:	13	14	16	8	16	14	15	15
633:	16	14	10	10	3	1	1	1
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	1	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	1	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010834.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_038
Chamber Serial Number: 04026478B
Detector Serial Number: 91134
Env. Background: System Bkgd 10016
Reagent Blank: <not performed>

Sample Size: 1.007E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:40 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6075 mL
Effective Efficiency: 0.2208 +/- 0.0117
Counting Efficiency: 0.1591 +/- 0.0026 on 8/30/2011 7:34:48 PM
Chem. Recovery Factor: 1.3878 +/- 0.0769

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.288	439.00	9.37	0.00	0.00E+000	13.9
U-234		4.741	80.49	21.93	0.51	0.00E+000	7.5
U-235		4.384	2.00	169.74	0.00	0.00E+000	3.0
U-238		4.165	83.66	21.48	0.34	0.00E+000	20.9

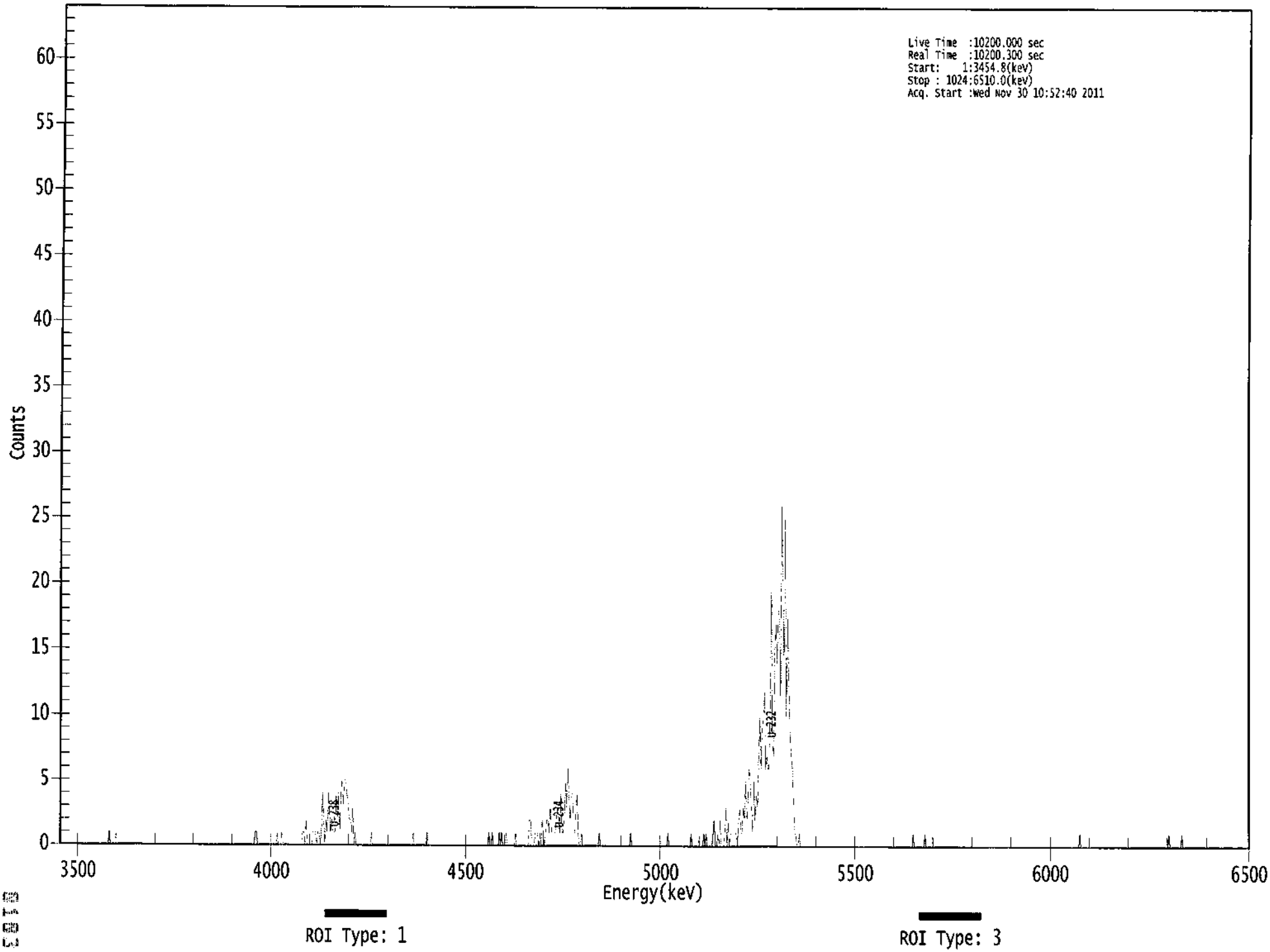
T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.24E+000 +/- 5.45E-001	7.16E-002 +/- 7.45E-003
U-234	0.993	4761.50*	9.61E-001 +/- 2.33E-001	6.27E-002 +/- 6.51E-003
U-235	1.000	4385.50*	2.95E-002 +/- 5.01E-002	8.83E-002 +/- 9.18E-003
U-238	0.994	4184.40*	9.95E-001 +/- 2.37E-001	5.69E-002 +/- 5.91E-003

AG
12/1/11

0000010834.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	1	1	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	1	0	0	0
193:	1	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	1	1	0	2	0	0
217:	0	0	0	1	1	1	0	1
225:	1	0	1	4	2	0	2	1
233:	4	3	1	2	1	1	1	4
241:	2	4	1	4	5	3	5	5
249:	4	3	2	2	1	3	0	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	1	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	1	0	0	0	0	0	0
313:	0	0	0	0	0	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	1	0	0	1	0	0

Sample Title: 06

Channel								
377:	0	0	0	1	0	1	0	0
385:	0	1	0	0	0	0	0	0
393:	0	1	0	0	0	0	0	0
401:	0	0	0	0	0	2	2	0
409:	0	0	1	1	1	0	1	0
417:	2	1	0	1	2	2	1	3
425:	1	1	1	1	2	3	2	1
433:	4	1	1	2	5	3	6	4
441:	2	4	4	1	1	3	4	1
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	1	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	1	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	1	0	0	0	0	0	0	0
553:	0	0	0	1	0	1	0	0
561:	0	0	0	1	2	0	0	1
569:	0	2	0	0	0	1	3	0
577:	2	0	1	1	1	1	1	1
585:	0	2	3	1	1	3	2	5
593:	2	3	6	5	3	1	5	2
601:	4	3	7	10	6	9	10	12
609:	6	7	6	6	11	20	8	7
617:	15	17	14	18	18	11	26	20
625:	14	25	10	18	13	9	7	6
633:	4	1	1	0	0	1	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	1
737:	0	0	0	0	0	0	0	0
745:	0	1	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	1	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	1	0	0	0	0	0
961:	0	0	0	0	0	1	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5N
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010839.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 10025
Reagent Blank: <not performed>

Sample Size: 1.006E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:32 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6097 mL
Effective Efficiency: 0.2190 +/- 0.0116
Counting Efficiency: 0.1714 +/- 0.0028 on 8/30/2011 7:34:58 PM
Chem. Recovery Factor: 1.2773 +/- 0.0709

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.280	437.00	9.39	0.00	0.00E+000	39.9
U-234		4.732	70.00	23.59	0.00	0.00E+000	3.9
U-235		4.405	3.83	102.72	0.17	0.00E+000	2.9
U-238		4.165	64.00	24.69	0.00	0.00E+000	5.1

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.27E+000 +/- 5.49E-001	7.23E-002 +/- 7.53E-003
U-234	0.986	4761.50*	8.43E-001 +/- 2.18E-001	7.22E-002 +/- 7.52E-003
U-235	0.994	4385.50*	5.69E-002 +/- 5.88E-002	6.20E-002 +/- 6.46E-003
U-238	0.994	4184.40*	7.68E-001 +/- 2.06E-001	7.19E-002 +/- 7.49E-003

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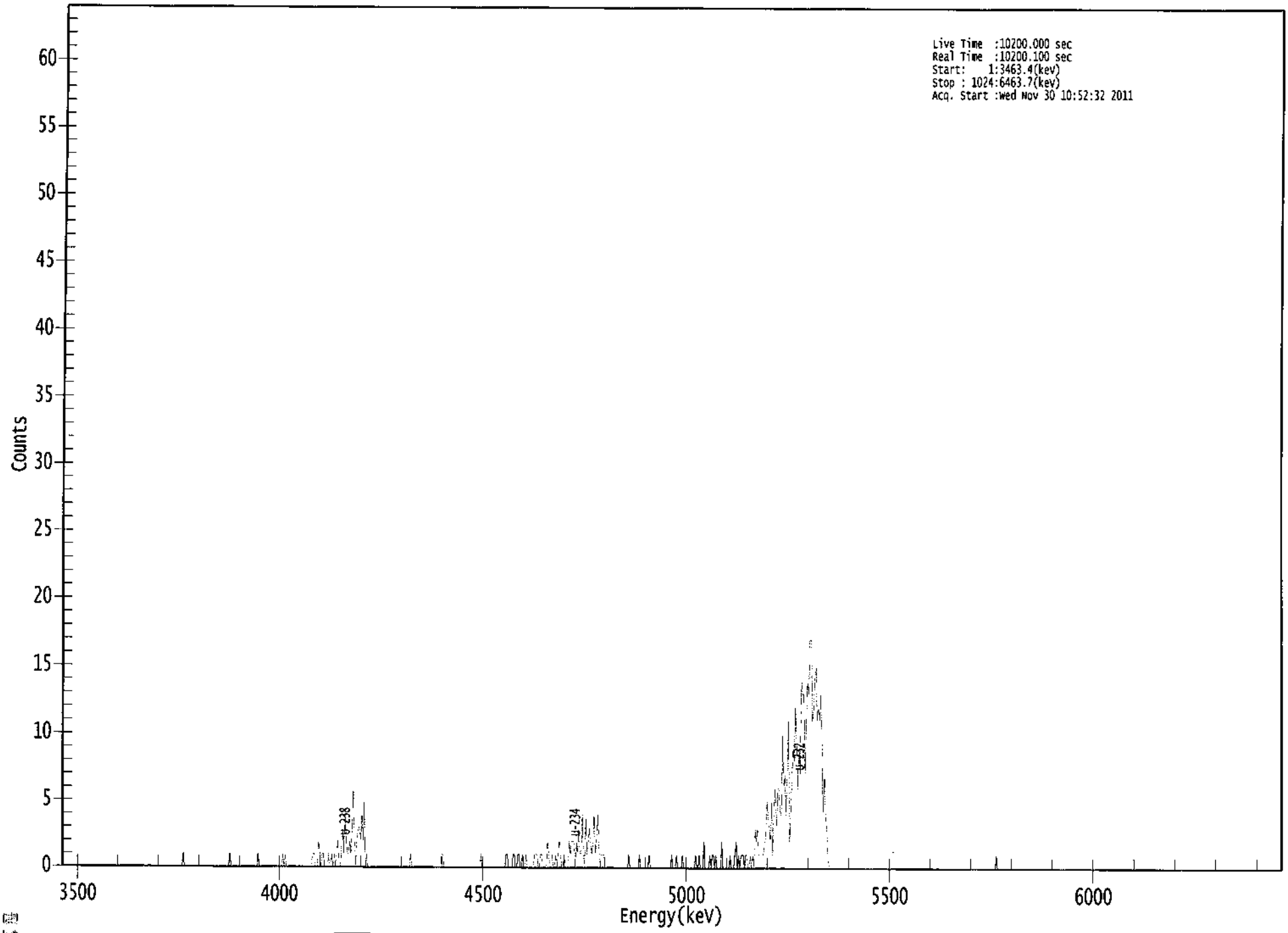
12/1/11

0000010839.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	1	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	1	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	1	0	1	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	1	1	0	0	0
217:	2	1	0	1	1	0	0	0
225:	1	0	0	1	0	1	0	1
233:	2	0	0	1	3	1	4	2
241:	1	1	2	1	3	6	2	0
249:	2	3	3	2	4	2	5	0
257:	1	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	1
321:	1	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	1	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	1	1	0

Sample Title: 07

Channel								
377:	0	0	0	1	1	0	0	1
385:	1	0	0	1	0	0	1	0
393:	0	0	0	0	0	1	1	1
401:	0	0	1	1	0	0	0	0
409:	2	1	0	0	1	0	0	1
417:	0	1	2	1	0	0	1	0
425:	0	0	2	1	2	2	2	0
433:	2	1	3	1	1	4	1	0
441:	4	1	2	3	2	1	2	4
449:	1	2	4	2	0	1	1	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	1	0	0	0
481:	0	0	0	0	0	1	0	0
489:	0	0	0	0	0	1	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	1	0	0	0	1	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	1
537:	0	0	0	2	0	0	0	0
545:	1	0	1	1	0	1	0	0
553:	0	0	2	0	0	0	0	0
561:	0	1	0	0	0	1	2	0
569:	1	0	1	1	1	0	1	1
577:	0	0	1	0	1	0	3	2
585:	3	1	1	1	1	1	2	2
593:	5	4	3	2	5	1	5	6
601:	3	6	6	4	4	10	6	7
609:	4	7	11	2	4	7	9	8
617:	12	9	6	9	7	14	13	13
625:	7	10	14	13	17	17	11	12
633:	14	15	11	12	11	13	9	4
641:	7	4	3	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	1	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5S
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010837.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 10026
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 10:52:33 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6108 mL
Effective Efficiency: 0.1732 +/- 0.0101
Counting Efficiency: 0.1651 +/- 0.0027 on 8/30/2011 7:34:57 PM
Chem. Recovery Factor: 1.0490 +/- 0.0637

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.277	346.32	10.54	0.68	0.00E+000	23.5
U-234		4.732	52.32	27.30	0.68	0.00E+000	3.7
U-235		4.390	9.83	63.14	0.17	0.00E+000	4.4
U-238		4.148	69.00	23.77	0.00	0.00E+000	5.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.990	5302.50*	5.27E+000 +/- 6.04E-001	8.58E-002 +/- 9.84E-003
U-234	0.986	4761.50*	7.96E-001 +/- 2.36E-001	8.58E-002 +/- 9.84E-003
U-235	1.000	4385.50*	1.84E-001 +/- 1.18E-001	7.83E-002 +/- 8.98E-003
U-238	0.979	4184.40*	1.04E+000 +/- 2.76E-001	9.08E-002 +/- 1.04E-002

AG
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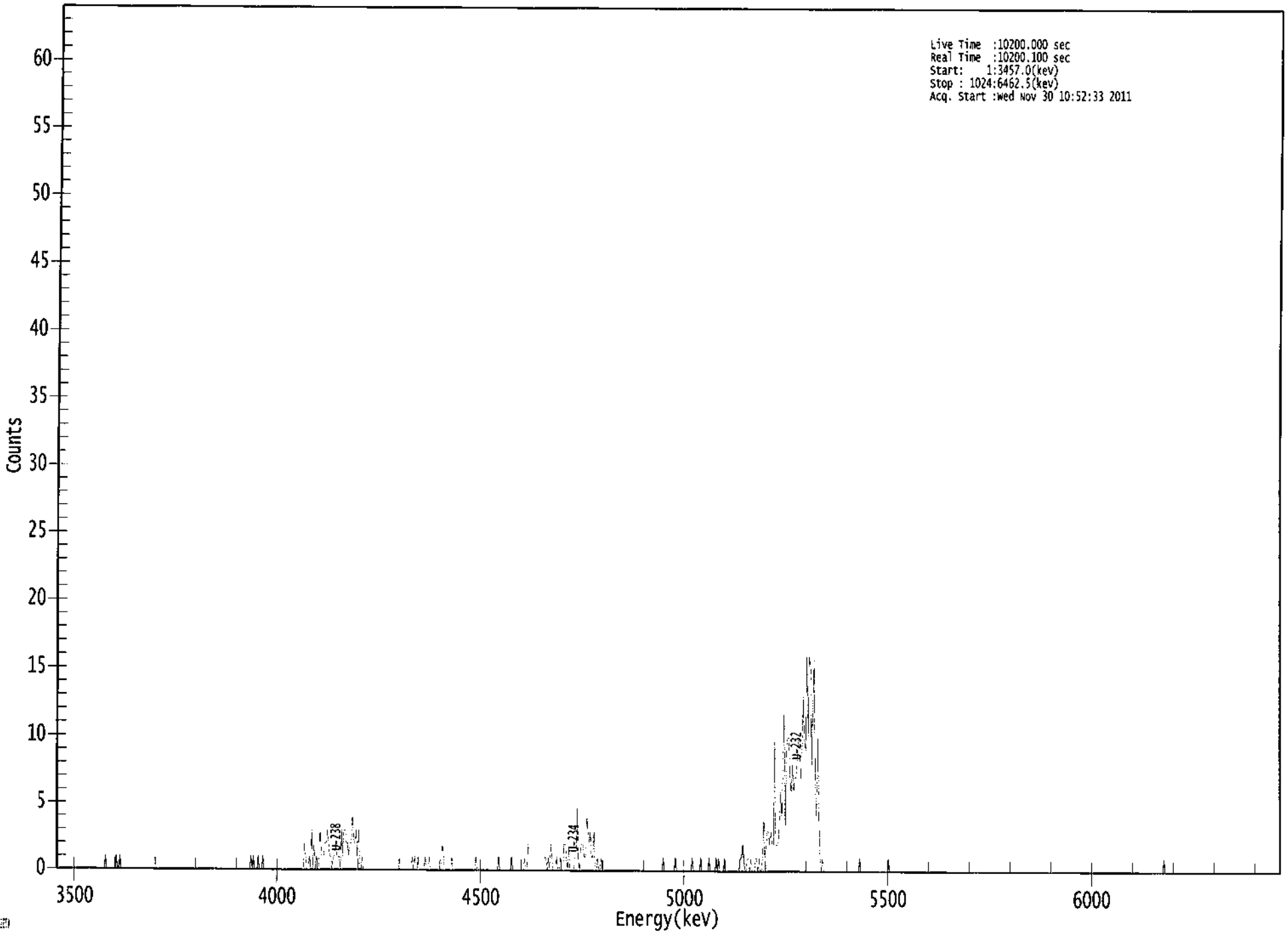
0000010837.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	1	0	0	0	0	0	0
49:	0	0	1	0	0	1	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	1	0	0
169:	0	1	0	0	0	1	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	2	1	0	0	1	0	3	0
217:	2	0	1	0	0	3	1	1
225:	1	2	2	3	2	1	1	0
233:	1	1	2	1	1	1	0	3
241:	1	3	3	2	2	1	2	2
249:	4	2	2	3	1	3	0	0
257:	1	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	1	0	0	1
305:	0	0	0	0	0	1	0	0
313:	1	0	0	0	0	0	0	0
321:	0	0	0	2	1	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	1
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	1	0	0	0	0	0

Sample Title: 08

Channel								
377:	0	0	0	0	0	1	0	0
385:	0	0	0	0	0	0	0	0
393:	1	0	0	2	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	1	1	0	1	0	2	1
417:	0	0	0	1	0	0	1	0
425:	0	2	2	1	0	2	0	0
433:	0	0	1	1	5	1	0	2
441:	2	2	1	1	4	3	2	3
449:	1	1	3	0	0	1	0	0
457:	1	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	1	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	1	0	0	0	0	0
553:	1	0	1	0	0	0	0	1
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	1	1	2	1
577:	0	0	1	1	0	1	0	0
585:	0	1	1	0	1	0	0	1
593:	4	1	2	3	3	2	3	2
601:	2	10	2	2	2	4	6	4
609:	8	12	3	9	10	10	7	6
617:	8	6	7	7	8	10	10	7
625:	8	13	10	9	16	10	16	15
633:	8	13	16	6	4	10	4	1
641:	0	1	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	1	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	1	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	1	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5W
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010850.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10017
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 11:52:19 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6100 mL
Effective Efficiency: 0.1798 +/- 0.0104
Counting Efficiency: 0.1847 +/- 0.0030 on 8/30/2011 7:34:47 PM
Chem. Recovery Factor: 0.9736 +/- 0.0583

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.304	359.00	10.36	0.00	0.00E+000	32.0
U-234		4.758	62.83	24.77	0.17	0.00E+000	9.4
U-235		4.409	2.83	120.53	0.17	0.00E+000	3.0
U-238		4.177	68.00	23.94	0.00	0.00E+000	4.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	1.000	5302.50*	5.30E+000 +/- 5.98E-001	8.84E-002 +/- 9.99E-003
U-234	1.000	4761.50*	9.26E-001 +/- 2.52E-001	6.15E-002 +/- 6.95E-003
U-235	0.991	4385.50*	5.15E-002 +/- 6.23E-002	7.59E-002 +/- 8.58E-003
U-238	0.999	4184.40*	9.98E-001 +/- 2.64E-001	8.80E-002 +/- 9.95E-003

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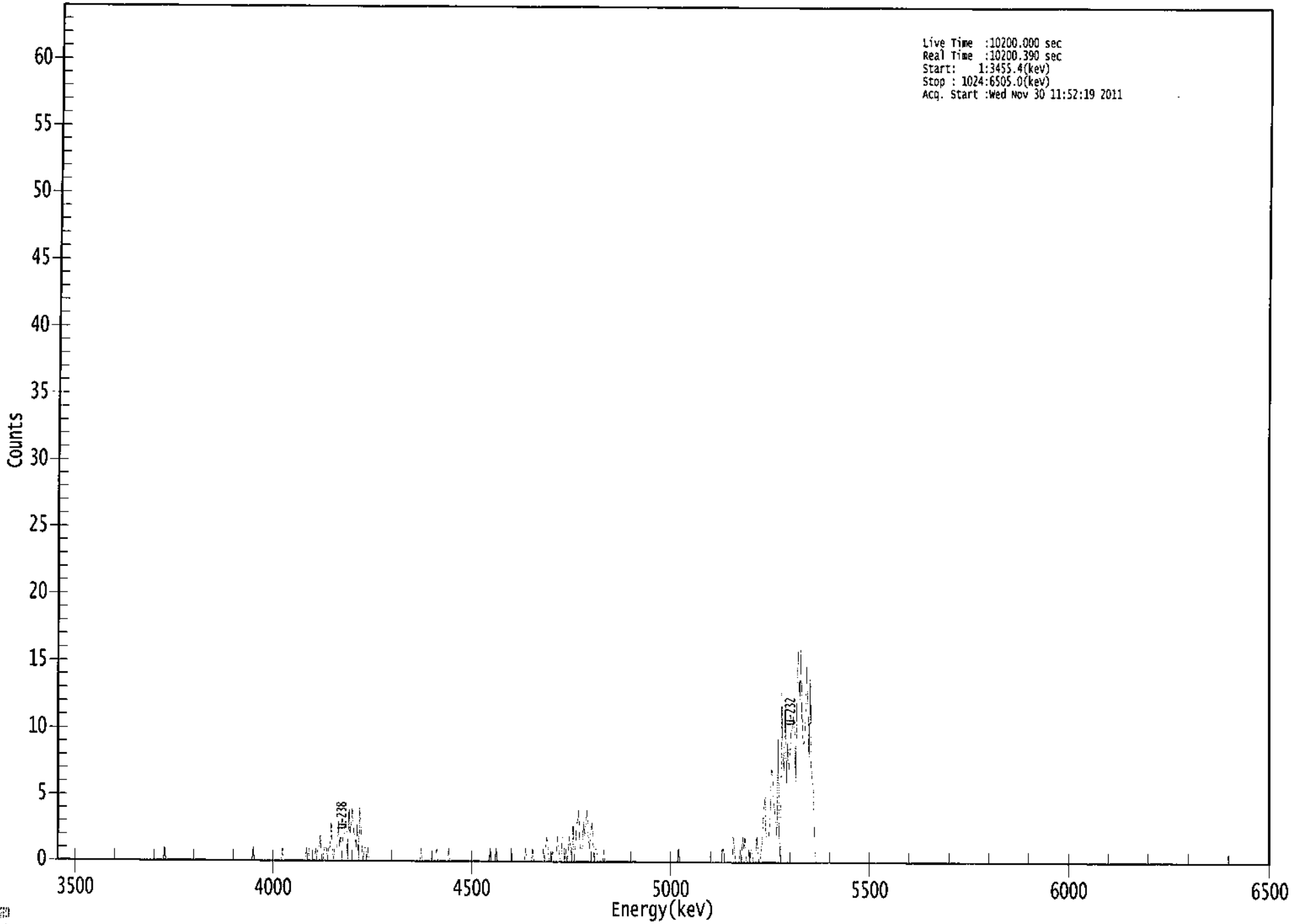
12/1/11

0000010850.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 09

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	1	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	1	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	1
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	1	0	1	0	0
217:	0	0	0	1	0	1	1	2
225:	0	0	1	1	1	0	1	1
233:	3	1	0	1	1	1	3	1
241:	2	0	2	2	3	3	0	4
249:	2	3	4	2	2	1	3	0
257:	4	3	1	0	1	1	0	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	1	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	1	0	0	0	0	0	0
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	1	0

369:	0	0	0	1	0	0	0	0

Sample Title: 09

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	0
393:	0	0	0	0	1	0	0	0
401:	0	0	1	0	0	0	0	0
409:	0	0	0	1	0	1	2	1
417:	0	0	0	1	0	0	0	2
425:	1	0	0	2	2	0	1	0
433:	1	2	1	0	3	0	1	3
441:	3	4	1	1	1	3	2	3
449:	4	2	1	2	3	2	0	1
457:	1	0	0	0	0	0	1	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	1	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	1	1	0	0	0	0
569:	0	0	0	2	1	0	0	0
577:	0	1	0	2	1	2	0	0
585:	1	0	1	1	0	0	0	2
593:	1	0	0	1	2	4	5	2
601:	2	2	3	7	7	5	4	3
609:	2	10	2	0	13	8	7	12
617:	6	9	7	8	10	10	11	10
625:	6	14	16	12	16	11	9	9
633:	11	15	12	8	14	7	6	5
641:	1	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 09

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: BKG-5E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000010849.Cnf
Batch Identification: 1111141A-UU
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10018
Reagent Blank: <not performed>

Sample Size: 1.010E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/18/2011 10:44:52 AM
Acquisition Date/Time: 11/30/2011 11:52:20 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6099 mL
Effective Efficiency: 0.1832 +/- 0.0105
Counting Efficiency: 0.1914 +/- 0.0031 on 8/30/2011 7:34:46 PM
Chem. Recovery Factor: 0.9575 +/- 0.0568

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.278	365.83	10.25	0.17	0.00E+000	22.9
U-234		4.742	41.00	30.98	0.00	0.00E+000	4.5
U-235		4.365	1.66	169.38	0.34	0.00E+000	3.0
U-238		4.151	54.00	26.92	0.00	0.00E+000	4.3

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.990	5302.50*	5.25E+000 +/- 5.88E-001	5.99E-002 +/- 6.71E-003
U-234	0.994	4761.50*	5.88E-001 +/- 1.94E-001	8.60E-002 +/- 9.63E-003
U-235	0.993	4385.50*	2.94E-002 +/- 4.99E-002	8.46E-002 +/- 9.48E-003
U-238	0.982	4184.40*	7.72E-001 +/- 2.25E-001	8.57E-002 +/- 9.59E-003

AG
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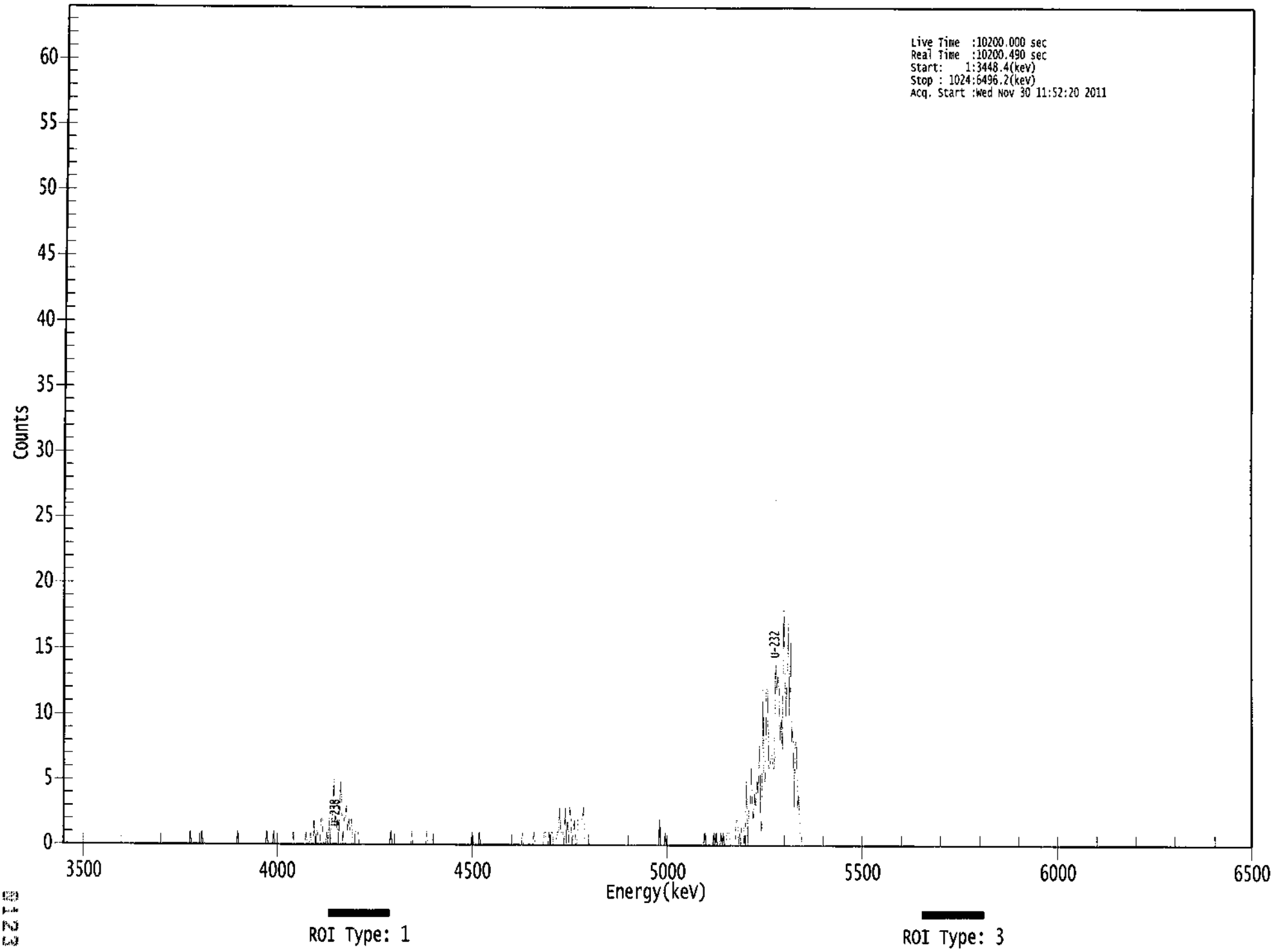
0000010849.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	1	0
113:	0	0	0	0	0	0	0	0
121:	1	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	1
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	1	0	0	0	0	0	1	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	1
201:	0	0	0	0	0	0	0	0
209:	0	0	1	0	0	0	1	0
217:	0	2	0	1	1	0	0	2
225:	2	0	0	0	1	0	2	0
233:	2	2	5	1	1	2	0	2
241:	5	3	0	2	2	3	1	2
249:	1	2	1	0	0	1	1	1
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	1	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	1	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	1	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	1	0	0	0	0	0	1
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	1	0	0	0
401:	0	0	0	0	0	0	1	0
409:	0	0	0	0	0	0	0	1
417:	1	0	0	1	0	1	1	0
425:	0	0	1	1	3	1	1	1
433:	0	3	0	2	0	3	2	0
441:	1	2	0	0	2	2	2	2
449:	2	3	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	2	0	0	0	0	1
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	1	0	0	0	0	0	0
561:	0	1	0	1	0	0	0	1
569:	0	1	0	0	1	1	1	0
577:	0	0	0	0	2	2	0	1
585:	0	2	2	0	2	5	0	3
593:	3	6	3	2	4	3	5	4
601:	8	2	1	12	5	5	12	12
609:	6	6	7	7	6	6	14	12
617:	13	12	8	10	7	18	14	10
625:	13	17	10	16	8	9	3	8
633:	8	3	4	1	1	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 5:31:18 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	11/30/2011 5:16:52 AM
Alpha_010	AIM21F	ALL	Passed	11/30/2011 5:16:53 AM
Alpha_011	AIM21F	ALL	Passed	11/30/2011 5:16:54 AM
Alpha_012	AIM21F	ALL	Passed	11/30/2011 5:16:55 AM
Alpha_013	AIM21F	ALL	Passed	11/30/2011 5:16:56 AM
Alpha_014	AIM21F	ALL	Passed	11/30/2011 5:16:56 AM
Alpha_015	AIM21F	ALL	Passed	11/30/2011 5:16:57 AM
Alpha_017	AIM730	ALL	Passed	11/30/2011 5:16:58 AM
Alpha_020	AIM730	Peak FWHM	Action	11/30/2011 5:16:59 AM
Alpha_021	AIM730	Peak FWHM	Action	11/30/2011 5:17:00 AM
Alpha_022	AIM730	ALL	Passed	11/30/2011 5:17:01 AM
Alpha_023	AIM730	Peak FWHM	Action	11/30/2011 5:17:01 AM
Alpha_024	AIM730	Peak FWHM	Action	11/30/2011 5:17:02 AM
Alpha_025	AIM730	ALL	Passed	11/30/2011 5:17:03 AM
Alpha_026	AIM730	ALL	Passed	11/30/2011 5:17:04 AM
Alpha_028	AIM730	Peak FWHM	Action	11/30/2011 5:17:05 AM
Alpha_029	AIM730	ALL	Passed	11/30/2011 5:17:06 AM
Alpha_030	AIM730	Peak Energy	Action	11/30/2011 5:17:06 AM
Alpha_030	AIM730	Peak FWHM	Action	11/30/2011 5:17:06 AM
Alpha_031	AIM730	ALL	Passed	11/30/2011 5:17:07 AM
Alpha_033	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:08 AM
Alpha_034	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:10 AM
Alpha_035	Alpha Analyst100DC	ALL	Not Done	
Alpha_036	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:13 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:14 AM
Alpha_038	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:16 AM
Alpha_039	Alpha Analyst100DC	ALL	Not Done	
Alpha_040	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:18 AM
Alpha_041	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:20 AM
Alpha_042	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:21 AM
Alpha_043	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:23 AM
Alpha_044	Alpha Analyst100DC	Peak CPS	Action	11/30/2011 5:17:25 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:26 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:28 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:29 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:17:31 AM

APPROVED BY: _____

11/30/11

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 5:57:54 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_035	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:47:10 AM
Alpha_039	Alpha Analyst100DC	ALL	Passed	11/30/2011 5:47:12 AM

APPROVED BY: _____

APPROVAL DATE: 11/30/11

11/30/2011 8:05:34 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 11/30/2011
Time : 8:05:34 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_017	AIM730	ALL	Passed	11/30/2011 7:54:14 AM
Alpha_020	AIM730	ALL	Passed	11/30/2011 7:54:15 AM
Alpha_021	AIM730	ALL	Passed	11/30/2011 7:54:15 AM
Alpha_022	AIM730	ALL	Passed	11/30/2011 7:54:16 AM
Alpha_023	AIM730	ALL	Passed	11/30/2011 7:54:17 AM
Alpha_024	AIM730	ALL	Passed	11/30/2011 7:54:18 AM
Alpha_025	AIM730	ALL	Passed	11/30/2011 7:54:19 AM
Alpha_026	AIM730	ALL	Passed	11/30/2011 7:54:19 AM
Alpha_028	AIM730	ALL	Passed	11/30/2011 7:54:20 AM
Alpha_029	AIM730	ALL	Passed	11/30/2011 7:54:21 AM
Alpha_030	AIM730	ALL	Passed	11/30/2011 7:54:22 AM
Alpha_031	AIM730	ALL	Passed	11/30/2011 7:54:23 AM

APPROVED BY: _____

APPROVAL DATE: 11/30/11

SECTION IX

ANALYTICAL DATA (RADIUM-226)

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

11-11141
Ra226
Run 1

Work Order	11-11141
Analysis Code	Ra226
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	BKG-4	42	11/18/11 00:00	1.0122E+00
04	DO	BKG-4	42	11/18/11 00:00	1.0138E+00
05	TRG	BKG-5	39	11/18/11 00:00	1.0078E+00
06	TRG	BKG-5C	47	11/18/11 00:00	1.0057E+00
07	TRG	BKG-5N	43	11/18/11 00:00	1.0128E+00
08	TRG	BKG-5S	38	11/18/11 00:00	1.0084E+00
09	TRG	BKG-5W	48	11/18/11 00:00	1.0116E+00
10	TRG	BKG-5E	53	11/18/11 00:00	1.0179E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory
Analysis Sheet

11-11141
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9106	1009.4	430.1	94.60		0.0214	0.0276	0.0062		94.60	2.23	1.00
02	MBL	0.9099	1008.6	454.7	100.08		0.0216	0.0281	0.0065		100.08	2.34	1.00
03	DUP	0.9084	1006.9	398.0	87.75		0.0217	0.0304	0.0087		87.75	2.94	1.00
04	DO	0.9093	1007.9	452.3	99.62		0.0215	0.0303	0.0088		99.62	2.96	1.00
05	TRG	0.9079	1006.4	434.5	95.85		0.0216	0.0303	0.0087		95.85	2.94	1.00
06	TRG	0.9085	1007.0	417.6	92.06		0.0218	0.0303	0.0085		92.06	2.89	1.00
07	TRG	0.9086	1007.2	455.3	100.36		0.0215	0.0301	0.0086		100.36	2.91	1.00
08	TRG	0.9080	1006.5	470.1	103.69		0.0218	0.0298	0.0080		103.69	2.77	1.00
09	TRG	0.9079	1006.4	428.0	94.41		0.0219	0.0303	0.0084		94.41	2.87	1.00
10	TRG	0.9067	1005.1	420.5	92.88		0.0217	0.0300	0.0083		92.88	2.84	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11141
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
02	MBL			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
03	DUP			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
04	DO	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
05	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
06	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
07	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
08	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
09	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		
10	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/g	9.80E+00	1.17E+00	1.41E-01	1.02E+01	95.80	OK		OK	
02	RA-226	MBL	BLANK	pCi/g	2.14E-02	6.53E-02	1.55E-01					OK	OK
03	RA-226	DUP	BKG-4	pCi/g	2.96E+00	7.71E-01	3.85E-01				INV	OK	
04	RA-226	DO	BKG-4	pCi/g	1.93E+00	5.59E-01	2.31E-01					OK	
05	RA-226	TRG	BKG-5	pCi/g	1.35E+00	4.57E-01	1.66E-01					OK	
06	RA-226	TRG	BKG-5C	pCi/g	1.43E+00	9.48E-01	5.98E-01					OK	
07	RA-226	TRG	BKG-5N	pCi/g	1.48E+00	4.86E-01	2.40E-01					OK	
08	RA-226	TRG	BKG-5S	pCi/g	1.35E+00	4.65E-01	1.71E-01					OK	
09	RA-226	TRG	BKG-5W	pCi/g	2.60E+00	6.92E-01	2.79E-01					OK	
10	RA-226	TRG	BKG-5E	pCi/g	1.70E+00	5.70E-01	2.72E-01					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	11/22/11 00:00	1.00E+00	94.60	0.00	94.60		12/1/2011 11:57	
02	RA-226	MBL	11/22/11 00:00	1.00E+00	100.00	0.00	100.08		12/1/2011 11:57	
03	RA-226	DUP	11/18/11 00:00	1.01E+00	87.75	0.00	87.75		12/1/2011 11:57	
04	RA-226	DO	11/18/11 00:00	1.01E+00	99.62	0.00	99.62		12/1/2011 11:57	
05	RA-226	TRG	11/18/11 00:00	1.01E+00	95.85	0.00	95.85		12/1/2011 11:57	
06	RA-226	TRG	11/18/11 00:00	1.01E+00	92.06	0.00	92.06		12/1/2011 11:57	
07	RA-226	TRG	11/18/11 00:00	1.01E+00	100.00	0.00	100.36		12/1/2011 11:57	
08	RA-226	TRG	11/18/11 00:00	1.01E+00	100.00	0.00	103.69		12/1/2011 11:57	
09	RA-226	TRG	11/18/11 00:00	1.01E+00	94.41	0.00	94.41		12/1/2011 11:57	
10	RA-226	TRG	11/18/11 00:00	1.02E+00	92.88	0.00	92.88		12/1/2011 11:57	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11141
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	12/02/11 13:03		A_Spec	Alpha_039	170	2.90 E+02	1.00 E-03	18.5
02	RA-226	MBL	12/02/11 13:03		A_Spec	Alpha_040	170	6.60 E-01	2.00 E-03	19.1
03	RA-226	DUP	12/02/11 13:03		A_Spec	Alpha_041	170	6.00 E+01	1.20 E-02	17.7
04	RA-226	DO	12/02/11 13:03		A_Spec	Alpha_042	170	4.73 E+01	4.00 E-03	19
05	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_043	170	3.38 E+01	1.00 E-03	20.3
06	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_044	45.08	8.91 E+00	2.00 E-03	19.4
07	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_045	170	3.70 E+01	0.00 E+00	19
08	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_046	170	3.28 E+01	1.00 E-03	17.7
09	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_047	170	5.60 E+01	0.00 E+00	17.1
10	RA-226	TRG	12/02/11 13:03		A_Spec	Alpha_048	170	3.53 E+01	4.00 E-03	16.5

Count Room Report
Client: Foxfire Scientific, Inc.

11-11141-Ra226-1 (pCi/g) in SO
Tracer ID: Ba-6a

25

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9106	1009.3755	430.1000	94.60	2.23	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9099	1008.5996	454.7000	100.08	2.34	1.00
03	DUP	BKG-4	11/18/11 00:00	1.0122	0.9084	1006.9369	398.0000	87.75	2.94	1.00
04	DO	BKG-4	11/18/11 00:00	1.0138	0.9093	1007.9345	452.3000	99.62	2.96	1.00
05	TRG	BKG-5	11/18/11 00:00	1.0078	0.9079	1006.3826	434.5000	95.85	2.94	1.00
06	TRG	BKG-5C	11/18/11 00:00	1.0057	0.9085	1007.0477	417.6000	92.06	2.89	1.00
07	TRG	BKG-5N	11/18/11 00:00	1.0128	0.9086	1007.1586	455.3000	100.36	2.91	1.00
08	TRG	BKG-5S	11/18/11 00:00	1.0084	0.9080	1006.4935	470.1000	103.69	2.77	1.00
09	TRG	BKG-5W	11/18/11 00:00	1.0116	0.9079	1006.3826	428.0000	94.41	2.87	1.00
10	TRG	BKG-5E	11/18/11 00:00	1.0179	0.9067	1005.0525	420.5000	92.88	2.84	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 12:12 PM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11141	1	Ra226	11/23/2011 12:11	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-226	Ra-5b	44.098	11/23/2011	0.500	0.5152				10.23	0.471	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9106	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9099	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9084	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9093	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9079	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9085	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9086	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9080	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9079	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.9067	0.9100

Balance Printer Tapes

Tracer

0.9106 g
0.9099 g
0.9084 g
0.9093 g
0.9079 g
0.9085 g
0.9086 g
0.9080 g
0.9079 g
0.9067 g

LCS

0.5152 g
0.4090 g

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11141	1	Ra226	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	BKG-4	DUP					1.0122E+00	1.0122E+00				
04	BKG-4	DO					1.0138E+00	1.0138E+00				
05	BKG-5	TRG					1.0078E+00	1.0078E+00				
06	BKG-5C	TRG					1.0057E+00	1.0057E+00				
07	BKG-5N	TRG					1.0128E+00	1.0128E+00				
08	BKG-5S	TRG					1.0084E+00	1.0084E+00				
09	BKG-5W	TRG					1.0116E+00	1.0116E+00				
10	BKG-5E	TRG					1.0179E+00	1.0179E+00				

1.0122 g
1.0138 g
1.0078 g
1.0057 g
1.0128 g
1.0084 g
1.0116 g
1.0179 g

Comments	

Technician: JB Date: 11/23/11

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11141	1	Ra226			TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS		0.0214	0.0276	**0.0062**	
02	BLANK	MBL		0.0216	0.0281	**0.0065**	
03	DUP	DUP		0.0217	0.0304	**0.0087**	
04	BKG-4	DO		0.0215	0.0303	**0.0088**	
05	BKG-5	TRG		0.0216	0.0303	**0.0087**	
06	BKG-5C	TRG		0.0218	0.0303	**0.0085**	
07	BKG-5N	TRG		0.0215	0.0301	**0.0086**	
08	BKG-5S	TRG		0.0218	0.0298	**0.0080**	
09	BKG-5W	TRG		0.0219	0.0303	**0.0084**	
10	BKG-5E	TRG		0.0217	0.0300	**0.0083**	

Technician: [illegible] Date: 12/1/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11141	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	BKG-4	13.6000	241.0500	195.5100	227.4500	181.9100	20.02%	79.98%	0.0000	0.0000	
05	BKG-5	13.5500	248.5500	196.1800	235.0000	182.6300	22.29%	77.71%	0.0000	0.0000	
06	BKG-5C	13.5200	220.9800	178.4500	207.4600	164.9300	20.50%	79.50%	0.0000	0.0000	
07	BKG-5N	13.5300	212.1500	167.3200	198.6200	153.7900	22.57%	77.43%	0.0000	0.0000	
08	BKG-5S	13.4400	233.1300	183.5900	219.6900	170.1500	22.55%	77.45%	0.0000	0.0000	
09	BKG-5W	13.4800	212.4000	170.2800	198.9200	156.8000	21.17%	78.83%	0.0000	0.0000	
10	BKG-5E	13.5800	211.4500	167.6000	197.8700	154.0200	22.16%	77.84%	0.0000	0.0000	

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sales Date: Analysis: Rough Prep Logbook

Analysis: Ra226 Page No. 7857

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011269.cnf
Batch Identification: 1111141A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10017
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.230E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/2/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:22 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9460 +/- 0.0000
Counting Efficiency: 0.1847 +/- 0.0030 on 8/30/2011 7:34:47 PM
Effective Efficiency: 0.1747 +/- 0.0028

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: 0.0072
Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

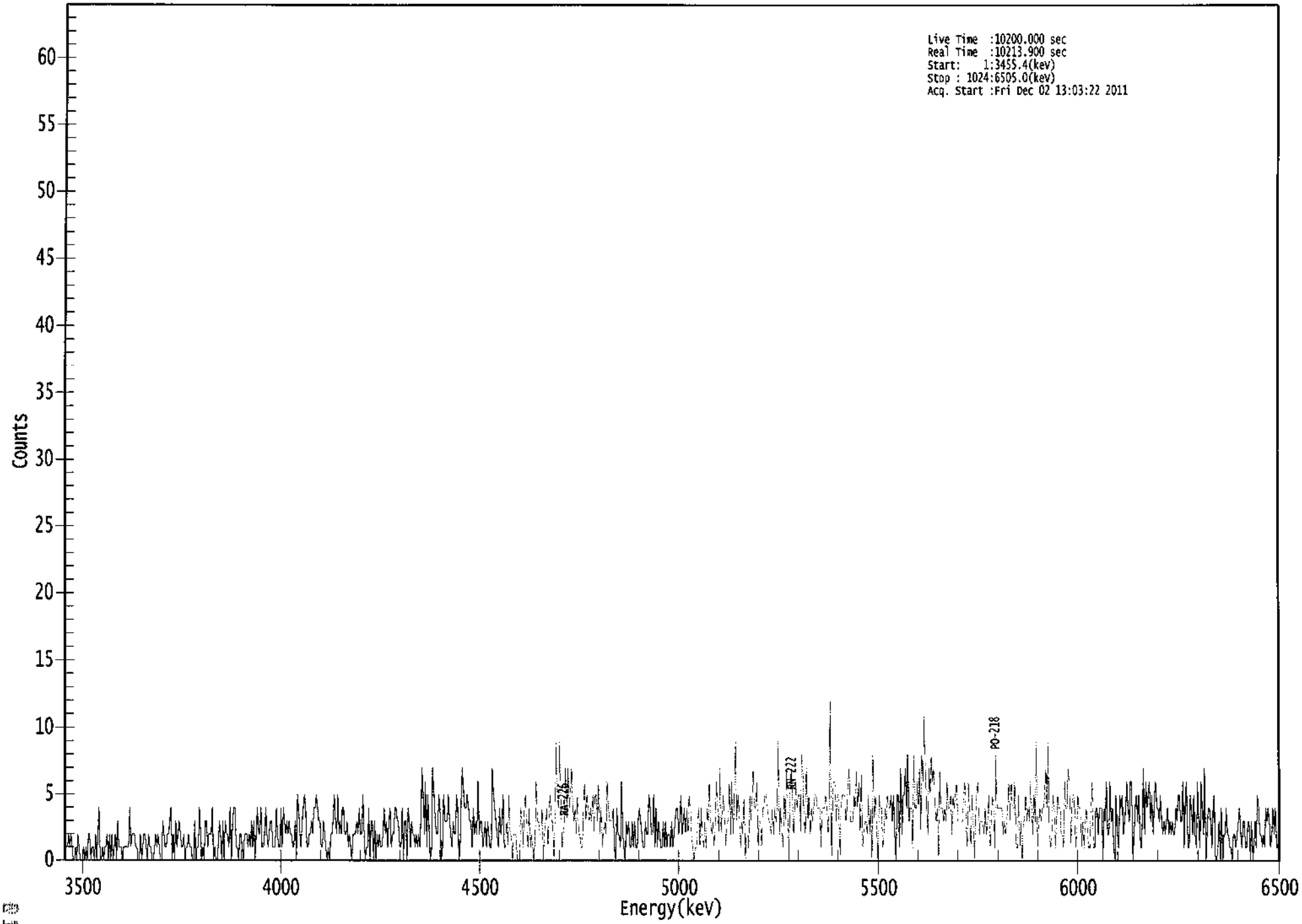
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.796	589.49	8.08	0.51	0.00E+000	11.7
RN-222	5.285	628.49	7.82	0.51	0.00E+000	3.7
RA-226	4.714	289.83	11.52	0.17	0.00E+000	6.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.973	6003.00*	1.99E+001 +/- 1.73E+000	1.78E-001 +/- 5.58E-003
RN-222	0.974	5490.00*	2.13E+001 +/- 1.79E+000	1.78E-001 +/- 5.58E-003
RA-226	0.997	4785.00*	9.80E+000 +/- 1.17E+000	1.41E-001 +/- 4.44E-003

AG
12/3/11

0000011269.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10214

Channel								
1:	1	1	1	2	1	2	1	0
9:	0	1	0	2	1	0	0	0
17:	1	0	1	0	2	2	0	1
25:	1	0	2	0	2	4	0	0
33:	1	0	1	1	2	0	2	0
41:	2	0	1	2	0	3	1	1
49:	1	0	1	1	1	1	1	4
57:	1	2	2	2	1	1	0	0
65:	2	0	1	2	2	1	0	2
73:	1	1	0	0	1	2	1	2
81:	1	0	0	3	2	1	1	2
89:	2	3	4	0	2	0	3	1
97:	2	3	2	1	1	2	0	1
105:	1	2	1	1	0	0	3	0
113:	1	1	4	2	0	1	0	3
121:	3	1	2	2	2	4	0	1
129:	0	0	1	3	2	0	3	0
137:	3	2	2	1	4	0	3	4
145:	4	1	1	0	2	2	1	0
153:	2	2	2	1	2	1	3	1
161:	3	0	2	4	2	2	4	1
169:	1	2	4	2	1	2	3	3
177:	1	1	1	4	2	1	1	4
185:	1	4	3	2	3	2	3	2
193:	2	1	1	3	0	5	4	2
201:	1	3	4	5	4	1	1	2
209:	2	3	2	4	4	5	4	3
217:	3	1	1	3	2	1	0	1
225:	0	2	2	3	5	3	2	5
233:	2	3	2	4	4	2	2	3
241:	1	2	1	0	2	2	2	3
249:	2	4	2	2	5	2	0	1
257:	1	4	0	3	3	0	3	0
265:	2	1	2	1	1	2	4	2
273:	3	1	3	4	1	2	2	4
281:	4	3	3	1	1	4	0	3
289:	3	0	4	3	1	3	2	2
297:	1	2	1	2	1	3	7	5
305:	2	6	1	5	2	0	1	7
313:	5	3	2	2	5	4	0	1
321:	5	3	3	3	5	3	2	1
329:	3	2	2	5	4	0	1	5
337:	7	5	4	4	5	4	3	3
345:	1	4	2	3	2	6	2	3
353:	3	1	2	3	1	3	2	1
361:	1	7	5	4	3	2	1	4

369:	2	3	5	1	1	3	1	5

Sample Title: 01

Channel								
377:	2	2	0	2	2	2	0	0
385:	0	4	3	1	4	5	3	1
393:	4	1	2	1	0	2	6	3
401:	3	2	2	4	0	2	3	4
409:	1	4	5	3	3	0	3	9
417:	5	4	9	5	1	2	3	7
425:	3	7	4	5	7	4	3	4
433:	2	5	2	2	1	1	4	6
441:	3	5	4	3	4	3	5	2
449:	5	5	3	6	2	4	1	2
457:	3	2	6	4	3	3	3	4
465:	1	0	4	2	2	1	6	2
473:	1	0	3	2	3	1	1	3
481:	1	3	1	1	3	4	3	2
489:	1	1	3	2	2	5	4	2
497:	2	5	1	4	1	3	2	1
505:	1	3	1	3	1	2	2	1
513:	3	1	2	3	4	4	2	3
521:	5	2	3	4	2	4	2	5
529:	4	2	1	0	1	1	3	4
537:	1	4	2	1	3	1	4	3
545:	6	3	2	3	1	3	6	4
553:	2	7	2	4	5	3	1	3
561:	3	6	2	6	2	4	9	3
569:	5	4	1	3	2	5	0	2
577:	2	1	5	3	5	7	4	4
585:	6	1	3	3	1	4	4	5
593:	5	4	3	3	2	4	2	4
601:	3	4	9	2	4	2	1	5
609:	3	7	4	0	5	7	5	2
617:	4	6	4	5	5	2	8	7
625:	3	2	7	3	5	2	4	3
633:	4	5	5	4	4	4	1	4
641:	4	4	5	4	2	4	12	0
649:	5	6	6	3	5	5	0	4
657:	5	5	5	3	4	6	7	3
665:	3	3	5	4	7	4	6	2
673:	7	1	2	3	3	2	5	2
681:	4	0	8	3	5	2	0	5
689:	4	4	1	2	4	3	5	4
697:	4	5	3	5	2	0	5	5
705:	1	7	2	5	5	7	4	8
713:	3	4	4	1	8	4	4	6
721:	4	7	2	8	6	11	7	4
729:	2	7	5	8	6	7	4	3
737:	4	0	7	4	4	3	4	3
745:	6	4	4	5	2	5	4	5
753:	6	3	3	3	3	3	5	6
761:	3	1	6	4	1	5	3	0
769:	3	5	6	2	3	3	3	2
777:	4	2	3	5	1	3	5	4
785:	1	8	4	4	4	4	4	2
793:	3	2	3	4	6	3	6	4

801:	4	6	1	1	5	1	3	0

Sample Title: 01

Channel								
809:	3	3	5	3	4	3	6	4
817:	2	5	3	9	1	3	4	3
825:	4	4	5	7	4	9	2	1
833:	2	5	4	1	3	5	4	4
841:	2	2	1	6	4	4	7	6
849:	1	4	5	5	1	2	5	4
857:	4	1	3	1	3	4	2	1
865:	1	4	6	1	1	4	4	2
873:	4	4	4	0	4	3	6	2
881:	2	6	3	4	1	0	5	2
889:	1	5	4	5	2	3	4	6
897:	4	3	6	6	0	2	4	5
905:	3	5	2	1	3	7	2	6
913:	4	5	6	3	5	2	5	6
921:	4	4	3	5	3	2	3	2
929:	3	4	2	3	2	3	2	2
937:	4	3	5	5	3	3	6	1
945:	5	6	1	1	5	4	2	5
953:	2	1	6	3	1	6	4	2
961:	7	0	2	4	4	3	1	4
969:	5	0	0	1	3	0	4	0
977:	2	2	4	2	2	1	1	0
985:	2	2	1	2	3	4	2	1
993:	3	3	1	1	3	3	0	3
1001:	0	1	3	1	5	4	2	2
1009:	1	2	1	4	3	4	3	1
1017:	2	4	2	4	1	1	2	1

ICB
12/2/11

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011177.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10018
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/2/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:23 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1914 +/- 0.0031 on 8/30/2011 7:34:46 PM
Effective Efficiency: 0.1914 +/- 0.0031

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

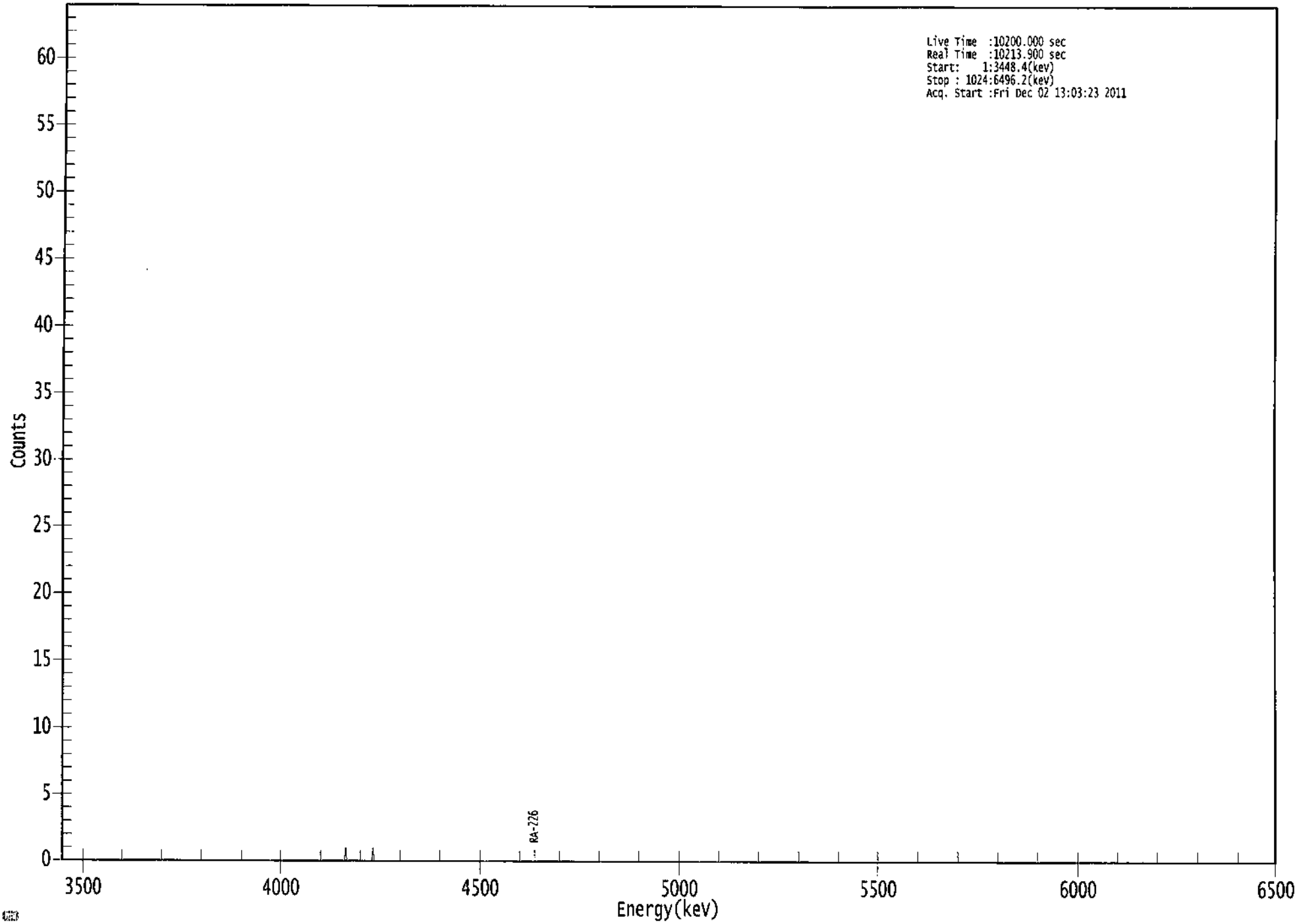
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.811	-0.68	304.44	0.68	0.00E+000	0.0
RN-222	5.272	-0.51	400.63	0.51	0.00E+000	0.0
RA-226	4.637	0.66	305.43	0.34	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	-2.20E-002 +/- 6.71E-002	1.83E-001 +/- 5.73E-003
RN-222	0.970	5490.00*	-1.65E-002 +/- 6.63E-002	1.70E-001 +/- 5.33E-003
RA-226	0.986	4785.00*	2.14E-002 +/- 6.53E-002	1.55E-001 +/- 4.86E-003

AG
12/3/11

0000011177.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10214

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	1	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB
12/2/14

Apex-Alpha™

Sample Description: BKG-4-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011175.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 10019
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.940E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:25 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.8775 +/- 0.0000
Counting Efficiency: 0.1774 +/- 0.0028 on 8/30/2011 7:34:44 PM
Effective Efficiency: 0.1557 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

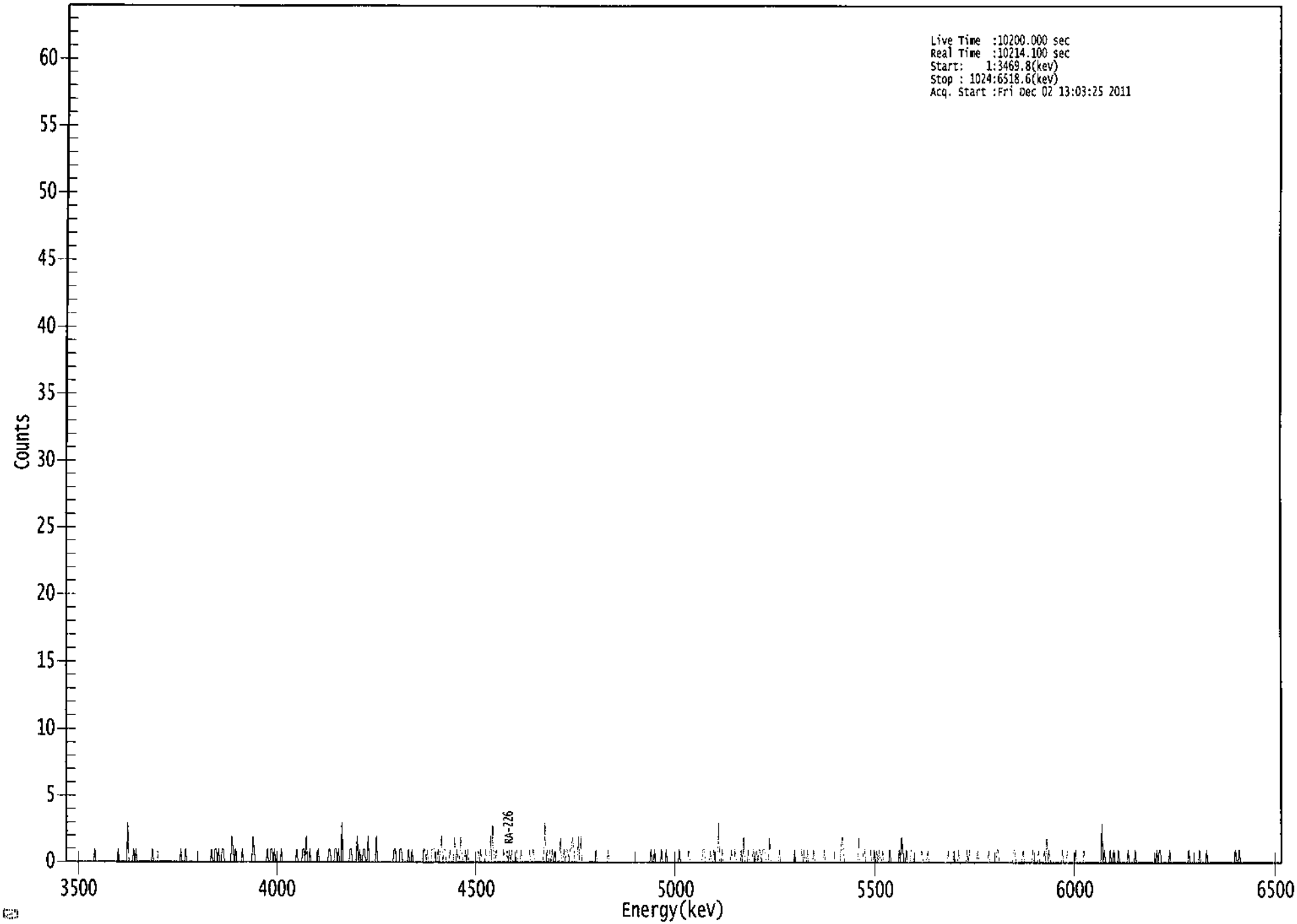
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.817	24.81	40.44	1.19	0.00E+000	3.0
RN-222	5.275	42.98	30.31	1.02	0.00E+000	3.0
RA-226	4.584	59.96	25.81	2.04	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.978	6003.00*	1.23E+000 +/- 4.98E-001	3.26E-001 +/- 1.03E-002
RN-222	0.971	5490.00*	2.13E+000 +/- 6.48E-001	3.12E-001 +/- 9.81E-003
RA-226	0.974	4785.00*	2.96E+000 +/- 7.71E-001	3.85E-001 +/- 1.21E-002

AG
12/3/11

0000011175.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10214

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	1	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	1	0	0	0
49:	0	0	0	0	3	0	0	0
57:	0	1	0	1	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	1	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	1	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	1	0	0	1	1
129:	0	1	0	0	1	1	0	0
137:	0	0	0	0	2	1	0	1
145:	0	0	0	0	0	1	0	0
153:	0	0	0	0	0	0	2	1
161:	0	0	0	0	0	0	0	0
169:	0	0	1	0	0	1	1	0
177:	1	0	0	0	0	0	1	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	1	0	0	0	0
201:	1	1	0	2	0	0	1	0
209:	0	0	0	0	0	1	0	0
217:	0	0	0	0	0	0	1	1
225:	0	0	0	1	1	0	1	0
233:	0	3	0	0	0	0	0	0
241:	1	1	0	0	0	0	2	0
249:	1	0	0	1	1	0	0	2
257:	0	0	0	0	0	0	2	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	1	1	0
281:	0	0	1	1	0	0	0	0
289:	0	1	0	0	1	0	0	0
297:	0	0	0	0	0	0	1	1
305:	0	1	0	0	0	1	1	1
313:	0	0	1	0	1	2	0	1
321:	1	0	0	0	1	0	0	0
329:	2	0	1	0	0	2	1	0
337:	0	1	0	1	0	0	0	0
345:	0	0	0	0	1	0	1	0
353:	0	0	1	0	0	0	2	0
361:	3	0	0	1	0	0	0	0

369:	0	1	0	0	1	0	1	0

Sample Title: 03

Channel								
377:	1	0	0	1	1	0	0	0
385:	1	0	0	0	0	0	0	1
393:	0	0	1	0	0	0	0	0
401:	0	0	0	1	3	0	1	0
409:	1	0	1	0	1	0	0	0
417:	0	2	0	0	1	0	1	1
425:	0	1	1	2	1	0	0	0
433:	2	0	2	0	0	0	0	0
441:	0	0	0	0	0	0	0	1
449:	0	0	0	0	0	0	0	0
457:	0	1	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	1	0	0
497:	1	0	0	0	0	0	1	0
505:	0	0	1	0	0	0	0	0
513:	0	0	0	0	0	1	0	0
521:	0	0	0	0	0	1	0	0
529:	0	0	0	0	0	0	0	0
537:	0	1	1	0	0	0	0	1
545:	0	0	1	0	0	0	3	0
553:	0	1	0	0	0	0	0	0
561:	0	1	0	0	1	0	0	0
569:	0	1	0	2	0	0	0	1
577:	0	0	0	1	0	0	1	0
585:	1	1	0	1	1	1	0	0
593:	0	2	0	0	0	0	0	0
601:	0	1	0	0	0	0	0	0
609:	0	0	0	0	0	0	1	0
617:	0	0	0	0	1	0	1	0
625:	0	1	0	0	0	0	1	0
633:	0	0	0	0	0	0	0	1
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	1	2	1
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	2	0	0	0
673:	1	1	0	0	0	0	1	0
681:	0	1	0	1	0	1	0	0
689:	1	0	0	0	0	0	1	0
697:	0	0	0	0	0	0	1	0
705:	2	1	0	0	1	0	0	0
713:	1	1	0	0	0	0	0	0
721:	0	1	0	0	0	0	1	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	1
745:	0	0	0	0	1	0	0	0
753:	1	0	0	0	0	0	0	1
761:	0	1	0	0	0	0	0	0
769:	1	0	0	0	0	0	0	0
777:	0	1	0	0	0	0	0	0
785:	1	1	0	0	0	0	0	0
793:	0	0	0	0	0	0	1	1

801:	0	0	0	0	0	0	1	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	1	0
817:	0	0	0	1	0	0	0	0
825:	1	0	2	0	1	0	0	0
833:	0	0	0	0	0	0	0	1
841:	0	0	0	1	0	0	0	0
849:	0	0	1	0	0	0	0	0
857:	0	1	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	3	0	1	0	0	0	0	1
881:	0	0	1	0	0	0	1	0
889:	0	0	0	0	0	0	1	0
897:	0	0	0	0	1	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	1	0
921:	1	1	0	0	0	0	0	0
929:	0	1	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	1	0	0	0	0	0	0
953:	0	0	1	0	0	0	0	0
961:	1	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	1	0	0	1	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	1

ICB 12/2/14

Apex-Alpha™

Sample Description: BKG-4
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011174.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 10020
Reagent Blank: <not performed>

Sample Size: 1.014E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.960E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:26 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9962 +/- 0.0000
Counting Efficiency: 0.1900 +/- 0.0030 on 8/30/2011 7:35:05 PM
Effective Efficiency: 0.1893 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

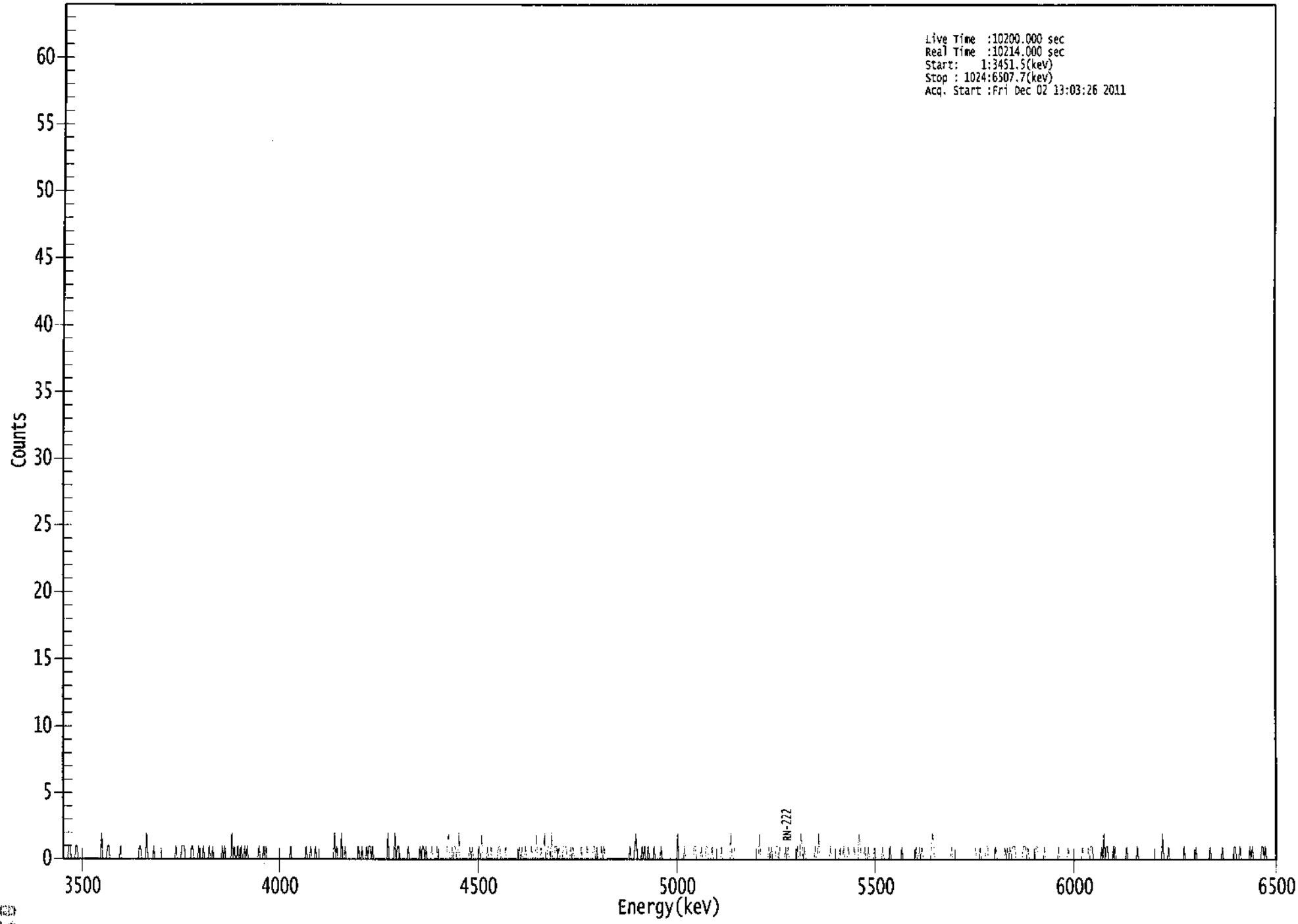
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.816	29.13	37.65	1.87	0.00E+000	6.0
RN-222	5.281	39.32	31.57	0.68	0.00E+000	3.0
RA-226	4.609	47.32	28.73	0.68	0.00E+000	4.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.978	6003.00*	1.19E+000 +/- 4.50E-001	3.10E-001 +/- 9.70E-003
RN-222	0.972	5490.00*	1.61E+000 +/- 5.10E-001	2.31E-001 +/- 7.23E-003
RA-226	0.980	4785.00*	1.93E+000 +/- 5.59E-001	2.31E-001 +/- 7.22E-003

AG
12/3/11

0000011174.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10214

Channel								
1:	0	0	0	0	0	1	1	0
9:	0	0	0	1	1	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	2	0	0	0	0	1	1
41:	0	0	0	0	0	0	0	0
49:	0	1	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	1	1	0	0	0	0	2
73:	0	0	0	0	0	1	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	1	0	0	0	0	1	1	1
105:	0	0	0	0	0	1	1	0
113:	0	0	0	1	0	0	0	1
121:	0	0	0	0	1	0	0	1
129:	0	0	0	0	0	0	0	1
137:	0	1	0	0	0	0	0	2
145:	0	1	0	0	1	0	0	1
153:	0	0	1	0	1	0	0	0
161:	0	0	0	0	0	0	1	0
169:	0	0	1	0	1	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	1	0	0	0	0	0	0
201:	0	0	0	0	0	0	1	0
209:	0	0	1	0	0	0	1	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	2	0
233:	1	0	0	0	2	0	0	1
241:	0	0	0	0	0	0	0	0
249:	0	0	1	0	0	1	0	0
257:	0	1	0	1	1	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	2	0	0	0	0
281:	0	2	0	1	1	0	0	0
289:	0	0	0	0	1	0	0	0
297:	0	0	0	0	0	0	1	0
305:	1	1	0	1	0	0	0	0
313:	1	0	0	0	1	0	0	0
321:	0	0	0	0	0	1	2	0
329:	0	1	0	1	1	0	0	2
337:	0	0	0	0	0	0	0	0
345:	1	0	1	0	0	0	0	0
353:	1	0	2	0	0	0	0	1
361:	0	0	1	0	0	0	0	0

369:	1	1	0	0	0	0	1	0

Sample Title: 04

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	1	0	1	0	0	1
393:	0	0	0	0	1	0	0	0
401:	2	0	0	0	1	0	0	2
409:	0	0	1	1	0	2	0	0
417:	1	1	0	1	0	0	0	1
425:	1	1	0	0	0	1	0	1
433:	0	0	0	0	0	0	1	0
441:	0	0	0	1	0	0	0	0
449:	1	1	0	1	0	0	0	1
457:	0	1	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	1
481:	0	0	0	1	2	0	0	0
489:	0	1	0	1	0	0	1	0
497:	0	0	0	1	0	0	0	0
505:	0	1	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	2
521:	0	0	0	0	0	1	0	0
529:	0	0	0	0	0	1	1	0
537:	0	0	0	1	0	0	0	1
545:	1	0	0	0	1	0	0	0
553:	0	0	0	0	1	0	0	0
561:	0	0	0	0	2	0	0	1
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	2	0	0	0
593:	0	0	0	0	1	0	1	0
601:	0	0	1	1	0	1	0	0
609:	0	0	1	0	1	0	0	0
617:	0	0	0	0	1	0	0	2
625:	1	0	1	0	0	0	0	0
633:	0	0	0	1	0	0	2	0
641:	0	0	0	0	0	0	0	0
649:	1	0	0	0	0	0	0	0
657:	1	0	0	1	0	0	0	1
665:	0	0	0	0	1	0	0	0
673:	2	1	0	0	0	1	0	0
681:	1	0	0	0	0	1	0	0
689:	0	0	0	0	1	0	0	0
697:	0	0	1	0	0	0	0	0
705:	0	0	0	0	1	0	0	0
713:	0	0	0	0	0	0	0	0
721:	1	0	0	1	0	1	0	0
729:	0	0	0	0	0	1	2	1
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	1	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	1	0	0	0	1	0
777:	0	0	0	1	1	0	0	0
785:	0	0	0	1	0	0	0	0
793:	0	0	0	1	0	1	0	1

801:	0	1	1	1	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	1	1	1	0	1	0
817:	0	0	0	0	0	1	1	0
825:	0	0	0	0	1	0	0	0
833:	0	0	0	0	0	0	0	0
841:	1	0	0	0	0	0	0	0
849:	1	0	0	0	0	0	0	0
857:	0	0	0	0	1	0	0	0
865:	0	1	0	1	1	0	0	0
873:	0	0	0	0	1	0	2	0
881:	1	1	0	0	0	0	1	1
889:	0	0	0	0	0	0	0	0
897:	0	1	0	0	0	0	0	0
905:	0	0	1	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	2
929:	0	0	0	0	1	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	1	0	0	0	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	0	0	1
969:	0	0	0	0	0	0	0	0
977:	0	1	0	0	0	0	0	0
985:	0	0	0	1	1	0	0	0
993:	1	0	0	0	0	0	0	0
1001:	1	0	1	0	0	0	0	0
1009:	0	0	1	1	0	1	0	0
1017:	0	0	0	0	0	0	0	0

WB 12/2/14

Apex-Alpha™

Sample Description: BKG-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011176.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 10021
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.940E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:28 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.2 minutes

Chem. Recovery Factor: 0.9585 +/- 0.0000
Counting Efficiency: 0.2025 +/- 0.0032 on 8/30/2011 7:35:03 PM
Effective Efficiency: 0.1941 +/- 0.0031

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

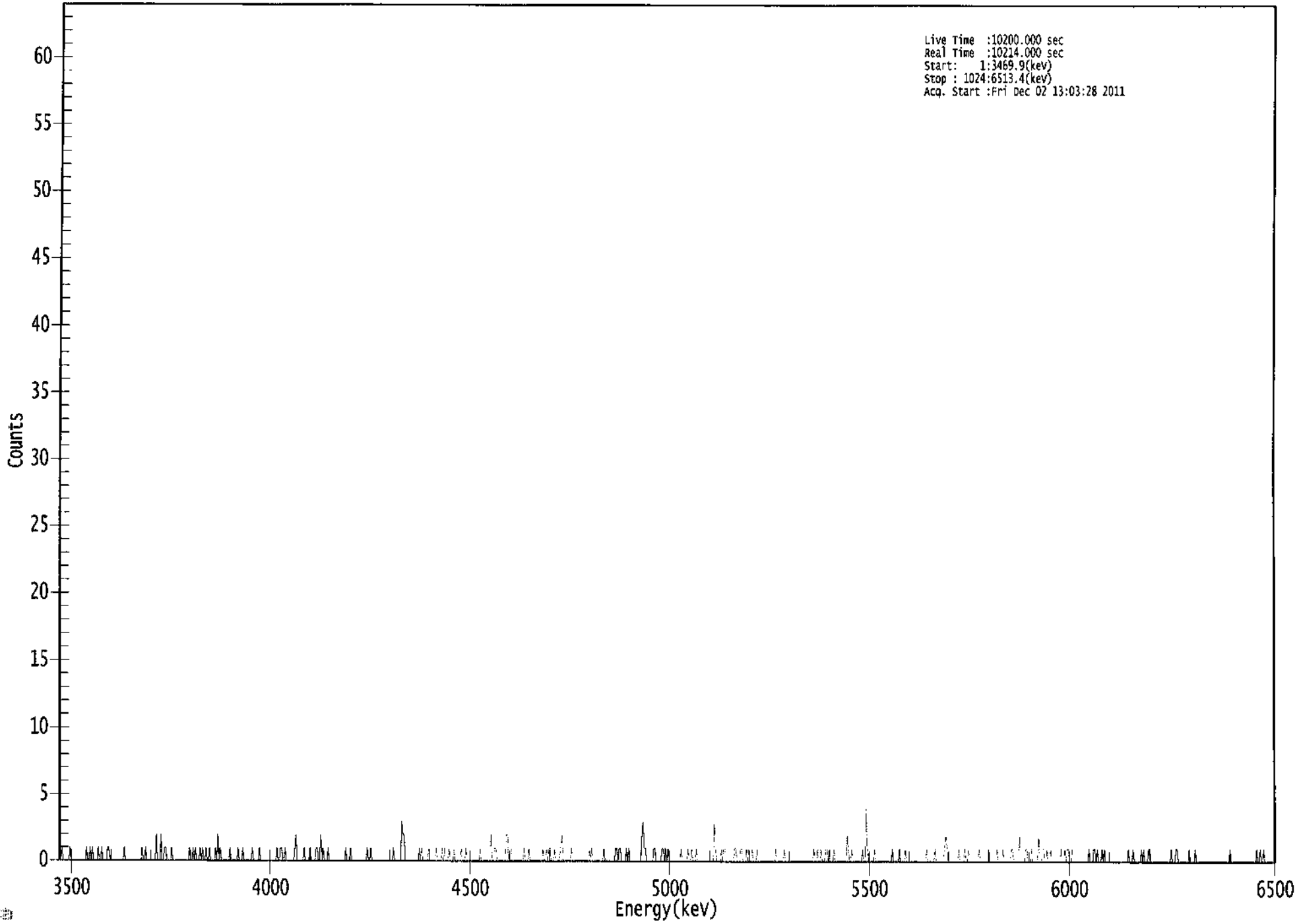
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.840	31.49	35.26	0.51	0.00E+000	6.0
RN-222	5.284	38.15	32.14	0.85	0.00E+000	3.5
RA-226	4.588	33.83	33.80	0.17	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.983	6003.00*	1.25E+000 +/- 4.44E-001	2.09E-001 +/- 6.54E-003
RN-222	0.973	5490.00*	1.52E+000 +/- 4.91E-001	2.39E-001 +/- 7.46E-003
RA-226	0.976	4785.00*	1.35E+000 +/- 4.57E-001	1.66E-001 +/- 5.20E-003

AG
12/3/11

0000011176.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10214

Channel								
1:	0	0	1	0	0	0	0	0
9:	0	1	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	1
25:	0	0	1	0	1	0	0	0
33:	0	1	0	0	1	0	0	0
41:	0	1	1	0	0	0	0	0
49:	0	0	0	0	0	0	0	1
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	1	0
73:	0	1	0	0	0	0	0	0
81:	0	0	2	0	0	0	2	0
89:	0	1	1	0	0	0	0	1
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	1	0
113:	0	1	0	1	0	0	0	1
121:	0	1	0	0	1	0	0	1
129:	0	0	0	0	1	0	2	0
137:	1	0	0	0	0	0	0	0
145:	1	0	0	0	0	0	0	1
153:	0	0	0	1	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	0	1	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	1	0	0	1	1	0	0	1
193:	0	0	0	0	0	0	0	1
201:	2	0	0	0	0	0	0	1
209:	0	0	0	0	1	0	0	0
217:	0	1	1	0	0	2	0	1
225:	0	0	0	1	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	1	0	0	0	1	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	1	0	0	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	1	0	0	0	0	0
289:	0	3	2	2	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	1	0	1	0	0	0	0	0
313:	1	0	0	0	0	0	1	0
321:	0	0	0	1	0	1	0	0
329:	0	1	0	0	0	1	0	0
337:	0	0	0	1	0	0	0	1
345:	0	0	0	0	0	0	0	0
353:	0	0	0	1	0	0	0	0
361:	0	0	0	0	2	0	0	1

369:	1	0	0	0	0	0	0	0

Sample Title: 05

Channel								
377:	0	2	2	0	1	1	0	0
385:	0	0	0	0	0	0	0	0
393:	1	0	0	0	1	0	0	0
401:	0	0	0	0	0	0	0	0
409:	1	0	0	1	0	1	1	0
417:	0	0	1	0	0	0	0	1
425:	2	0	0	0	0	0	0	0
433:	1	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	1	0	0	0	0	0	0
457:	0	0	0	1	0	0	0	0
465:	0	0	0	0	0	1	1	0
473:	1	1	0	0	0	0	1	0
481:	1	0	0	0	0	0	0	0
489:	0	0	0	2	3	1	1	0
497:	0	0	0	0	0	1	1	0
505:	0	0	0	0	1	1	0	1
513:	0	1	0	0	0	0	0	0
521:	0	0	0	0	1	0	0	0
529:	0	0	1	0	0	1	0	0
537:	0	1	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	3	1	0	0	0	0	1	0
561:	1	1	0	0	0	0	0	0
569:	0	1	1	0	0	0	1	1
577:	0	0	0	1	0	1	0	0
585:	1	0	0	0	1	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	1	0	0	0
609:	0	0	0	1	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	1	0	0	1
641:	0	0	1	0	0	0	1	1
649:	0	1	0	0	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	2	1	0	0	1	0	0	0
673:	0	0	0	0	0	1	0	0
681:	4	1	0	0	0	0	0	1
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	1	0
705:	0	0	0	0	1	0	0	0
713:	0	1	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	1	0	0	0	0
737:	0	0	1	0	0	0	0	0
745:	0	0	1	2	1	0	0	0
753:	0	0	0	0	0	0	1	0
761:	0	0	0	1	0	0	1	0
769:	0	0	0	0	0	0	0	1
777:	0	0	0	0	0	0	0	1
785:	0	0	0	0	0	0	1	0
793:	0	0	0	1	0	0	0	0

801:	0	0	1	1	0	0	0	0

Sample Title: 05

Channel								
809:	0	2	0	0	0	0	1	1
817:	0	0	0	1	0	0	0	0
825:	0	2	0	0	1	1	0	0
833:	1	0	0	1	0	0	0	0
841:	0	0	0	0	1	0	0	1
849:	0	1	1	0	0	1	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	1	0	0	0	1
873:	1	0	1	0	0	0	1	0
881:	1	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	1	0	0	0
905:	1	0	0	0	0	0	0	1
913:	0	1	0	0	0	1	1	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	1	0	0	0	1	1	0	0
945:	0	0	0	0	0	0	0	1
953:	0	0	0	0	1	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	1	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	1
1009:	0	0	1	0	0	1	0	0
1017:	0	0	0	0	0	0	0	0

RB
12/2/14

Apex-Alpha™

Sample Description: BKG-5C
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011155.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 10022
Reagent Blank: <not performed>

Sample Size: 1.006E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.890E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:30 PM
Acquisition Live Time: 45.1 minutes
Acquisition Real Time: 45.2 minutes

Chem. Recovery Factor: 0.9206 +/- 0.0000
Counting Efficiency: 0.1937 +/- 0.0031 on 8/30/2011 7:35:02 PM
Effective Efficiency: 0.1783 +/- 0.0029

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

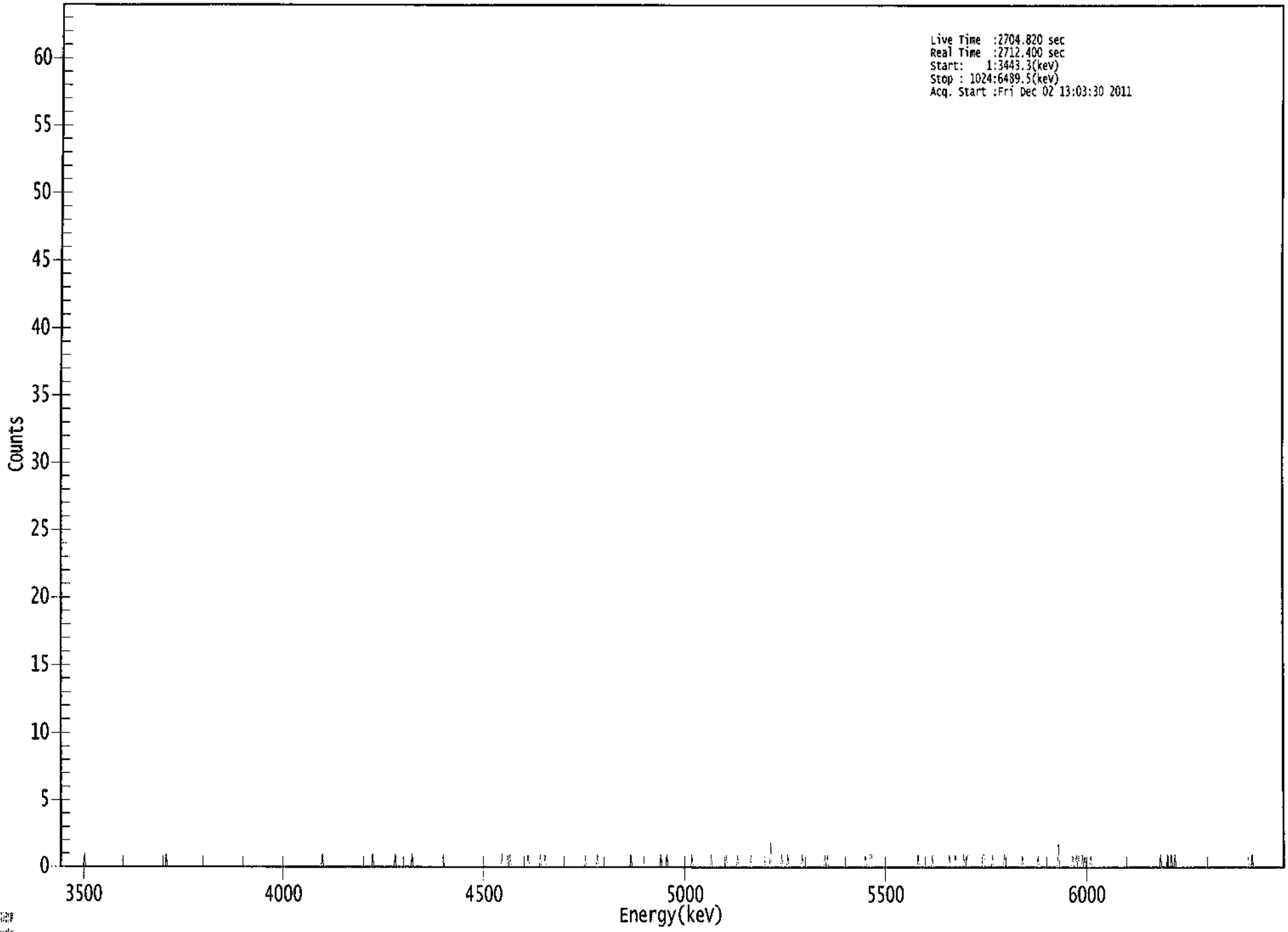
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.824	19.86	44.13	0.14	0.00E+000	3.0
RN-222	5.253	14.73	51.56	0.27	0.00E+000	3.0
RA-226	4.612	8.91	66.01	0.09	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.980	6003.00*	3.20E+000 +/- 1.42E+000	6.35E-001 +/- 1.99E-002
RN-222	0.965	5490.00*	2.37E+000 +/- 1.23E+000	7.18E-001 +/- 2.25E-002
RA-226	0.981	4785.00*	1.43E+000 +/- 9.48E-001	5.98E-001 +/- 1.88E-002

AG
12/3/11

0000011155.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 06

Elapsed Live time: 2705
Elapsed Real Time: 2712

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	1	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	1	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	1	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	1
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	1	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	1	0	0	0	0	1

Sample Title: 06

Channel								
377:	0	1	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	1	0	0	0	0	0	0	0
401:	0	0	1	0	0	0	1	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	1	0	0	0	0	0	0	0
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	1
505:	0	0	0	0	1	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	1	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	0	0	1	0
561:	0	0	0	0	0	0	0	1
569:	0	0	0	0	0	0	0	0
577:	0	0	1	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	2	0	0	0	0
601:	0	0	0	0	1	0	0	0
609:	0	1	0	0	0	0	0	0
617:	0	0	0	0	0	1	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	1	0	1	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	1	0	0	0	1	1
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	1	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	1	0	0	0	0	1	0	0
753:	0	0	0	0	1	0	0	1
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	1	1	0	0
777:	0	0	0	0	1	0	0	0
785:	0	0	0	0	0	0	1	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	1	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	1	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	2	0	0	0	0
841:	0	0	0	0	0	0	0	1
849:	0	0	1	0	1	0	0	1
857:	0	1	0	0	0	0	1	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	1	0	0	0	0	0	1	0
929:	0	1	0	0	1	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	1	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

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12/2/14

Apex-Alpha™

Sample Description: BKG-5N
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011171.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 10023
Reagent Blank: <not performed>

Sample Size: 1.013E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.910E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:31 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1901 +/- 0.0030 on 8/30/2011 7:35:01 PM
Effective Efficiency: 0.1901 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

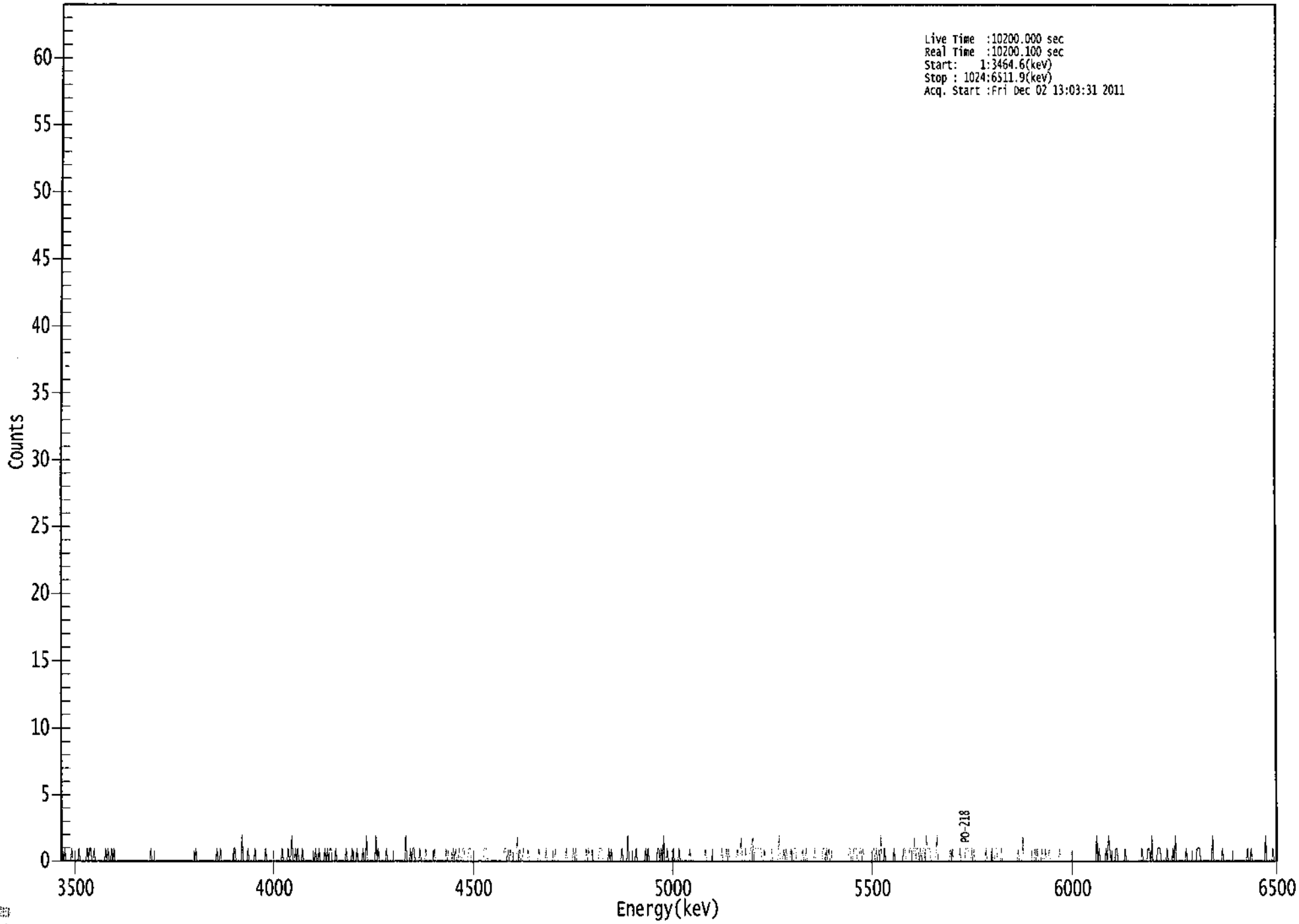
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.736	38.15	32.14	0.85	0.00E+000	3.0
RN-222	5.304	50.00	27.99	0.00	0.00E+000	3.0
RA-226	4.595	37.00	32.65	0.00	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.955	6003.00*	1.53E+000 +/- 4.93E-001	2.40E-001 +/- 7.53E-003
RN-222	0.978	5490.00*	2.00E+000 +/- 5.64E-001	2.40E-001 +/- 7.54E-003
RA-226	0.977	4785.00*	1.48E+000 +/- 4.86E-001	2.40E-001 +/- 7.54E-003

AG
12/3/11

0000011171.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	1	0	1	0	0	0	0
9:	0	1	0	0	0	0	0	1
17:	0	0	0	0	0	0	1	0
25:	1	1	0	0	1	0	0	0
33:	0	0	0	0	0	0	1	0
41:	1	0	0	1	0	1	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	1	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	1	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	1	0	0	1
137:	0	0	0	0	0	0	0	0
145:	0	0	1	1	0	0	0	0
153:	0	2	0	0	0	0	1	0
161:	0	0	0	0	1	0	0	0
169:	0	0	0	0	0	1	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	1	0	0	0	0
193:	1	0	0	2	0	0	1	0
201:	1	0	0	0	1	0	0	0
209:	0	0	0	0	0	0	0	1
217:	0	0	1	0	0	0	0	1
225:	0	1	0	1	1	0	0	0
233:	1	0	0	0	0	0	0	0
241:	0	1	0	0	0	0	1	0
249:	0	0	1	0	0	0	0	1
257:	0	0	2	0	0	0	0	0
265:	0	0	2	0	1	0	0	0
273:	0	0	0	1	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	2	0	0	0	1
297:	0	1	1	0	0	0	0	1
305:	0	0	0	0	1	0	0	0
313:	0	0	0	1	0	0	0	0
321:	0	0	0	0	0	1	0	1
329:	1	1	0	1	0	1	0	0
337:	1	0	0	1	1	0	0	0
345:	1	1	0	0	0	0	0	0
353:	0	0	0	0	0	1	1	1
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	1	1

Sample Title: 07

Channel								
377:	0	1	0	1	0	0	0	0
385:	0	2	0	1	0	0	1	0
393:	0	0	1	0	0	0	0	0
401:	0	0	0	1	0	0	0	0
409:	0	1	0	0	0	0	0	0
417:	0	1	0	0	0	0	0	0
425:	0	0	1	0	0	0	0	0
433:	1	0	1	0	0	0	0	0
441:	0	0	0	1	0	1	0	0
449:	1	0	0	0	0	0	1	1
457:	1	0	0	0	0	0	1	0
465:	1	0	0	0	0	0	0	0
473:	0	1	0	0	0	0	2	0
481:	0	0	0	0	0	1	0	0
489:	0	0	0	0	0	1	0	1
497:	0	0	0	0	0	0	0	1
505:	1	0	1	0	2	0	0	1
513:	0	0	0	0	1	0	0	0
521:	0	1	0	0	0	0	0	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	0	0	0	1	0	0
553:	0	0	0	0	0	1	0	0
561:	0	1	0	1	0	0	0	0
569:	0	0	1	0	0	2	0	0
577:	0	1	0	0	0	1	1	2
585:	0	1	1	1	1	1	1	0
593:	0	1	0	0	0	0	0	1
601:	0	0	0	0	0	2	0	0
609:	0	1	0	1	0	0	0	1
617:	0	0	1	1	0	0	0	0
625:	0	1	0	0	1	0	0	0
633:	0	0	0	1	0	0	0	0
641:	0	0	1	1	0	1	0	1
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	1	1	0	0	1	1	1	0
673:	0	1	1	0	1	0	0	0
681:	0	0	0	0	1	1	0	1
689:	0	1	0	2	0	0	1	0
697:	0	0	0	0	0	0	1	0
705:	0	0	0	0	0	0	1	1
713:	0	0	0	1	1	0	0	2
721:	0	1	1	0	1	0	1	1
729:	0	2	1	1	1	0	0	0
737:	0	0	2	0	0	0	0	0
745:	0	0	0	0	0	1	0	1
753:	0	0	0	0	0	1	0	0
761:	0	0	1	1	1	0	0	1
769:	0	1	0	0	0	0	0	0
777:	0	0	0	1	0	0	0	0
785:	1	0	0	1	1	0	0	0
793:	1	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	1	0

Sample Title: 07

Channel								
809:	0	0	2	0	0	0	0	0
817:	0	0	0	0	1	0	1	0
825:	0	0	1	0	0	1	0	0
833:	1	0	0	0	0	0	0	0
841:	0	1	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	2	0	1	0	0	0	0	0
881:	1	0	2	1	0	0	0	0
889:	1	1	0	0	0	0	0	0
897:	1	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	1	0
913:	0	0	0	1	1	0	2	0
921:	0	0	0	1	1	1	0	0
929:	0	0	0	1	0	0	0	0
937:	1	0	2	0	0	0	0	0
945:	0	0	0	1	0	0	0	0
953:	0	0	0	0	1	1	1	0
961:	0	0	0	0	0	0	0	0
969:	0	2	0	0	0	0	0	0
977:	0	1	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	1	0
1001:	0	1	0	0	0	0	0	0
1009:	0	0	0	0	0	2	0	0
1017:	0	0	0	1	0	0	0	0

ICB
12/2/11

Apex-Alpha™

Sample Description: BKG-5S
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011170.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 10024
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:33 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1773 +/- 0.0035 on 10/23/2011 12:17:07 PM
Effective Efficiency: 0.1773 +/- 0.0035

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

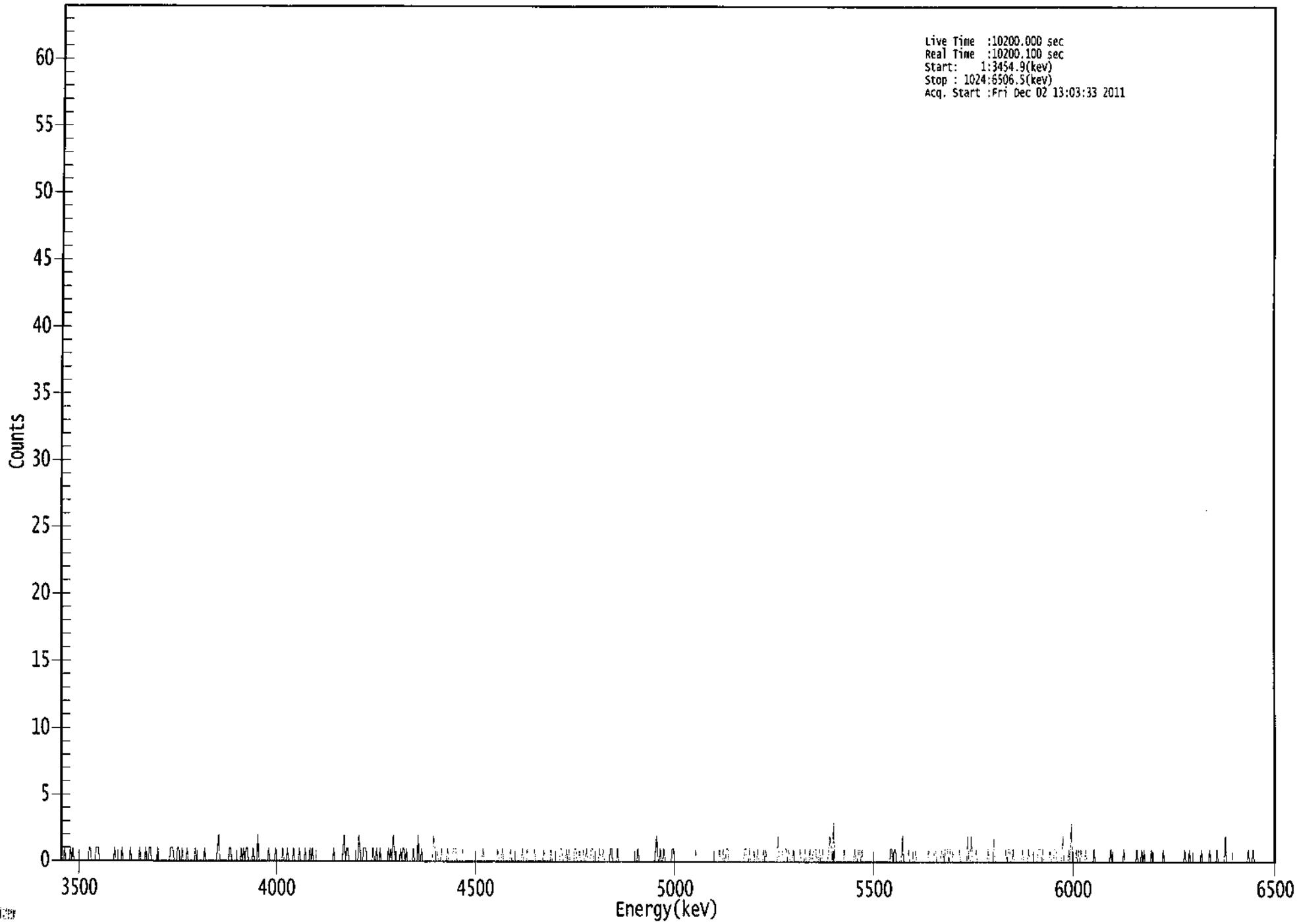
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.831	42.32	30.41	0.68	0.00E+000	3.0
RN-222	5.302	39.00	31.78	0.00	0.00E+000	3.0
RA-226	4.608	32.83	34.31	0.17	0.00E+000	4.5

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.981	6003.00*	1.74E+000 +/- 5.33E-001	2.32E-001 +/- 8.95E-003
RN-222	0.978	5490.00*	1.60E+000 +/- 5.13E-001	2.46E-001 +/- 9.52E-003
RA-226	0.980	4785.00*	1.35E+000 +/- 4.65E-001	1.71E-001 +/- 6.62E-003

AG
12/3/11

0000011170.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	1	0	0	0	0
9:	1	0	1	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	1	1	0	0	0	0	1	1
33:	1	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	1	0	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	1	0	0	0	0
73:	1	0	0	1	1	0	0	0
81:	0	0	1	0	0	0	0	0
89:	0	0	0	0	0	1	1	1
97:	0	0	0	1	1	0	0	1
105:	0	0	0	1	0	0	0	0
113:	0	0	1	0	0	0	0	0
121:	0	0	1	0	0	0	0	0
129:	0	0	0	0	0	1	2	0
137:	0	0	0	0	0	0	0	1
145:	1	0	0	0	0	0	0	0
153:	0	1	0	1	0	1	1	0
161:	0	0	0	1	0	0	0	2
169:	0	0	0	0	0	0	0	0
177:	1	0	0	0	0	0	1	0
185:	0	0	0	0	1	0	0	0
193:	1	0	0	0	0	1	0	0
201:	0	0	1	0	0	0	0	1
209:	0	0	0	1	0	1	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	1
233:	0	0	0	0	0	0	0	1
241:	2	0	1	1	0	0	0	0
249:	0	0	0	0	2	1	0	0
257:	1	1	1	0	0	0	0	0
265:	1	0	0	1	0	0	1	0
273:	0	0	0	0	0	1	0	1
281:	0	2	1	0	0	0	0	1
289:	0	1	1	0	1	0	0	0
297:	0	0	1	0	0	0	2	0
305:	0	1	0	0	0	0	0	0
313:	0	0	0	2	1	1	1	0
321:	0	0	1	0	0	0	0	1
329:	0	0	0	0	1	1	1	0
337:	0	0	0	0	1	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	1	0	0
361:	0	0	0	0	0	0	0	0

369:	0	1	0	0	0	1	0	0

Sample Title: 08

Channel								
377:	0	0	0	0	1	0	0	0
385:	0	0	0	0	0	0	1	0
393:	0	0	1	0	0	0	0	0
401:	1	0	0	0	0	0	0	0
409:	1	0	0	0	0	0	1	0
417:	0	0	0	0	0	0	1	1
425:	0	0	0	1	0	1	0	0
433:	0	0	1	1	0	0	1	0
441:	0	1	0	0	1	0	0	0
449:	1	1	0	0	0	0	0	1
457:	0	0	1	0	0	0	0	0
465:	1	1	0	0	0	0	1	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	1
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	1	2
505:	0	0	1	0	0	1	0	0
513:	0	0	0	0	1	1	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	1	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	1	0	0	1
561:	0	0	1	1	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	1	1	0	0	1	0	0
585:	0	0	0	0	1	0	0	0
593:	0	1	0	1	0	0	0	0
601:	0	0	0	0	0	2	0	0
609:	0	1	1	1	1	0	1	0
617:	0	0	1	0	0	0	0	0
625:	1	0	0	0	1	0	0	0
633:	1	0	0	1	1	1	0	0
641:	1	0	0	1	0	0	0	0
649:	1	2	1	0	3	0	0	0
657:	0	0	0	0	0	1	0	0
665:	0	0	0	0	0	0	1	0
673:	0	1	1	0	1	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	1	1	0	1
705:	1	0	0	0	0	0	2	0
713:	0	0	0	1	0	0	0	0
721:	0	1	0	0	0	0	0	0
729:	0	0	0	0	1	0	0	0
737:	0	1	1	0	0	0	0	1
745:	1	0	1	1	1	0	1	0
753:	0	0	0	0	0	0	1	0
761:	0	0	0	0	0	2	0	0
769:	2	0	0	0	1	0	0	0
777:	0	0	0	0	0	0	1	0
785:	0	0	0	2	0	0	0	0
793:	0	0	0	0	0	1	0	1

801:	1	0	0	1	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	1	0	0	0	0
817:	1	0	0	0	0	0	0	0
825:	1	1	1	0	1	0	0	0
833:	0	0	1	0	0	0	1	1
841:	0	0	0	0	0	2	0	0
849:	0	0	1	0	3	0	0	0
857:	1	0	1	0	1	0	0	0
865:	1	0	0	0	0	0	0	1
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	1	0	0
889:	0	0	0	0	0	0	0	0
897:	1	0	0	0	0	0	0	0
905:	0	0	0	1	0	0	0	1
913:	0	1	0	0	0	0	0	1
921:	0	0	0	0	0	0	0	0
929:	0	1	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	1	0	0	0	1
953:	0	0	0	0	0	0	0	0
961:	0	1	0	0	0	0	0	0
969:	1	0	0	0	0	0	1	0
977:	0	0	0	0	0	2	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	1	0	0	0	1	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB
12/2/14

Apex-Alpha™

Sample Description: BKG-5W
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011173.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 10025
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.870E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:34 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9441 +/- 0.0000
Counting Efficiency: 0.1714 +/- 0.0028 on 8/30/2011 7:34:58 PM
Effective Efficiency: 0.1618 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

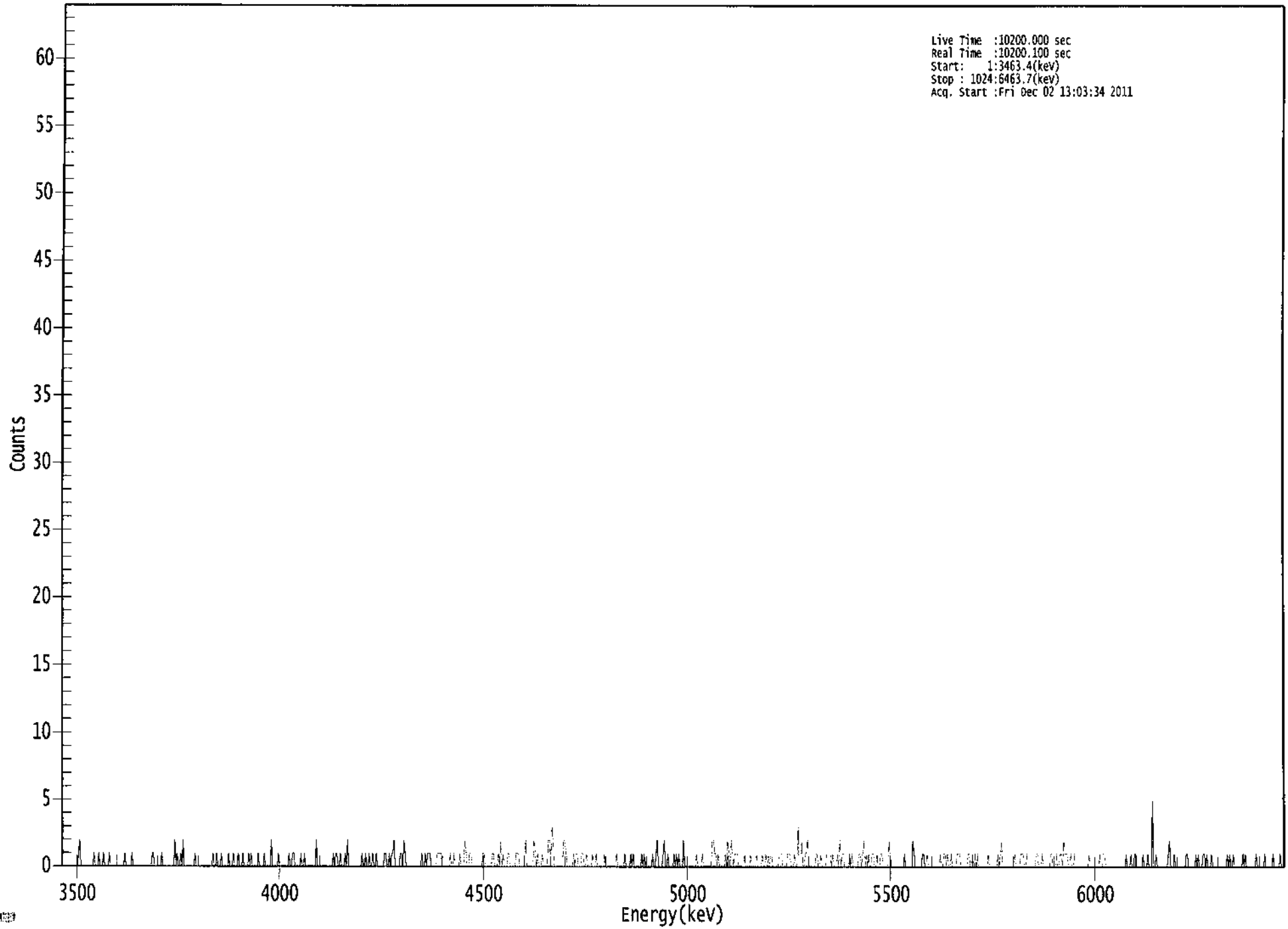
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.811	42.66	30.15	0.34	0.00E+000	4.4
RN-222	5.269	71.83	23.16	0.17	0.00E+000	2.9
RA-226	4.602	56.00	26.42	0.00	0.00E+000	5.1

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	1.98E+000 +/- 6.01E-001	2.22E-001 +/- 7.02E-003
RN-222	0.969	5490.00*	3.34E+000 +/- 7.80E-001	1.94E-001 +/- 6.13E-003
RA-226	0.979	4785.00*	2.60E+000 +/- 6.92E-001	2.79E-001 +/- 8.80E-003

AG
12/3/11

0000011173.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 09

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	1	2
17:	0	0	0	0	0	0	0	0
25:	0	0	0	1	0	0	0	1
33:	0	0	0	1	0	0	0	0
41:	1	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	0	0
57:	0	0	0	1	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	1	1	0	0
81:	0	0	0	0	1	0	0	0
89:	0	0	0	0	0	0	0	2
97:	0	1	0	0	1	0	2	0
105:	0	0	0	0	0	0	0	0
113:	1	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	1
129:	0	0	1	0	0	0	1	0
137:	0	0	0	0	1	0	0	0
145:	1	0	0	0	1	0	0	0
153:	1	0	0	0	0	1	0	1
161:	0	0	0	0	0	1	0	0
169:	0	0	1	0	0	0	0	0
177:	2	0	0	0	0	0	1	0
185:	0	0	0	0	0	0	0	1
193:	0	0	1	1	0	0	0	0
201:	0	1	0	0	1	0	0	0
209:	0	0	0	0	0	0	2	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	1	0	1	1
233:	0	0	1	0	0	0	1	0
241:	2	0	0	0	0	0	0	0
249:	0	0	0	0	1	0	0	1
257:	0	0	1	0	0	1	0	0
265:	1	0	0	0	0	0	0	1
273:	1	0	0	1	0	1	1	2
281:	0	0	0	0	1	1	0	2
289:	1	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	1	0
305:	0	1	0	1	1	1	0	0
313:	0	0	0	1	1	1	1	0
321:	0	0	0	0	0	0	1	0
329:	0	1	0	0	0	0	1	0
337:	0	0	2	1	0	0	1	1
345:	0	0	0	0	0	0	0	0
353:	0	1	1	0	0	0	0	0
361:	0	1	1	0	0	0	1	0

369:	2	0	1	0	0	0	1	1

Sample Title: 09

Channel								
377:	0	0	0	0	0	1	1	1
385:	0	0	0	0	0	2	0	0
393:	0	0	0	0	2	1	0	1
401:	0	0	0	1	0	0	0	0
409:	2	2	0	3	2	0	0	0
417:	0	0	0	0	0	2	2	1
425:	0	0	0	0	0	1	0	1
433:	1	0	0	0	1	1	0	0
441:	1	0	0	0	0	1	0	0
449:	1	0	0	0	0	0	0	1
457:	0	0	0	0	0	0	0	0
465:	0	1	0	0	0	0	0	0
473:	1	0	0	0	0	1	0	1
481:	0	0	0	0	0	0	1	0
489:	1	0	0	0	0	0	0	1
497:	0	0	1	2	0	0	0	0
505:	1	2	0	0	1	0	0	0
513:	0	1	0	1	0	1	0	0
521:	0	2	0	0	0	0	0	0
529:	0	0	0	0	1	0	0	0
537:	0	1	0	0	0	0	0	0
545:	0	2	2	1	1	0	1	0
553:	0	0	0	0	1	0	2	1
561:	0	2	1	0	1	1	1	0
569:	0	0	0	0	1	0	0	0
577:	0	1	0	0	0	0	1	0
585:	0	0	0	1	0	0	1	0
593:	0	0	1	1	0	0	0	0
601:	0	1	1	1	0	0	0	0
609:	1	1	1	0	0	0	1	0
617:	0	3	0	0	2	0	0	1
625:	1	2	0	0	0	0	0	0
633:	1	1	0	0	1	0	0	0
641:	0	1	1	1	1	0	1	0
649:	0	0	1	0	2	0	1	1
657:	0	0	0	0	1	0	1	0
665:	0	0	0	0	1	1	0	1
673:	2	0	1	0	1	0	0	1
681:	1	0	0	1	0	0	1	1
689:	0	0	0	0	0	2	1	0
697:	0	0	0	0	0	0	0	0
705:	0	0	1	0	0	0	0	0
713:	0	2	1	0	0	0	0	0
721:	0	1	1	0	0	1	0	0
729:	0	0	0	0	0	0	0	0
737:	1	0	0	1	1	0	1	0
745:	0	1	0	0	0	0	1	1
753:	1	0	0	0	0	0	0	1
761:	1	0	0	1	0	1	0	1
769:	0	0	0	0	0	0	0	0
777:	1	0	0	0	0	0	0	0
785:	1	0	1	2	0	0	0	0
793:	0	0	0	0	0	0	1	0

801:	0	0	0	1	1	1	0	0

Sample Title: 09

Channel								
809:	1	0	0	0	0	0	0	0
817:	1	1	0	0	0	1	0	0
825:	0	0	0	0	1	1	0	0
833:	0	1	0	0	1	1	0	2
841:	1	1	1	0	0	1	0	0
849:	1	0	0	0	0	0	0	0
857:	0	0	0	0	1	0	0	0
865:	0	0	0	0	0	1	0	0
873:	1	1	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	1	0	0	0	1
897:	0	0	1	1	0	0	0	0
905:	0	1	0	0	0	1	0	0
913:	0	5	0	0	1	0	0	0
921:	0	0	0	0	0	0	1	2
929:	0	0	0	1	0	0	0	0
937:	0	0	0	0	0	1	1	0
945:	0	0	0	0	0	1	0	1
953:	0	0	0	1	1	0	1	0
961:	0	0	1	0	0	0	0	0
969:	0	0	0	0	0	0	0	1
977:	0	1	0	0	1	0	0	0
985:	0	0	0	0	1	0	1	0
993:	0	0	0	0	0	0	0	1
1001:	0	0	0	0	0	0	1	0
1009:	0	0	0	0	0	1	0	0
1017:	0	0	0	1	0	0	1	0

KB
12/2/11

Apex-Alpha™

Sample Description: BKG-5E
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011172.Cnf
Batch Identification: 1111141A-RA
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 10026
Reagent Blank: <not performed>

Sample Size: 1.018E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.840E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/18/2011 12:44:24 PM
Acquisition Date/Time: 12/2/2011 1:03:36 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9288 +/- 0.0000
Counting Efficiency: 0.1651 +/- 0.0027 on 8/30/2011 7:34:57 PM
Effective Efficiency: 0.1534 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

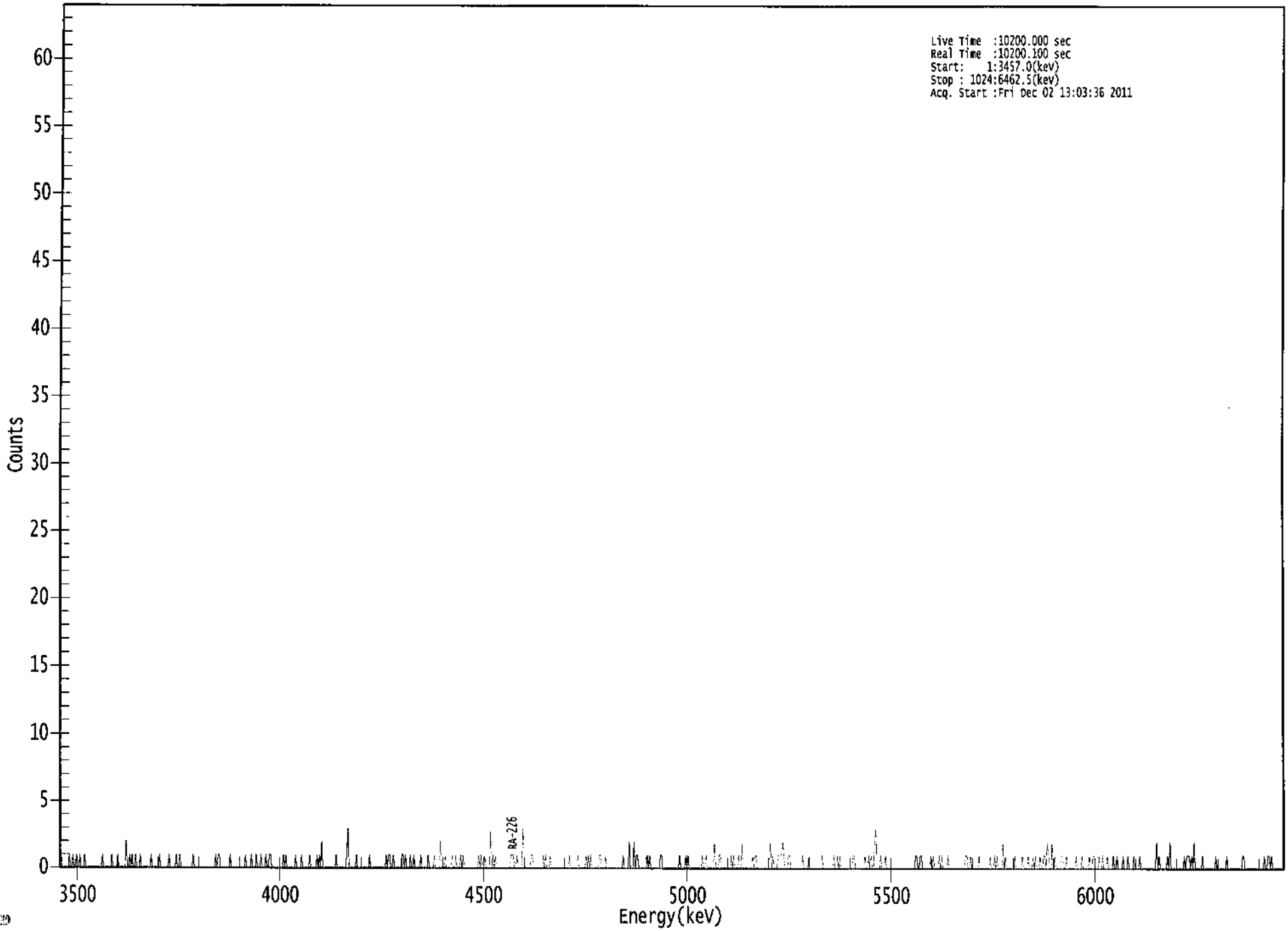
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.833	39.49	31.42	0.51	0.00E+000	2.9
RN-222	5.264	43.47	30.33	1.53	0.00E+000	5.1
RA-226	4.572	35.32	33.35	0.68	0.00E+000	2.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.982	6003.00*	1.90E+000 +/- 6.01E-001	2.53E-001 +/- 8.01E-003
RN-222	0.968	5490.00*	2.10E+000 +/- 6.40E-001	3.43E-001 +/- 1.08E-002
RA-226	0.971	4785.00*	1.70E+000 +/- 5.70E-001	2.72E-001 +/- 8.60E-003

AG
12/3/11

0000011172.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	1	0	0	0	0	0	0
9:	1	0	0	1	0	0	1	0
17:	0	1	0	0	0	1	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	1	0	0	0
41:	0	0	0	0	1	0	0	0
49:	0	1	0	0	0	0	0	0
57:	2	0	0	1	0	1	0	0
65:	1	0	0	0	1	0	0	0
73:	0	0	0	0	0	1	0	0
81:	0	0	0	0	1	0	0	0
89:	0	0	0	0	1	0	0	0
97:	0	0	1	0	0	1	0	0
105:	0	0	0	0	0	0	0	0
113:	1	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	1	0	1	1	0
137:	0	0	0	0	0	0	0	1
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	1	0	0	0
161:	0	1	0	0	0	1	0	0
169:	0	1	0	0	0	1	0	0
177:	1	1	0	0	0	0	0	0
185:	0	0	0	0	1	0	1	0
193:	0	0	0	0	0	0	1	0
201:	0	0	0	1	0	0	0	0
209:	0	0	1	0	0	0	0	0
217:	1	0	1	0	2	0	0	0
225:	0	0	0	0	0	0	0	0
233:	1	0	0	0	0	0	0	0
241:	0	1	3	0	0	0	0	0
249:	0	1	0	0	0	0	0	0
257:	0	0	0	0	1	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	1	0	1	1	0	0
281:	1	0	0	0	0	0	0	1
289:	1	0	1	0	0	0	1	0
297:	0	1	0	0	0	0	0	1
305:	0	0	0	0	0	1	0	0
313:	0	0	1	0	0	0	0	2
321:	0	0	0	1	0	0	0	0
329:	0	1	0	0	1	0	0	0
337:	1	0	1	0	0	0	0	0
345:	0	0	0	0	0	0	0	1
353:	0	1	0	0	1	0	0	0
361:	0	3	0	1	0	1	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
377:	0	0	1	1	1	0	0	1
385:	0	0	0	0	3	1	0	0
393:	0	0	0	1	1	0	0	0
401:	0	0	0	0	0	1	0	1
409:	0	0	0	1	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	1	0	0	0	0
433:	0	0	1	0	0	0	0	0
441:	0	1	0	1	0	1	0	0
449:	0	0	0	0	1	1	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	1	0	0	0	0	2	0	0
481:	0	2	0	1	1	0	0	0
489:	0	0	0	0	1	0	1	0
497:	0	0	0	0	0	0	0	1
505:	1	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	1
521:	0	0	0	0	1	0	1	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	0	0	1	0	0
545:	0	0	0	0	2	0	0	0
553:	1	1	0	0	0	0	0	0
561:	0	0	1	0	1	0	0	0
569:	1	0	0	2	0	0	0	0
577:	0	0	0	0	1	0	1	1
585:	0	0	0	0	0	0	0	0
593:	0	0	1	2	0	1	0	0
601:	0	1	1	1	1	2	1	0
609:	0	0	1	1	0	0	0	0
617:	0	0	0	0	0	0	1	0
625:	0	0	0	1	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	1	0	0	1	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	1	1	0	0	0	0	0	0
673:	0	0	1	0	0	1	0	1
681:	0	0	2	3	0	0	0	1
689:	0	0	0	1	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	1	1	0	0
721:	1	1	0	0	0	0	0	0
729:	0	1	0	1	0	0	0	0
737:	1	0	1	0	0	0	0	1
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	1	1
761:	0	0	1	0	0	0	0	0
769:	0	1	0	0	0	0	0	0
777:	0	0	1	0	0	0	1	0
785:	1	0	0	0	0	2	0	1
793:	0	0	0	0	0	0	0	1

801:	0	0	0	0	0	1	0	0

Sample Title: 10

Channel								
809:	0	0	1	0	0	0	1	0
817:	1	0	0	0	1	0	0	1
825:	1	0	2	1	0	0	2	0
833:	1	0	0	0	0	0	1	1
841:	0	0	1	0	0	0	0	0
849:	0	0	1	0	0	0	0	1
857:	0	0	0	0	0	1	0	0
865:	1	1	0	0	0	1	0	0
873:	1	0	0	0	1	0	0	0
881:	0	1	0	0	1	0	0	0
889:	0	1	0	0	0	1	0	0
897:	0	0	1	0	0	0	0	1
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	2	0	1
921:	0	0	0	0	0	0	1	0
929:	2	0	0	0	0	0	0	0
937:	0	0	0	0	1	0	1	1
945:	1	0	1	0	2	0	0	0
953:	0	0	0	1	0	0	0	0
961:	0	0	0	0	0	0	1	0
969:	0	0	0	0	0	0	0	1
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	1	1	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	1	0
1009:	0	1	1	0	1	0	0	0
1017:	0	0	0	0	0	0	0	0

12/2/2011 5:40:57 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 12/2/2011
Time : 5:40:57 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	12/2/2011 5:26:50 AM
Alpha_010	AIM21F	ALL	Passed	12/2/2011 5:26:51 AM
Alpha_011	AIM21F	ALL	Passed	12/2/2011 5:26:52 AM
Alpha_012	AIM21F	ALL	Passed	12/2/2011 5:26:53 AM
Alpha_013	AIM21F	ALL	Passed	12/2/2011 5:26:54 AM
Alpha_014	AIM21F	ALL	Passed	12/2/2011 5:26:54 AM
Alpha_015	AIM21F	ALL	Passed	12/2/2011 5:26:55 AM
Alpha_017	AIM730	ALL	Passed	12/2/2011 5:26:56 AM
Alpha_020	AIM730	ALL	Passed	12/2/2011 5:26:57 AM
Alpha_021	AIM730	ALL	Passed	12/2/2011 5:26:58 AM
Alpha_022	AIM730	ALL	Passed	12/2/2011 5:26:59 AM
Alpha_023	AIM730	ALL	Passed	12/2/2011 5:26:59 AM
Alpha_024	AIM730	ALL	Passed	12/2/2011 5:27:00 AM
Alpha_025	AIM730	ALL	Passed	12/2/2011 5:27:01 AM
Alpha_026	AIM730	ALL	Passed	12/2/2011 5:27:02 AM
Alpha_028	AIM730	Peak FWHM	Action	12/2/2011 5:27:03 AM
Alpha_029	AIM730	ALL	Passed	12/2/2011 5:27:04 AM
Alpha_030	AIM730	ALL	Passed	12/2/2011 5:27:04 AM
Alpha_031	AIM730	ALL	Passed	12/2/2011 5:27:05 AM
Alpha_033	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:07 AM
Alpha_034	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:08 AM
Alpha_035	Alpha Analyst100DC	ALL	Not Done	
Alpha_036	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:11 AM
Alpha_037	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:12 AM
Alpha_038	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:14 AM
Alpha_039	Alpha Analyst100DC	Peak Energy	Action	12/2/2011 5:27:15 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:17 AM
Alpha_041	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:18 AM
Alpha_042	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:20 AM
Alpha_043	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:21 AM
Alpha_044	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:23 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:25 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:26 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:28 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:27:29 AM

APPROVED BY: _____

12/2/11

12/2/2011 6:05:22 AM

Apex-Alpha™

QA SUMMARY REPORT

Review Of QA Results - Pulser Check

ıte : 12/2/2011
ne : 6:05:22 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_035	Alpha Analyst100DC	ALL	Passed	12/2/2011 5:54:50 AM

APPROVED BY: _____

APPROVAL DATE: 12/2/2011

SECTION X

ANALYTICAL DATA (RADIUM-228)

11-11141
Ra228
Run 1

Work Order	11-11141
Analysis Code	Ra228
Run	1
Date Received	11/22/2011
Lab Deadline	12/2/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 904.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1108.473
Carrier	Yttirum
Carrier Conc (mg/ml)	30

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/22/11 00:00	1.0000E+00
02	MBL	BLANK		11/22/11 00:00	1.0000E+00
03	DUP	BKG-4	42	11/18/11 00:00	1.0122E+00
04	DO	BKG-4	42	11/18/11 00:00	1.0138E+00
05	TRG	BKG-5	39	11/18/11 00:00	1.0078E+00
06	TRG	BKG-5C	47	11/18/11 00:00	1.0057E+00
07	TRG	BKG-5N	43	11/18/11 00:00	1.0128E+00
08	TRG	BKG-5S	38	11/18/11 00:00	1.0084E+00
09	TRG	BKG-5W	48	11/18/11 00:00	1.0116E+00
10	TRG	BKG-5E	53	11/18/11 00:00	1.0179E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11141
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9106	1009.4	430.1	94.60	2.000	0.0960	0.1490	0.0530	88.33	83.56	1.00	1.00
02	MBL	0.9099	1008.6	454.7	100.08	2.000	0.0959	0.1503	0.0544	90.67	90.74	1.00	1.00
03	DUP	0.9084	1006.9	398.0	87.75	2.000	0.0961	0.1480	0.0519	86.50	75.90	1.00	1.00
04	DO	0.9093	1007.9	452.3	99.62	2.000	0.0957	0.1463	0.0506	84.33	84.01	1.00	1.00
05	TRG	0.9079	1006.4	434.5	95.85	2.000	0.0961	0.1483	0.0522	87.00	83.39	1.00	1.00
06	TRG	0.9085	1007.0	417.6	92.06	2.000	0.0960	0.1481	0.0521	86.83	79.94	1.00	1.00
07	TRG	0.9086	1007.2	455.3	100.36	2.000	0.0961	0.1488	0.0527	87.83	88.15	1.00	1.00
08	TRG	0.9080	1006.5	470.1	103.69	2.000	0.0963	0.1486	0.0523	87.17	90.38	1.00	1.00
09	TRG	0.9079	1006.4	428.0	94.41	2.000	0.0963	0.1485	0.0522	87.00	82.14	1.00	1.00
10	TRG	0.9067	1005.1	420.5	92.88	2.000	0.0963	0.1486	0.0523	87.17	80.96	1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11141
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
02	MBL			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
03	DUP			11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
04	DO	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
05	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
06	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
07	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
08	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
09	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH
10	TRG	11/23/11 08:43	KSALLINGS	11/23/11 12:12	JBARNARD	12/01/11 11:57	TSMITH	12/09/11 06:33	TSMITH

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/g	7.35E+00	9.66E-01	1.38E+00	8.51E+00	86.35	OK		OK	
02	RA-228	MBL	BLANK	pCi/g	5.84E-01	5.89E-01	1.19E+00					OK	OK
03	RA-228	DUP	BKG-4	pCi/g	1.34E+00	7.53E-01	1.46E+00				NA	OK	
04	RA-228	DO	BKG-4	pCi/g	1.43E+00	6.27E-01	1.17E+00					OK	
05	RA-228	TRG	BKG-5	pCi/g	1.69E+00	6.64E-01	1.22E+00					OK	
06	RA-228	TRG	BKG-5C	pCi/g	2.01E+00	8.19E-01	1.54E+00					OK	
07	RA-228	TRG	BKG-5N	pCi/g	1.92E+00	6.50E-01	1.16E+00					OK	
08	RA-228	TRG	BKG-5S	pCi/g	2.05E+00	6.86E-01	1.25E+00					OK	
09	RA-228	TRG	BKG-5W	pCi/g	1.49E+00	6.77E-01	1.28E+00					OK	
10	RA-228	TRG	BKG-5E	pCi/g	1.24E+00	7.34E-01	1.44E+00					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11141-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	11/22/11 00:00	1.00E+00	94.60	88.33	83.56	1.00	12/1/2011 11:57	12/9/2011 6:33
02	RA-228	MBL	11/22/11 00:00	1.00E+00	100.08	90.67	90.74	1.00	12/1/2011 11:57	12/9/2011 6:33
03	RA-228	DUP	11/18/11 00:00	1.01E+00	87.75	86.50	75.90	1.00	12/1/2011 11:57	12/9/2011 6:33
04	RA-228	DO	11/18/11 00:00	1.01E+00	99.62	84.33	84.01	1.00	12/1/2011 11:57	12/9/2011 6:33
05	RA-228	TRG	11/18/11 00:00	1.01E+00	95.85	87.00	83.39	1.00	12/1/2011 11:57	12/9/2011 6:33
06	RA-228	TRG	11/18/11 00:00	1.01E+00	92.06	86.83	79.94	1.00	12/1/2011 11:57	12/9/2011 6:33
07	RA-228	TRG	11/18/11 00:00	1.01E+00	100.36	87.83	88.15	1.00	12/1/2011 11:57	12/9/2011 6:33
08	RA-228	TRG	11/18/11 00:00	1.01E+00	103.69	87.17	90.38	1.00	12/1/2011 11:57	12/9/2011 6:33
09	RA-228	TRG	11/18/11 00:00	1.01E+00	94.41	87.00	82.14	1.00	12/1/2011 11:57	12/9/2011 6:33
10	RA-228	TRG	11/18/11 00:00	1.02E+00	92.88	87.17	80.96	1.00	12/1/2011 11:57	12/9/2011 6:33

Preliminary Data Report & Analytical Calculations

Work Order: 11-11141-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11141
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	12/09/11 11:22		LB4110R	B1	120	564	1.35	0.4754
02	RA-228	MBL	12/09/11 11:22		LB4110R	B2	120	170	1.133333333	0.4658
03	RA-228	DUP	12/09/11 11:22		LB4110R	B3	120	217	1.25	0.4713
04	RA-228	DO	12/09/11 11:22		LB4110R	B4	120	200	1	0.4773
05	RA-228	TRG	12/09/11 11:22		LB4110R	C1	120	216	1.033333333	0.4705
06	RA-228	TRG	12/09/11 11:22		LB4110R	C2	120	286	1.516666667	0.4676
07	RA-228	TRG	12/09/11 11:22		LB4110R	C3	120	231	1.016666667	0.4614
08	RA-228	TRG	12/09/11 11:22		LB4110R	C4	120	275	1.283333333	0.4714
09	RA-228	TRG	12/09/11 11:22		LB4110R	D2	120	217	1.133333333	0.4753
10	RA-228	TRG	12/09/11 11:22		LB4110R	D4	120	237	1.416666667	0.4747

Count Room Report
Client: Foxfire Scientific, Inc.

11-11141-Ra228-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/22/11 00:00	1.0000	0.9106	1009.3755	430.1000	94.60	1.00	1.00
02	MBL	BLANK	11/22/11 00:00	1.0000	0.9099	1008.5996	454.7000	100.08	1.00	1.00
03	DUP	BKG-4	11/18/11 00:00	1.0122	0.9084	1006.9369	398.0000	87.75	1.00	1.00
04	DO	BKG-4	11/18/11 00:00	1.0138	0.9093	1007.9345	452.3000	99.62	1.00	1.00
05	TRG	BKG-5	11/18/11 00:00	1.0078	0.9079	1006.3826	434.5000	95.85	1.00	1.00
06	TRG	BKG-5C	11/18/11 00:00	1.0057	0.9085	1007.0477	417.6000	92.06	1.00	1.00
07	TRG	BKG-5N	11/18/11 00:00	1.0128	0.9086	1007.1586	455.3000	100.36	1.00	1.00
08	TRG	BKG-5S	11/18/11 00:00	1.0084	0.9080	1006.4935	470.1000	103.69	1.00	1.00
09	TRG	BKG-5W	11/18/11 00:00	1.0116	0.9079	1006.3826	428.0000	94.41	1.00	1.00
10	TRG	BKG-5E	11/18/11 00:00	1.0179	0.9067	1005.0525	420.5000	92.88	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/23/2011 12:12 PM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11141	1	Ra228	11/23/2011 12:12	JBARNARD		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-11	46.218	11/23/2011	0.430	0.4090				8.51	0.434	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1108.473	11/23/2011	0.9106	0.9100
02	Ba-133	Ba-6a	1108.473	11/23/2011	0.9099	0.9100
03	Ba-133	Ba-6a	1108.473	11/23/2011	0.9084	0.9100
04	Ba-133	Ba-6a	1108.473	11/23/2011	0.9093	0.9100
05	Ba-133	Ba-6a	1108.473	11/23/2011	0.9079	0.9100
06	Ba-133	Ba-6a	1108.473	11/23/2011	0.9085	0.9100
07	Ba-133	Ba-6a	1108.473	11/23/2011	0.9086	0.9100
08	Ba-133	Ba-6a	1108.473	11/23/2011	0.9080	0.9100
09	Ba-133	Ba-6a	1108.473	11/23/2011	0.9079	0.9100
10	Ba-133	Ba-6a	1108.473	11/23/2011	0.9067	0.9100

Balance Printer Tapes

Tracer	LCS

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11141	1	Ra228	grams	12/2/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	BKG-4	DUP					1.0122E+00	1.0122E+00				
04	BKG-4	DO					1.0138E+00	1.0138E+00				
05	BKG-5	TRG					1.0078E+00	1.0078E+00				
06	BKG-5C	TRG					1.0057E+00	1.0057E+00				
07	BKG-5N	TRG					1.0128E+00	1.0128E+00				
08	BKG-5S	TRG					1.0084E+00	1.0084E+00				
09	BKG-5W	TRG					1.0116E+00	1.0116E+00				
10	BKG-5E	TRG					1.0179E+00	1.0179E+00				

Comments	

Technician: JBarnard Date: 11/23/11

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11141	1	Ra228	Yttirum	30.0000	TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Data: Filter Final (g)	Filter Data: Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS	2.0000	0.0960	0.1490	**0.0530**	**88.33**
02	BLANK	MBL	2.0000	0.0959	0.1503	**0.0544**	**90.67**
03	DUP	DUP	2.0000	0.0961	0.1480	**0.0519**	**86.50**
04	BKG-4	DO	2.0000	0.0957	0.1463	**0.0506**	**84.33**
05	BKG-5	TRG	2.0000	0.0961	0.1483	**0.0522**	**87.00**
06	BKG-5C	TRG	2.0000	0.0960	0.1481	**0.0521**	**86.83**
07	BKG-5N	TRG	2.0000	0.0961	0.1488	**0.0527**	**87.83**
08	BKG-5S	TRG	2.0000	0.0963	0.1486	**0.0523**	**87.17**
09	BKG-5W	TRG	2.0000	0.0963	0.1485	**0.0522**	**87.00**
10	BKG-5E	TRG	2.0000	0.0963	0.1486	**0.0523**	**87.17**

Technician: [illegible] Date: 12/9/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11141	12/2/2011	11/22/2011	11/23/2011	11/24/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	BKG-4	13.6000	241.0500	195.5100	227.4500	181.9100	20.02%	79.98%	0.0000	0.0000	
05	BKG-5	13.5500	248.5500	196.1800	235.0000	182.6300	22.29%	77.71%	0.0000	0.0000	
06	BKG-5C	13.5200	220.9800	178.4500	207.4600	164.9300	20.50%	79.50%	0.0000	0.0000	
07	BKG-5N	13.5300	212.1500	167.3200	198.6200	153.7900	22.57%	77.43%	0.0000	0.0000	
08	BKG-5S	13.4400	233.1300	183.5900	219.6900	170.1500	22.55%	77.45%	0.0000	0.0000	
09	BKG-5W	13.4800	212.4000	170.2800	198.9200	156.8000	21.17%	78.83%	0.0000	0.0000	
10	BKG-5E	13.5800	211.4500	167.6000	197.8700	154.0200	22.16%	77.84%	0.0000	0.0000	

Comments	
Special Codes	**H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)**

Technician: Kenyscelli

Date: **Analysis: Rough Prep Logbook**

Analysis: Ra228 Page No. 7857

(R) 12/9/11 KD

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1111141-05	9	216	120	1400	12/9/11 13:22
C2	1111141-06	14	286	120	1400	12/9/11 13:22
B1	1111141-01	12	564	120	1400	12/9/11 13:22
C3	1111141-07	7	231	120	1400	12/9/11 13:22
B2	1111141-02	13	170	120	1400	12/9/11 13:22
C4	1111141-08	19	275	120	1400	12/9/11 13:22
B3	1111141-03	2	217	120	1400	12/9/11 13:22
B4	1111141-04	13	200	120	1400	12/9/11 13:22
D2	1111141-09	12	217	120	1400	12/9/11 13:22
D4	1111141-10	8	237	120	1400	12/9/11 13:22

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

AG
12/9/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/9/2011	0.00E+00	P	-2.53E+01	3.61E-01	2.60E+01
LB4110A - A2	Alpha	11/18/2007	12/9/2011	0.00E+00	P	-2.15E+01	3.44E-01	2.22E+01
LB4110A - A3	Alpha	11/18/2007	12/9/2011	0.00E+00	P	-2.09E+01	2.98E-01	2.15E+01
LB4110A - A4	Alpha	11/18/2007	12/9/2011	0.00E+00	P	-2.22E+01	3.23E-01	2.29E+01
LB4110A - B1	Alpha	11/18/2007	12/9/2011	6.67E-02	P	-1.16E-01	7.47E-02	2.65E-01
LB4110A - B2	Alpha	11/18/2007	12/9/2011	8.33E-02	P	-6.67E-02	7.18E-02	2.10E-01
LB4110A - B3	Alpha	11/18/2007	12/9/2011	5.00E-02	P	-5.90E-02	4.80E-02	1.55E-01
LB4110A - B4	Alpha	11/18/2007	12/9/2011	1.17E-01	P	-4.95E-02	5.97E-02	1.69E-01
LB4110A - C1	Alpha	11/18/2007	12/9/2011	1.17E-01	P	-6.41E-02	7.59E-02	2.16E-01
LB4110A - C2	Alpha	11/18/2007	12/9/2011	5.00E-02	P	-1.83E-01	9.77E-02	3.79E-01
LB4110A - C3	Alpha	11/18/2007	12/9/2011	8.33E-02	P	-2.06E-01	1.05E-01	4.15E-01
LB4110A - C4	Alpha	11/18/2007	12/9/2011	1.67E-02	P	-6.84E-02	7.25E-02	2.13E-01
LB4110A - D1	Alpha	11/18/2007	12/9/2011	1.17E-01	P	-5.94E-02	8.31E-02	2.26E-01
LB4110A - D2	Alpha	11/18/2007	12/9/2011	6.67E-02	P	-7.00E-02	6.10E-02	1.92E-01
LB4110A - D3	Alpha	11/18/2007	12/9/2011	5.00E-02	P	-4.80E-02	6.87E-02	1.85E-01
LB4110A - D4	Alpha	11/18/2007	12/9/2011	1.67E-01	P	-5.77E-02	7.34E-02	2.05E-01
LB4110R - A1	Alpha	11/24/2006	12/9/2011	2.00E-01	P	-1.13E-01	9.01E-02	2.93E-01
LB4110R - A2	Alpha	11/24/2006	12/9/2011	1.33E-01	P	-9.49E-02	8.48E-02	2.64E-01
LB4110R - A3	Alpha	11/24/2006	12/9/2011	2.00E-01	W	-8.10E-02	7.30E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	12/9/2011	1.67E-02	P	-5.24E-02	7.77E-02	2.08E-01
LB4110R - B1	Alpha	11/24/2006	12/9/2011	1.33E-01	P	-1.06E-01	6.39E-02	2.34E-01
LB4110R - B2	Alpha	11/24/2006	12/9/2011	3.33E-02	P	-7.42E-02	6.91E-02	2.12E-01
LB4110R - B3	Alpha	11/24/2006	12/9/2011	5.00E-02	P	-6.84E-02	6.80E-02	2.04E-01
LB4110R - B4	Alpha	11/24/2006	12/9/2011	1.00E-01	P	-6.68E-02	7.57E-02	2.18E-01
LB4110R - C1	Alpha	11/24/2006	12/9/2011	3.33E-02	P	-8.40E-02	7.89E-02	2.42E-01
LB4110R - C2	Alpha	11/24/2006	12/9/2011	5.00E-02	P	-7.98E-02	7.73E-02	2.34E-01
LB4110R - C3	Alpha	11/24/2006	12/9/2011	5.00E-02	P	-9.71E-02	8.53E-02	2.68E-01
LB4110R - C4	Alpha	11/24/2006	12/9/2011	1.17E-01	P	-6.70E-02	8.67E-02	2.40E-01
LB4110R - D1	Alpha	11/24/2006	12/9/2011	6.67E-02	P	-8.28E-02	8.22E-02	2.47E-01
LB4110R - D2	Alpha	11/24/2006	12/9/2011	8.33E-02	P	-6.10E-02	8.20E-02	2.25E-01
LB4110R - D3	Alpha	11/24/2006	12/9/2011	6.67E-02	P	-5.72E-02	7.43E-02	2.06E-01
LB4110R - D4	Alpha	11/24/2006	12/9/2011	1.17E-01	P	-5.58E-02	8.81E-02	2.32E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

AG
12/9/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/9/2011	5.00E-02	P	-4.12E+01	2.71E+00	4.66E+01
LB4110A - A2	Beta	11/18/2007	12/9/2011	2.00E-01	P	-3.51E+01	1.89E+00	3.89E+01
LB4110A - A3	Beta	11/18/2007	12/9/2011	3.33E-02	P	-3.59E+01	1.68E+00	3.93E+01
LB4110A - A4	Beta	11/18/2007	12/9/2011	3.33E-02	P	-3.74E+01	2.22E+00	4.18E+01
LB4110A - B1	Beta	11/18/2007	12/9/2011	1.27E+00	P	-7.44E+00	3.00E+00	1.34E+01
LB4110A - B2	Beta	11/18/2007	12/9/2011	1.45E+00	P	1.97E-01	1.40E+00	2.60E+00
LB4110A - B3	Beta	11/18/2007	12/9/2011	1.22E+00	P	2.64E-01	1.41E+00	2.56E+00
LB4110A - B4	Beta	11/18/2007	12/9/2011	1.65E+00	P	1.26E-01	1.38E+00	2.63E+00
LB4110A - C1	Beta	11/18/2007	12/9/2011	1.42E+00	P	-6.33E+00	2.45E+00	1.12E+01
LB4110A - C2	Beta	11/18/2007	12/9/2011	1.15E+00	P	3.33E-01	1.32E+00	2.30E+00
LB4110A - C3	Beta	11/18/2007	12/9/2011	1.27E+00	P	4.79E-01	1.53E+00	2.58E+00
LB4110A - C4	Beta	11/18/2007	12/9/2011	5.50E+00	W	-1.74E+00	2.30E+00	6.35E+00
LB4110A - D1	Beta	11/18/2007	12/9/2011	2.32E+00	P	-3.01E+00	2.68E+00	8.37E+00
LB4110A - D2	Beta	11/18/2007	12/9/2011	1.42E+00	P	-9.01E-01	1.62E+00	4.14E+00
LB4110A - D3	Beta	11/18/2007	12/9/2011	4.65E+00	P	7.22E-01	4.36E+00	8.00E+00
LB4110A - D4	Beta	11/18/2007	12/9/2011	1.27E+00	P	-6.14E-01	1.43E+00	3.48E+00
LB4110R - A1	Beta	11/24/2006	12/9/2011	3.68E+00	P	-7.00E+01	4.41E+00	7.89E+01
LB4110R - A2	Beta	11/24/2006	12/9/2011	1.10E+00	P	-5.58E+01	2.37E+00	6.05E+01
LB4110R - A3	Beta	11/24/2006	12/9/2011	1.30E+00	P	-5.16E+01	3.26E+00	5.81E+01
LB4110R - A4	Beta	11/24/2006	12/9/2011	1.23E+00	P	-5.16E+01	2.26E+00	5.61E+01
LB4110R - B1	Beta	11/24/2006	12/9/2011	1.35E+00	P	-5.43E+01	2.27E+00	5.88E+01
LB4110R - B2	Beta	11/24/2006	12/9/2011	1.13E+00	P	-5.42E+01	2.32E+00	5.89E+01
LB4110R - B3	Beta	11/24/2006	12/9/2011	1.25E+00	P	-5.39E+01	3.09E+00	6.01E+01
LB4110R - B4	Beta	11/24/2006	12/9/2011	1.00E+00	P	-5.44E+01	2.15E+00	5.87E+01
LB4110R - C1	Beta	11/24/2006	12/9/2011	1.03E+00	P	-5.39E+01	3.57E+00	6.11E+01
LB4110R - C2	Beta	11/24/2006	12/9/2011	1.52E+00	P	-5.42E+01	3.04E+00	6.03E+01
LB4110R - C3	Beta	11/24/2006	12/9/2011	1.02E+00	P	-5.47E+01	2.89E+00	6.04E+01
LB4110R - C4	Beta	11/24/2006	12/9/2011	1.28E+00	P	-6.17E+01	3.36E+00	6.84E+01
LB4110R - D1	Beta	11/24/2006	12/9/2011	7.27E+00	P	-5.05E+01	6.90E+00	6.42E+01
LB4110R - D2	Beta	11/24/2006	12/9/2011	1.13E+00	P	-5.52E+01	2.18E+00	5.95E+01
LB4110R - D3	Beta	11/24/2006	12/9/2011	3.22E+00	P	-5.85E+01	6.33E+00	7.11E+01
LB4110R - D4	Beta	11/24/2006	12/9/2011	1.42E+00	P	-5.48E+01	2.53E+00	5.99E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

GPC Detector Report
(ALL Efficiencies)

AG
12/9/11

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/9/2011	0.0000	F	0.1176	0.2386	0.3595
LB4110A - A2	Alpha	11/18/2007	12/9/2011	0.0000	F	0.1019	0.2097	0.3174
LB4110A - A3	Alpha	11/18/2007	12/9/2011	0.0000	F	0.1015	0.2073	0.3130
LB4110A - A4	Alpha	11/18/2007	12/9/2011	0.0000	F	0.1078	0.2179	0.3281
LB4110A - B1	Alpha	11/18/2007	12/9/2011	0.2161	P	0.2064	0.2270	0.2475
LB4110A - B2	Alpha	11/18/2007	12/9/2011	0.2304	P	0.2088	0.2249	0.2410
LB4110A - B3	Alpha	11/18/2007	12/9/2011	0.2394	P	0.2259	0.2410	0.2561
LB4110A - B4	Alpha	11/18/2007	12/9/2011	0.2340	P	0.2224	0.2381	0.2537
LB4110A - C1	Alpha	11/18/2007	12/9/2011	0.2186	P	0.2102	0.2214	0.2326
LB4110A - C2	Alpha	11/18/2007	12/9/2011	0.2281	P	0.2049	0.2259	0.2468
LB4110A - C3	Alpha	11/18/2007	12/9/2011	0.2529	P	0.2374	0.2494	0.2614
LB4110A - C4	Alpha	11/18/2007	12/9/2011	0.2226	P	0.2061	0.2272	0.2483
LB4110A - D1	Alpha	11/18/2007	12/9/2011	0.2325	P	0.2190	0.2365	0.2540
LB4110A - D2	Alpha	11/18/2007	12/9/2011	0.2587	P	0.2449	0.2611	0.2773
LB4110A - D3	Alpha	11/18/2007	12/9/2011	0.2637	P	0.2464	0.2663	0.2861
LB4110A - D4	Alpha	11/18/2007	12/9/2011	0.1934	P	0.1784	0.2043	0.2302
LB4110R - A1	Alpha	11/24/2006	12/9/2011	0.2420	P	0.2043	0.2396	0.2748
LB4110R - A2	Alpha	11/24/2006	12/9/2011	0.2162	P	0.1949	0.2227	0.2505
LB4110R - A3	Alpha	11/24/2006	12/9/2011	0.2265	P	0.2003	0.2266	0.2529
LB4110R - A4	Alpha	11/24/2006	12/9/2011	0.2479	P	0.2183	0.2465	0.2746
LB4110R - B1	Alpha	11/24/2006	12/9/2011	0.2200	P	0.1881	0.2276	0.2671
LB4110R - B2	Alpha	11/24/2006	12/9/2011	0.2161	P	0.1817	0.2195	0.2573
LB4110R - B3	Alpha	11/24/2006	12/9/2011	0.2366	P	0.2073	0.2449	0.2824
LB4110R - B4	Alpha	11/24/2006	12/9/2011	0.2287	P	0.1978	0.2347	0.2716
LB4110R - C1	Alpha	11/24/2006	12/9/2011	0.2109	P	0.1872	0.2161	0.2449
LB4110R - C2	Alpha	11/24/2006	12/9/2011	0.2197	P	0.1988	0.2260	0.2532
LB4110R - C3	Alpha	11/24/2006	12/9/2011	0.2384	P	0.2083	0.2412	0.2741
LB4110R - C4	Alpha	11/24/2006	12/9/2011	0.2164	P	0.1942	0.2269	0.2596
LB4110R - D1	Alpha	11/24/2006	12/9/2011	0.2252	P	0.1981	0.2285	0.2589
LB4110R - D2	Alpha	11/24/2006	12/9/2011	0.2520	P	0.2296	0.2592	0.2889
LB4110R - D3	Alpha	11/24/2006	12/9/2011	0.2552	P	0.2256	0.2536	0.2816
LB4110R - D4	Alpha	11/24/2006	12/9/2011	0.1932	P	0.1747	0.2068	0.2389
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

GPC Detector Report
(ALL Efficiencies)

AG
12/9/11

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/9/2011	0.3390	F	0.4755	0.5784	0.6813
LB4110A - A2	Beta	11/18/2007	12/9/2011	0.2911	F	0.4111	0.5116	0.6120
LB4110A - A3	Beta	11/18/2007	12/9/2011	0.2998	F	0.4213	0.5169	0.6124
LB4110A - A4	Beta	11/18/2007	12/9/2011	0.3117	F	0.4413	0.5389	0.6364
LB4110A - B1	Beta	11/18/2007	12/9/2011	0.5160	P	0.4928	0.5335	0.5742
LB4110A - B2	Beta	11/18/2007	12/9/2011	0.5424	P	0.4930	0.5316	0.5701
LB4110A - B3	Beta	11/18/2007	12/9/2011	0.5618	P	0.5058	0.5494	0.5930
LB4110A - B4	Beta	11/18/2007	12/9/2011	0.5425	P	0.5227	0.5541	0.5855
LB4110A - C1	Beta	11/18/2007	12/9/2011	0.5041	P	0.4802	0.5032	0.5261
LB4110A - C2	Beta	11/18/2007	12/9/2011	0.4964	P	0.4401	0.5029	0.5656
LB4110A - C3	Beta	11/18/2007	12/9/2011	0.5927	P	0.5647	0.5880	0.6114
LB4110A - C4	Beta	11/18/2007	12/9/2011	0.5179	P	0.4798	0.5289	0.5780
LB4110A - D1	Beta	11/18/2007	12/9/2011	0.5349	P	0.5120	0.5618	0.6115
LB4110A - D2	Beta	11/18/2007	12/9/2011	0.5782	P	0.5212	0.5995	0.6778
LB4110A - D3	Beta	11/18/2007	12/9/2011	0.6258	P	0.5660	0.6199	0.6739
LB4110A - D4	Beta	11/18/2007	12/9/2011	0.4513	P	0.4168	0.4846	0.5523
LB4110R - A1	Beta	11/24/2006	12/9/2011	0.5627	P	0.4812	0.5697	0.6582
LB4110R - A2	Beta	11/24/2006	12/9/2011	0.5197	P	0.4165	0.5087	0.6010
LB4110R - A3	Beta	11/24/2006	12/9/2011	0.5298	P	0.4647	0.5448	0.6249
LB4110R - A4	Beta	11/24/2006	12/9/2011	0.5950	P	0.5094	0.5913	0.6733
LB4110R - B1	Beta	11/24/2006	12/9/2011	0.5398	P	0.4554	0.5467	0.6379
LB4110R - B2	Beta	11/24/2006	12/9/2011	0.5122	P	0.4321	0.5239	0.6156
LB4110R - B3	Beta	11/24/2006	12/9/2011	0.5706	P	0.5008	0.5913	0.6818
LB4110R - B4	Beta	11/24/2006	12/9/2011	0.5485	P	0.4695	0.5554	0.6413
LB4110R - C1	Beta	11/24/2006	12/9/2011	0.5003	P	0.4259	0.5049	0.5840
LB4110R - C2	Beta	11/24/2006	12/9/2011	0.5255	P	0.4518	0.5315	0.6112
LB4110R - C3	Beta	11/24/2006	12/9/2011	0.5616	P	0.4803	0.5732	0.6662
LB4110R - C4	Beta	11/24/2006	12/9/2011	0.5106	P	0.4456	0.5349	0.6243
LB4110R - D1	Beta	11/24/2006	12/9/2011	0.5410	P	0.4635	0.5454	0.6273
LB4110R - D2	Beta	11/24/2006	12/9/2011	0.6005	P	0.5230	0.6110	0.6990
LB4110R - D3	Beta	11/24/2006	12/9/2011	0.5895	P	0.5081	0.5909	0.6738
LB4110R - D4	Beta	11/24/2006	12/9/2011	0.4629	P	0.4039	0.4921	0.5803
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

SECTION XI

BARIUM-133 ANALYTICAL TRACER DATA

VAX/VMS Peak Search Report Generated 2-DEC-2011 07:21:03.73 12/2/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114101_GE5_BAFIL_171645.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 07:05:46.
Sample ID : 1111141-01 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	15.92	6	13	0.32	158.28	152	8	6.52E-03	116.8	
2	0	18.58	10	20	0.18	183.83	172	16	1.12E-02	103.7	
3	0	20.93	142	17	0.89	206.39	188	37	1.57E-01	12.8	
4	5	24.49	8	4	0.48	240.53	238	15	8.91E-03	57.8	7.65E+00
5	5	25.09	29	21	0.63	246.26	238	15	3.25E-02	34.9	
6	0	30.99	2228	65	0.69	302.83	293	23	2.48E+00	2.3	
7	2	35.08	430	21	0.65	342.03	331	30	4.78E-01	5.6	1.62E+00
8	2	36.10	108	5	0.73	351.79	331	30	1.20E-01	19.5	
9	0	53.62	33	33	0.14	519.77	507	20	3.63E-02	40.7	
10	0	61.89	257	11	0.73	599.10	589	22	2.86E-01	6.8	
11	1	65.91	71	41	0.73	637.64	628	31	7.93E-02	22.0	4.20E-01
12	1	66.58	28	34	0.67	644.00	628	31	3.08E-02	56.0	
13	8	79.76	51	19	1.03	770.42	761	35	5.64E-02	25.9	1.98E+00
14	8	81.21	852	13	0.73	784.33	761	35	9.47E-01	3.5	
15	0	112.25	161	43	0.73	1081.94	1070	22	1.79E-01	11.9	
16	0	116.48	35	27	0.32	1122.43	1111	20	3.93E-02	34.8	
17	0	146.69	9	7	0.49	1412.14	1403	13	1.03E-02	58.9	
18	0	277.07	38	11	0.68	2662.14	2648	23	4.27E-02	23.6	
19	2	303.13	100	3	0.95	2912.00	2903	24	1.11E-01	10.3	4.22E+00
20	2	303.76	53	2	0.89	2918.04	2903	24	5.85E-02	21.4	
21	0	334.56	42	10	0.71	3213.31	3198	28	4.64E-02	22.6	
22	0	338.67	21	7	0.56	3252.71	3237	25	2.31E-02	36.4	
23	0	356.84	419	0	0.89	3426.91	3410	33	4.66E-01	4.9	
24	0	384.72	60	9	0.73	3694.20	3680	24	6.71E-02	16.2	
25	0	387.71	120	7	0.61	3722.89	3708	28	1.33E-01	10.3	
26	0	415.83	13	7	0.49	3992.52	3981	18	1.48E-02	44.6	

Sample ID : 1111141-01 Acquisition date : 2-DEC-2011 07:05:46

Total number of lines in spectrum	26	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	6	23.08%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.301E+02	4.301E+02	0.722E+02	16.78	
		Total Activity :	4.301E+02	4.301E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.324E+02	2.324E+02	0.332E+02	14.28	
		Total Activity :	2.324E+02	2.324E+02			

Grand Total Activity : 6.625E+02 6.626E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-01 Acquisition date : 2-DEC-2011 07:05:46

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.301E+02	4.301E+02	16.78	OK
	302.84	17.80	2.575E+00	6.552E+02	6.552E+02	33.45	OK
	356.01	60.00	4.312E+00	4.864E+02	4.864E+02	17.45	OK

Final Mean for 3 Valid Peaks = 4.301E+02+/- 7.216E+01 (16.78%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.324E+02	2.324E+02	14.28	OK

Final Mean for 1 Valid Peaks = 2.324E+02+/- 3.319E+01 (14.28%)

Flag: "*" = Keyline

Sample ID : 1111141-01 Acquisition date : 2-DEC-2011 07:05:46

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.301E+02	7.216E+01	1.237E+01	1.821E+00	34.783
TH-234	2.324E+02	3.319E+01	2.942E+01	3.785E-01	7.899

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.647E+00		1.220E+01	2.156E+01	7.308E+00	-0.216
CD-109	-3.762E+00		1.074E+02	1.940E+02	1.867E+01	-0.019
PA-231	-2.681E-01		8.485E-01	1.490E+00	1.678E-02	-0.180
PA-234	6.552E+00	+	1.703E+00	2.111E+00	2.376E-02	3.104
NP-237	-4.228E-01		3.042E+01	5.489E+01	4.842E+00	-0.008
AM-241	1.622E+00		1.311E+00	2.521E+00	2.838E-02	0.644

VAX/VMS Peak Search Report Generated 2-DEC-2011 07:38:21.36

12/12/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114102_GE5_BAFIL_171647.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 07:23:02.
Sample ID : 1111141-02 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.08	109	25	0.76	207.81	199	17	1.21E-01	14.3	
2	0	30.96	2281	69	0.78	302.48	289	33	2.53E+00	2.4	
3	3	35.14	431	53	0.67	342.59	332	27	4.78E-01	6.5	9.28E-01
4	3	36.02	105	44	0.60	351.00	332	27	1.17E-01	23.7	
5	0	53.70	30	47	0.56	520.52	507	20	3.38E-02	51.4	
6	0	61.81	227	38	0.86	598.26	584	29	2.52E-01	9.4	
7	1	65.64	28	26	0.67	635.00	627	27	3.10E-02	42.2	1.37E+00
8	1	66.47	54	22	0.67	643.00	627	27	5.99E-02	27.1	
9	0	77.52	23	10	0.56	748.88	742	15	2.56E-02	33.1	
10	1	79.88	61	17	0.76	771.58	759	36	6.77E-02	32.2	1.29E+00
11	1	81.24	901	26	0.66	784.62	759	36	1.00E+00	3.5	
12	0	112.18	168	38	0.37	1081.20	1071	19	1.87E-01	10.8	
13	10	116.22	26	27	0.75	1120.00	1109	20	2.91E-02	44.6	1.59E+00
14	10	116.82	10	9	0.30	1125.73	1109	20	1.11E-02	67.9	
15	0	303.50	120	5	0.72	2915.48	2902	23	1.34E-01	9.9	
16	0	334.53	66	8	0.76	3213.04	3197	27	7.38E-02	14.8	
17	0	356.88	428	0	1.01	3427.29	3412	29	4.76E-01	4.8	
18	1	384.07	26	0	0.92	3688.03	3681	25	2.85E-02	24.7	7.28E+00
19	1	384.90	125	3	1.02	3696.00	3681	25	1.39E-01	7.6	
20	0	387.77	130	7	1.02	3723.52	3708	28	1.44E-01	9.8	
21	0	415.66	30	0	0.72	3990.87	3976	25	3.33E-02	18.3	

Sample ID : 1111141-02 Acquisition date : 2-DEC-2011 07:23:02

Total number of lines in spectrum	21	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	6	28.57%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.547E+02	4.547E+02	0.765E+02	16.82	
		Total Activity :	4.547E+02	4.547E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.048E+02	2.048E+02	0.394E+02	19.22	
		Total Activity :	2.048E+02	2.048E+02			

Grand Total Activity : 6.594E+02 6.595E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-02 Acquisition date : 2-DEC-2011 07:23:02

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.547E+02	4.547E+02	16.82	OK
	302.84	17.80	2.575E+00	7.878E+02	7.879E+02	32.99	OK
	356.01	60.00	4.312E+00	4.968E+02	4.968E+02	17.40	OK

Final Mean for 3 Valid Peaks = 4.547E+02+/- 7.647E+01 (16.82%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.048E+02	2.048E+02	19.22	OK

Final Mean for 1 Valid Peaks = 2.048E+02+/- 3.935E+01 (19.22%)

Flag: "*" = Keyline

Sample ID : 1111141-02 Acquisition date : 2-DEC-2011 07:23:02

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.547E+02	7.647E+01	1.228E+01	1.808E+00	37.018
TH-234	2.048E+02	3.935E+01	2.563E+01	3.297E-01	7.991

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.135E+00		1.167E+01	2.300E+01	7.798E+00	0.093
CD-109	-1.655E+01		9.148E+01	1.645E+02	1.583E+01	-0.101
PA-231	-7.809E-02		8.544E-01	1.557E+00	1.753E-02	-0.050
PA-234	5.052E+00	+	1.456E+00	2.185E+00	2.459E-02	2.313
NP-237	1.954E+01		2.539E+01	5.119E+01	4.515E+00	0.382
AM-241	2.978E+00		1.273E+00	2.781E+00	3.130E-02	1.071

VAX/VMS Peak Search Report Generated 2-DEC-2011 07:54:21.35

12/214

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114103_GE5_BAFIL_171649.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-4
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 07:39:02.
Sample ID : 1111141-03 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	17.80	3	9	0.12	176.33	170	9	3.33E-03	189.3	
2	5	19.84	25	4	0.55	195.93	192	26	2.75E-02	23.6	1.35E+00
3	5	20.97	112	18	0.88	206.75	192	26	1.24E-01	13.9	
4	0	28.30	11	38	0.31	276.98	267	14	1.19E-02	126.6	
5	0	30.99	2220	99	0.71	302.80	288	33	2.47E+00	2.5	
6	1	35.08	453	14	0.61	342.04	331	30	5.03E-01	5.4	1.56E+00
7	1	36.06	142	11	0.66	351.42	331	30	1.58E-01	15.2	
8	0	38.76	9	7	0.71	377.28	366	15	9.86E-03	74.8	
9	0	53.52	34	35	0.28	518.85	507	19	3.80E-02	39.2	
10	0	61.89	209	46	0.69	599.07	587	23	2.33E-01	9.9	
11	0	66.24	118	51	1.37	640.76	626	28	1.31E-01	17.2	
12	1	79.58	43	32	0.76	768.66	763	35	4.82E-02	22.4	3.86E+00
13	1	79.93	22	47	0.69	772.00	763	35	2.44E-02	67.2	
14	1	81.20	788	33	0.62	784.19	763	35	8.76E-01	4.0	
15	0	93.32	8	27	0.66	900.38	884	20	9.28E-03	133.3	
16	0	112.15	218	39	0.79	1080.91	1067	26	2.42E-01	9.5	
17	1	115.42	19	4	0.67	1112.24	1110	22	2.16E-02	20.3	1.24E+00
18	1	116.33	28	30	0.75	1121.00	1110	22	3.07E-02	47.5	
19	0	160.85	31	7	0.61	1547.89	1535	22	3.41E-02	26.3	
20	0	176.20	8	18	0.17	1695.00	1680	18	8.89E-03	111.8	
21	4	276.74	21	11	0.93	2659.00	2651	19	2.34E-02	41.2	8.18E-01
22	4	277.23	29	7	0.63	2663.70	2651	19	3.20E-02	26.3	
23	1	303.54	75	2	1.05	2915.91	2901	25	8.36E-02	14.8	1.44E+00
24	1	304.07	47	2	0.95	2921.00	2901	25	5.19E-02	18.9	
25	5	356.67	294	3	0.92	3425.28	3412	27	3.27E-01	7.0	1.39E+00
26	5	357.19	112	3	0.72	3430.27	3412	27	1.25E-01	17.3	
27	2	384.28	26	9	1.02	3690.00	3678	25	2.87E-02	39.9	6.74E-01
28	2	385.02	43	7	0.82	3697.10	3678	25	4.77E-02	19.2	
29	0	387.83	131	17	0.97	3724.03	3710	28	1.45E-01	11.1	
30	1	415.57	35	4	1.04	3990.00	3978	23	3.92E-02	17.9	1.72E+00
31	1	416.19	14	4	1.04	3996.00	3978	23	1.55E-02	31.4	

Sample ID : 1111141-03 Acquisition date : 2-DEC-2011 07:39:02

Total number of lines in spectrum	31	
Number of unidentified lines	25	
Number of lines tentatively identified by NID	6	19.35%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.980E+02	3.980E+02	0.685E+02	17.21	
			---	---			
Total Activity :			3.980E+02	3.980E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.891E+02	1.891E+02	0.383E+02	20.28	
			---	---			
Total Activity :			1.891E+02	1.891E+02			

Grand Total Activity :	5.871E+02	5.871E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-03 Acquisition date : 2-DEC-2011 07:39:02

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.980E+02	3.980E+02	17.21	OK
	302.84	17.80	2.575E+00	4.929E+02	4.930E+02	39.59	OK
	356.01	60.00	4.312E+00	3.414E+02	3.414E+02	20.18	OK

Final Mean for 3 Valid Peaks = 3.980E+02+/- 6.851E+01 (17.21%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.891E+02	1.891E+02	20.28	OK

Final Mean for 1 Valid Peaks = 1.891E+02+/- 3.835E+01 (20.28%)

Flag: "*" = Keyline

Sample ID : 1111141-03 Acquisition date : 2-DEC-2011 07:39:02

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.980E+02	6.851E+01	1.463E+01	2.155E+00	27.197
TH-234	1.891E+02	3.835E+01	2.077E+01	2.672E-01	9.104

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.425E+01		1.503E+01	3.007E+01	1.019E+01	0.474
CD-109	-3.335E+01		9.333E+01	1.631E+02	1.570E+01	-0.204
PA-231	3.844E-01		1.020E+00	1.937E+00	2.180E-02	0.198
PA-234	5.165E+00	+	1.447E+00	2.078E+00	2.340E-02	2.485
NP-237	1.663E+01		2.493E+01	4.988E+01	4.400E+00	0.333
AM-241	1.023E+00		1.473E+00	2.522E+00	2.839E-02	0.406

VAX/VMS Peak Search Report Generated 2-DEC-2011 08:14:16.05

12/2/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114104_GE5_BAFIL_171651.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-4
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 07:58:28.
Sample ID : 1111141-04 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.19	74	34	0.37	208.82	199	17	8.23E-02	21.5	
2	0	30.98	2152	147	0.79	302.72	293	21	2.39E+00	2.6	
3	3	35.19	482	32	0.72	343.05	332	25	5.36E-01	5.5	3.70E+00
4	3	35.97	93	11	0.50	350.54	332	25	1.03E-01	21.6	
5	0	53.39	58	18	0.62	517.56	509	15	6.49E-02	18.7	
6	2	61.56	213	48	0.71	595.94	584	28	2.37E-01	10.2	3.05E+00
7	2	62.10	147	37	0.68	601.09	584	28	1.63E-01	14.8	
8	0	66.24	167	12	1.44	640.80	628	29	1.85E-01	9.5	
9	1	79.76	53	25	0.74	770.42	763	32	5.93E-02	21.4	1.70E+00
10	1	81.25	896	25	0.66	784.67	763	32	9.95E-01	3.5	
11	0	93.42	8	19	0.15	901.37	886	19	8.89E-03	116.7	
12	0	112.20	167	90	0.79	1081.44	1069	25	1.86E-01	15.1	
13	0	116.57	56	16	0.58	1123.33	1111	25	6.22E-02	21.2	
14	0	161.36	18	25	0.63	1552.75	1542	18	2.03E-02	58.7	
15	0	277.19	51	9	0.59	2663.28	2650	23	5.68E-02	18.0	
16	1	303.34	87	2	0.95	2914.00	2902	24	9.66E-02	13.7	1.83E+00
17	1	303.97	30	2	0.95	2920.00	2902	24	3.31E-02	36.5	
18	0	308.01	17	9	0.70	2958.77	2946	20	1.93E-02	41.2	
19	3	333.40	16	2	1.30	3202.22	3198	25	1.82E-02	23.2	6.82E-01
20	3	334.42	51	6	0.98	3212.00	3198	25	5.65E-02	17.6	
21	3	335.30	17	1	0.88	3220.42	3198	25	1.85E-02	16.7	
22	0	356.86	409	10	0.94	3427.09	3412	29	4.54E-01	5.2	
23	0	384.83	94	13	0.90	3695.31	3681	26	1.04E-01	13.0	
24	0	387.80	148	29	0.69	3723.80	3707	28	1.65E-01	11.2	
25	0	415.70	26	8	0.98	3991.23	3974	23	2.93E-02	29.1	

Sample ID : 1111141-04 Acquisition date : 2-DEC-2011 07:58:28

Total number of lines in spectrum	25	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	6	24.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.523E+02	4.523E+02	0.761E+02	16.82	
		Total Activity :	4.523E+02	4.523E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.323E+02	1.323E+02	0.395E+02	29.87	
		Total Activity :	1.323E+02	1.323E+02			

Grand Total Activity : 5.846E+02 5.846E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-04 Acquisition date : 2-DEC-2011 07:58:28

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.523E+02	4.523E+02	16.82	OK
	302.84	17.80	2.575E+00	5.694E+02	5.695E+02	38.08	OK
	356.01	60.00	4.312E+00	4.743E+02	4.744E+02	17.86	OK

Final Mean for 3 Valid Peaks = 4.523E+02+/- 7.606E+01 (16.82%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.323E+02	1.323E+02	29.87	OK

Final Mean for 1 Valid Peaks = 1.323E+02+/- 3.953E+01 (29.87%)

Flag: "*" = Keyline

Sample ID : 1111141-04 Acquisition date : 2-DEC-2011 07:58:28

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.523E+02	7.606E+01	1.333E+01	1.962E+00	33.944
TH-234	1.323E+02	3.953E+01	3.419E+01	4.399E-01	3.870

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-1.069E+01		1.605E+01	2.617E+01	8.871E+00	-0.408
CD-109	2.127E+00		9.428E+01	1.739E+02	1.673E+01	0.012
PA-231	4.627E-02		9.478E-01	1.743E+00	1.962E-02	0.027
PA-234	3.426E+00	+	1.477E+00	2.089E+00	2.352E-02	1.640
NP-237	5.826E-01		2.592E+01	4.774E+01	4.211E+00	0.012
AM-241	1.653E+00		1.388E+00	2.583E+00	2.908E-02	0.640

VAX/VMS Peak Search Report Generated 2-DEC-2011 08:31:34.15

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114105_GE5_BAFIL_171653.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 08:16:13.
Sample ID : 1111141-05 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	8.33	19	12	1.93	85.58	70	24	2.15E-02	52.3	
2	0	9.83	7	12	0.31	99.96	93	12	7.25E-03	113.6	
3	0	16.19	16	12	0.38	160.93	152	17	1.76E-02	57.2	
4	0	21.22	84	47	0.44	209.16	198	20	9.36E-02	23.2	
5	0	25.49	10	22	0.20	250.07	240	15	1.11E-02	108.2	
6	0	30.98	2255	67	0.78	302.67	289	28	2.51E+00	2.4	
7	0	35.20	520	48	0.55	343.18	334	23	5.78E-01	5.5	
8	1	52.46	20	7	0.58	508.61	507	20	2.21E-02	20.0	1.51E+00
9	1	53.43	28	31	0.64	518.00	507	20	3.14E-02	45.5	
10	1	61.36	51	34	0.66	594.00	588	24	5.69E-02	31.0	2.39E+00
11	1	61.99	221	47	0.66	600.00	588	24	2.45E-01	9.3	
12	1	66.23	143	24	0.73	640.64	627	29	1.59E-01	10.8	3.44E+00
13	1	67.10	29	12	0.67	649.00	627	29	3.17E-02	37.2	
14	0	81.24	861	59	0.61	784.61	774	21	9.56E-01	3.9	
15	2	111.75	82	45	0.82	1077.09	1064	30	9.09E-02	24.5	2.83E+00
16	2	112.19	167	39	0.78	1081.36	1064	30	1.86E-01	11.7	
17	0	116.53	65	14	0.80	1122.93	1111	24	7.17E-02	18.5	
18	0	167.76	15	3	0.51	1614.13	1602	18	1.62E-02	35.7	
19	5	276.30	13	1	0.55	2654.73	2650	20	1.41E-02	36.8	1.26E+00
20	5	276.96	51	7	0.92	2661.09	2650	20	5.65E-02	16.7	
21	0	303.64	131	0	1.04	2916.88	2904	25	1.46E-01	8.7	
22	9	333.70	17	2	1.05	3205.04	3200	25	1.84E-02	23.0	1.16E+00
23	9	334.11	10	3	0.98	3209.00	3200	25	1.10E-02	68.4	
24	9	334.83	19	1	0.38	3215.88	3200	25	2.14E-02	29.3	
25	4	356.81	417	10	0.95	3426.67	3411	29	4.63E-01	5.2	3.47E+00
26	4	357.67	37	8	0.81	3434.94	3411	29	4.12E-02	33.1	
27	0	384.69	109	0	1.03	3693.93	3680	25	1.21E-01	9.6	
28	1	387.30	47	5	1.02	3719.00	3710	26	5.21E-02	21.7	2.41E+00
29	1	388.35	34	7	1.02	3729.00	3710	26	3.78E-02	30.3	
30	0	392.07	32	7	0.61	3764.66	3748	26	3.54E-02	26.4	

Sample ID : 1111141-05 Acquisition date : 2-DEC-2011 08:16:13

Total number of lines in spectrum	30	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	7	23.33%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.345E+02	4.345E+02	0.745E+02	17.14	
		Total Activity :	4.345E+02	4.345E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	4.666E-01	4.666E-01	10.61E-01	227.31	
PA-234	4.47E+09Y	1.00	3.896E+00	3.896E+00	1.814E+00	46.55	
TH-234	4.47E+09Y	1.00	1.994E+02	1.994E+02	0.378E+02	18.98	
AM-241	432.20Y	1.00	4.287E+00	4.287E+00	2.664E+00	62.13	
		Total Activity :	2.080E+02	2.080E+02			

Grand Total Activity : 6.425E+02 6.426E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-05 Acquisition date : 2-DEC-2011 08:16:13

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.345E+02	4.345E+02	17.14	OK
	302.84	17.80	2.575E+00	8.581E+02	8.582E+02	31.66	OK
	356.01	60.00	4.312E+00	4.835E+02	4.835E+02	17.82	OK

Final Mean for 3 Valid Peaks = 4.345E+02+/- 7.447E+01 (17.14%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	4.666E-01	4.666E-01	227.31	OK
	10.11	20.20	1.000E+02	9.702E-01	9.702E-01	227.31	OK
	283.67	1.60	2.191E+00	-----	Line Not Found	-----	Absent
	302.67	2.30	2.572E+00	6.651E+03	6.651E+03	30.04	OK

Final Mean for 3 Valid Peaks = 4.666E-01+/- 1.061E+00 (227.31%)

PA-234	9.89	89.00	1.000E+02	2.202E-01	2.202E-01	227.31	OK
	21.72	64.90*	1.000E+02	3.896E+00	3.896E+00	46.55	OK
	37.93	23.75	1.000E+02	-----	Line Not Found	-----	Absent
	131.42	20.40	2.473E+00	-----	Line Not Found	-----	Absent

Final Mean for 2 Valid Peaks = 3.896E+00+/- 1.814E+00 (46.55%)

TH-234	63.29	3.80*	8.750E+01	1.994E+02	1.994E+02	18.98	OK

Final Mean for 1 Valid Peaks = 1.994E+02+/- 3.784E+01 (18.98%)

AM-241	59.54	35.90*	1.000E+02	4.287E+00	4.287E+00	62.13	OK

Final Mean for 1 Valid Peaks = 4.287E+00+/- 2.664E+00 (62.13%)

Flag: "*" = Keyline

Sample ID : 1111141-05 Acquisition date : 2-DEC-2011 08:16:13

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.345E+02	7.447E+01	2.086E+01	3.072E+00	20.829
PA-231	4.666E-01	1.061E+00	1.933E-01	2.175E-03	2.415
PA-234	3.896E+00	1.814E+00	1.037E+00	1.167E-02	3.758
TH-234	1.994E+02	3.784E+01	3.311E+01	4.260E-01	6.021
AM-241	4.287E+00	2.664E+00	2.294E+00	2.582E-02	1.869

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.275E+00		1.450E+01	2.640E+01	8.949E+00	-0.086
CD-109	8.994E+00		9.318E+01	1.738E+02	1.672E+01	0.052
NP-237	-1.766E+01		2.773E+01	4.630E+01	4.084E+00	-0.382

VAX/VMS Peak Search Report Generated 2-DEC-2011 08:48:13.96

12/12/14

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114106_GE5_BAFIL_171655.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5C
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 08:32:56.
Sample ID : 1111141-06 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	9.06	12	11	0.20	92.58	82	14	1.35E-02	63.5	
2	1	20.89	56	18	0.56	206.00	196	22	6.26E-02	24.8	1.47E+00
3	1	21.41	56	8	0.56	211.00	196	22	6.18E-02	22.9	
4	0	25.07	15	6	0.62	246.08	241	11	1.63E-02	40.8	
5	0	30.97	2225	116	0.80	302.66	291	28	2.47E+00	2.6	
6	1	35.14	469	10	0.66	342.58	329	32	5.22E-01	4.9	4.92E+00
7	1	35.91	132	3	0.60	350.00	329	32	1.47E-01	15.8	
8	8	53.23	26	23	0.64	516.00	504	20	2.90E-02	43.4	1.24E+00
9	8	53.71	11	8	0.29	520.66	504	20	1.19E-02	71.6	
10	0	61.87	240	31	0.72	598.87	586	23	2.66E-01	8.2	
11	0	66.06	113	47	0.98	639.07	626	28	1.26E-01	17.1	
12	0	70.02	23	11	0.15	677.00	663	21	2.57E-02	36.4	
13	1	79.81	59	28	0.71	770.83	758	37	6.57E-02	28.0	7.85E-01
14	1	81.24	827	21	0.64	784.56	758	37	9.19E-01	3.7	
15	0	84.03	14	10	0.13	811.35	804	15	1.54E-02	50.6	
16	0	112.24	165	56	0.58	1081.80	1070	21	1.84E-01	12.3	
17	0	116.53	69	4	0.23	1122.95	1110	26	7.65E-02	13.9	
18	0	277.00	57	2	0.75	2661.45	2649	22	6.29E-02	14.4	
19	0	303.58	107	3	0.70	2916.25	2903	25	1.19E-01	10.3	
20	0	334.51	59	13	0.67	3212.88	3198	25	6.50E-02	17.9	
21	1	356.84	389	12	1.01	3426.95	3412	27	4.33E-01	5.3	1.31E+00
22	1	357.37	37	11	1.00	3432.00	3412	27	4.06E-02	44.1	
23	1	384.28	56	1	1.02	3690.00	3679	27	6.19E-02	15.3	3.01E+00
24	1	384.80	28	3	1.01	3694.98	3679	27	3.16E-02	32.5	
25	1	387.10	13	8	1.12	3717.02	3710	26	1.44E-02	71.6	4.62E+00
26	1	387.82	196	19	1.02	3724.00	3710	26	2.18E-01	7.3	

Sample ID : 1111141-06 Acquisition date : 2-DEC-2011 08:32:56

Total number of lines in spectrum	26	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	6	23.08%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.175E+02	4.176E+02	0.706E+02	16.91	
		Total Activity :	4.175E+02	4.176E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	8.704E-01	8.704E-01	11.06E-01	127.06	
PA-234	4.47E+09Y	1.00	2.573E+00	2.573E+00	1.183E+00	45.96	
TH-234	4.47E+09Y	1.00	2.165E+02	2.165E+02	0.368E+02	16.97	
		Total Activity :	2.200E+02	2.200E+02			

Grand Total Activity : 6.375E+02 6.375E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-06
Acquisition date : 2-DEC-2011 08:32:56

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.175E+02	4.176E+02	16.91	OK
	302.84	17.80	2.575E+00	6.992E+02	6.992E+02	33.43	OK
	356.01	60.00	4.312E+00	4.521E+02	4.521E+02	17.98	OK

Final Mean for 3 Valid Peaks = 4.176E+02+/- 7.063E+01 (16.91%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	8.704E-01	8.704E-01	127.06	OK
	10.11	20.20	1.000E+02	1.810E+00	1.810E+00	127.06	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	5.419E+03	5.419E+03	31.90	OK

Final Mean for 3 Valid Peaks = 8.704E-01+/- 1.106E+00 (127.06%)

PA-234	9.89	89.00	1.000E+02	4.108E-01	4.108E-01	127.06	OK
	21.72	64.90*	1.000E+02	2.573E+00	2.573E+00	45.96	OK
	37.93	23.75	1.000E+02	----- Line Not Found		-----	Absent
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 2 Valid Peaks = 2.573E+00+/- 1.183E+00 (45.96%)

TH-234	63.29	3.80*	8.750E+01	2.165E+02	2.165E+02	16.97	OK

Final Mean for 1 Valid Peaks = 2.165E+02+/- 3.675E+01 (16.97%)

Flag: "*" = Keyline

Sample ID : 1111141-06 Acquisition date : 2-DEC-2011 08:32:56

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.176E+02	7.063E+01	1.315E+01	1.937E+00	31.743
PA-231	8.704E-01	1.106E+00	1.691E+00	1.903E-02	0.515
PA-234	2.573E+00	1.183E+00	7.699E-01	8.666E-03	3.342
TH-234	2.165E+02	3.675E+01	2.836E+01	3.649E-01	7.633

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	9.855E+00		1.499E+01	2.962E+01	1.004E+01	0.333
CD-109	8.068E+01		7.966E+01	1.706E+02	1.641E+01	0.473
NP-237	-1.546E+01		2.491E+01	3.863E+01	3.407E+00	-0.400
AM-241	-5.182E-02		1.649E+00	2.470E+00	2.781E-02	-0.021

VAX/VMS Peak Search Report Generated 2-DEC-2011 09:05:41.50

12/2/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114107_GE5_BAFIL_171657.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5N
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 08:50:23.
Sample ID : 1111141-07 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	4	20.89	63	8	0.56	206.00	193	25	7.04E-02	20.3	1.63E+00
2	4	21.45	45	7	0.55	211.32	193	25	4.96E-02	26.3	
3	0	25.76	16	21	0.13	252.66	238	16	1.78E-02	67.7	
4	0	30.98	2152	142	0.72	302.68	292	22	2.39E+00	2.6	
5	1	35.09	452	41	0.55	342.15	332	31	5.02E-01	5.8	1.01E+00
6	1	35.96	123	21	0.66	350.42	332	31	1.37E-01	21.4	
7	0	52.06	33	27	0.60	504.84	496	18	3.63E-02	36.4	
8	0	53.48	35	22	0.24	518.40	513	14	3.90E-02	30.1	
9	0	61.96	212	65	0.85	599.76	585	28	2.35E-01	11.4	
10	2	65.88	71	25	0.81	637.34	626	29	7.94E-02	21.3	8.37E-01
11	2	66.47	43	24	0.67	643.00	626	29	4.74E-02	32.7	
12	5	79.79	54	29	0.75	770.66	760	34	6.04E-02	30.7	1.31E+00
13	5	81.24	902	17	0.68	784.63	760	34	1.00E+00	3.5	
14	0	84.36	21	21	0.19	814.51	802	21	2.37E-02	50.3	
15	0	112.24	201	50	0.81	1081.84	1065	31	2.23E-01	11.3	
16	10	116.06	51	17	1.27	1118.45	1108	23	5.69E-02	21.0	1.40E+00
17	10	117.09	10	4	0.34	1128.27	1108	23	1.06E-02	46.8	
18	6	276.83	56	0	0.90	2659.86	2648	22	6.26E-02	13.2	1.65E+00
19	6	277.43	12	0	0.75	2665.58	2648	22	1.36E-02	36.5	
20	0	303.53	119	3	0.87	2915.86	2903	25	1.32E-01	9.7	
21	0	334.27	44	11	0.71	3210.58	3197	24	4.94E-02	21.4	
22	0	356.80	395	11	0.92	3426.51	3412	29	4.39E-01	5.3	
23	4	384.49	85	2	1.02	3692.00	3679	24	9.47E-02	11.1	3.24E+00
24	4	385.16	15	2	0.67	3698.49	3679	24	1.67E-02	42.8	
25	1	387.62	77	11	1.02	3722.00	3707	32	8.59E-02	17.4	1.66E+00
26	1	388.03	52	10	1.02	3726.00	3707	32	5.75E-02	25.6	
27	0	392.21	33	8	0.49	3766.00	3748	29	3.67E-02	24.8	

Sample ID : 1111141-07 Acquisition date : 2-DEC-2011 08:50:23

Total number of lines in spectrum	27	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	6	22.22%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.553E+02	4.553E+02	0.763E+02	16.75	
		Total Activity :	4.553E+02	4.553E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.914E+02	1.914E+02	0.443E+02	23.15	
		Total Activity :	1.914E+02	1.914E+02			

Grand Total Activity : 6.467E+02 6.467E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-07
Acquisition date : 2-DEC-2011 08:50:23

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.553E+02	4.553E+02	16.75	OK
	302.84	17.80	2.575E+00	7.784E+02	7.785E+02	32.72	OK
	356.01	60.00	4.312E+00	4.588E+02	4.588E+02	17.98	OK

Final Mean for 3 Valid Peaks = 4.553E+02+/- 7.625E+01 (16.75%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.914E+02	1.914E+02	23.15	OK

Final Mean for 1 Valid Peaks = 1.914E+02+/- 4.431E+01 (23.15%)

Flag: "*" = Keyline

Sample ID : 1111141-07 Acquisition date : 2-DEC-2011 08:50:23

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.553E+02	7.625E+01	1.185E+01	1.745E+00	38.407
TH-234	1.914E+02	4.431E+01	2.294E+01	2.951E-01	8.346

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	7.408E-01		1.531E+01	2.853E+01	9.672E+00	0.026
CD-109	-5.265E+00		1.053E+02	1.903E+02	1.831E+01	-0.028
PA-231	3.282E-01		9.200E-01	1.770E+00	1.993E-02	0.185
PA-234	2.066E+00	+	1.089E+00	2.183E+00	2.458E-02	0.946
NP-237	-1.667E+01		3.322E+01	4.740E+01	4.181E+00	-0.352
AM-241	5.380E-01		1.752E+00	2.754E+00	3.100E-02	0.195

VAX/VMS Peak Search Report Generated 2-DEC-2011 09:22:13.17

12/24

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114108_GE5_BAFIL_171659.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5S
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 09:06:53.
Sample ID : 1111141-08 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.75	3	13	0.19	108.75	100	10	3.68E-03	207.5	
2	6	20.01	38	6	0.79	197.51	191	26	4.27E-02	18.2	1.24E+00
3	6	21.07	53	4	0.65	207.70	191	26	5.90E-02	21.5	
4	0	28.17	43	34	1.64	275.72	265	23	4.83E-02	38.2	
5	0	30.97	2092	107	0.75	302.65	292	23	2.32E+00	2.5	
6	2	35.13	419	27	0.65	342.46	331	28	4.65E-01	5.8	1.54E+00
7	2	36.02	95	7	0.60	351.00	331	28	1.05E-01	22.6	
8	0	53.36	64	16	0.56	517.25	507	21	7.06E-02	18.7	
9	0	61.89	199	38	0.81	599.07	587	25	2.21E-01	9.9	
10	1	65.74	79	23	0.67	636.00	626	28	8.80E-02	16.8	1.61E+00
11	1	66.58	46	21	0.67	644.00	626	28	5.12E-02	29.5	
12	3	79.81	60	18	0.73	770.90	761	33	6.65E-02	19.6	1.75E+00
13	3	81.22	931	10	0.70	784.43	761	33	1.03E+00	3.4	
14	1	112.02	193	50	0.82	1079.71	1068	25	2.14E-01	10.3	5.47E+00
15	1	112.47	49	30	0.74	1084.00	1068	25	5.48E-02	36.0	
16	1	116.02	41	18	0.75	1118.00	1110	26	4.55E-02	24.5	3.62E+00
17	1	116.54	44	21	0.75	1123.00	1110	26	4.84E-02	28.4	
18	0	139.89	5	18	0.88	1346.88	1331	17	5.97E-03	156.9	
19	0	161.26	22	32	0.43	1551.80	1532	24	2.44E-02	61.3	
20	0	276.98	26	12	0.69	2661.24	2646	22	2.85E-02	33.9	
21	0	303.57	119	9	0.76	2916.23	2903	24	1.32E-01	10.5	
22	1	356.22	28	5	0.99	3421.00	3412	27	3.13E-02	63.7	1.15E+00
23	1	356.85	332	6	1.00	3427.00	3412	27	3.69E-01	6.0	
24	3	384.49	46	0	1.02	3692.00	3680	25	5.15E-02	18.8	9.25E-01
25	3	385.37	23	0	0.74	3700.50	3680	25	2.61E-02	21.3	
26	0	387.67	107	10	1.02	3722.48	3708	28	1.18E-01	11.6	

Sample ID : 1111141-08 Acquisition date : 2-DEC-2011 09:06:53

Total number of lines in spectrum	26	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	7	26.92%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.701E+02	4.701E+02	0.784E+02	16.67	
		Total Activity :	4.701E+02	4.701E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	2.368E-01	2.368E-01	9.830E-01	415.05	
PA-234	4.47E+09Y	1.00	2.457E+00	2.457E+00	1.062E+00	43.24	
TH-234	4.47E+09Y	1.00	1.800E+02	1.800E+02	0.366E+02	20.34	
		Total Activity :	1.827E+02	1.827E+02			

Grand Total Activity : 6.528E+02 6.528E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-08 Acquisition date : 2-DEC-2011 09:06:53

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.701E+02	4.701E+02	16.67	OK
	302.84	17.80	2.575E+00	7.780E+02	7.781E+02	33.71	OK
	356.01	60.00	4.312E+00	3.270E+01	3.270E+01	128.26	OK

Final Mean for 3 Valid Peaks = 4.701E+02+/- 7.835E+01 (16.67%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	2.368E-01	2.368E-01	415.05	OK
	10.11	20.20	1.000E+02	4.924E-01	4.924E-01	415.05	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	6.030E+03	6.030E+03	32.20	OK

Final Mean for 3 Valid Peaks = 2.368E-01+/- 9.830E-01 (415.05%)

PA-234	9.89	89.00	1.000E+02	1.118E-01	1.118E-01	415.05	OK
	21.72	64.90*	1.000E+02	2.457E+00	2.457E+00	43.24	OK
	37.93	23.75	1.000E+02	1.200E+01	1.200E+01	45.35	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 2.457E+00+/- 1.062E+00 (43.24%)

TH-234	63.29	3.80*	8.750E+01	1.800E+02	1.800E+02	20.34	OK

Final Mean for 1 Valid Peaks = 1.800E+02+/- 3.661E+01 (20.34%)

Flag: "*" = Keyline

Sample ID : 1111141-08 Acquisition date : 2-DEC-2011 09:06:53

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.701E+02	7.835E+01	1.159E+01	1.706E+00	40.565
PA-231	2.368E-01	9.830E-01	1.548E+00	1.742E-02	0.153
PA-234	2.457E+00	1.062E+00	9.407E-01	1.059E-02	2.612
TH-234	1.800E+02	3.661E+01	2.489E+01	3.202E-01	7.232

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.420E-01		1.416E+01	2.653E+01	8.992E+00	0.009
CD-109	8.145E+01		9.788E+01	1.970E+02	1.896E+01	0.413
NP-237	-1.822E+01		2.548E+01	4.201E+01	3.705E+00	-0.434
AM-241	1.068E+00		1.255E+00	2.278E+00	2.565E-02	0.469

VAX/VMS Peak Search Report Generated 2-DEC-2011 09:45:56.03

171216

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114109_GE5_BAFIL_171661.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5W
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 09:30:37.
Sample ID : 1111141-09 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4.29	15	53	0.18	46.79	39	11	1.69E-02	102.1	
2	0	13.63	11	6	0.12	136.35	129	12	1.27E-02	51.8	
3	2	19.86	26	10	0.67	196.12	182	35	2.84E-02	39.9	5.21E-01
4	2	21.10	107	10	0.68	208.00	182	35	1.19E-01	12.6	
5	0	24.21	8	6	0.13	237.81	231	12	8.89E-03	70.7	
6	0	25.59	7	15	0.18	251.03	242	12	7.58E-03	120.1	
7	0	31.01	2092	120	0.73	302.96	292	26	2.32E+00	2.7	
8	5	35.11	461	25	0.65	342.32	333	25	5.12E-01	5.6	1.05E+00
9	5	36.09	107	15	0.50	351.72	333	25	1.19E-01	17.3	
10	0	53.54	38	28	0.57	519.00	510	16	4.20E-02	31.8	
11	0	61.96	269	37	0.75	599.69	587	31	2.98E-01	8.5	
12	1	65.74	55	12	0.67	636.00	629	33	6.12E-02	19.6	1.27E+00
13	1	66.33	58	14	0.60	641.64	629	33	6.50E-02	22.0	
14	1	67.10	28	14	0.67	649.00	629	33	3.13E-02	42.6	
15	1	79.68	31	29	0.76	769.66	758	38	3.47E-02	48.0	8.57E-01
16	1	81.24	848	25	0.66	784.62	758	38	9.42E-01	3.6	
17	0	112.09	203	56	0.70	1080.41	1065	28	2.25E-01	11.3	
18	0	116.29	40	20	1.25	1120.66	1111	17	4.48E-02	26.7	
19	0	161.19	21	18	0.61	1551.14	1540	18	2.33E-02	45.9	
20	0	277.34	20	15	0.23	2664.73	2655	17	2.26E-02	40.2	
21	3	303.13	95	2	0.95	2912.00	2901	24	1.06E-01	11.5	3.01E+00
22	3	303.82	53	2	0.76	2918.60	2901	24	5.90E-02	18.5	
23	1	334.21	91	15	0.98	3210.00	3195	28	1.01E-01	12.3	3.90E+00
24	1	334.94	10	3	0.98	3217.00	3195	28	1.10E-02	80.6	
25	3	356.49	143	4	0.80	3423.62	3412	29	1.59E-01	14.4	1.20E+00
26	3	357.06	292	7	1.00	3429.00	3412	29	3.25E-01	7.1	
27	0	384.79	86	10	0.65	3694.88	3681	24	9.57E-02	12.9	
28	3	387.41	105	2	1.02	3720.00	3708	27	1.16E-01	11.6	4.39E+00
29	3	387.89	68	3	1.11	3724.62	3708	27	7.51E-02	17.5	

Sample ID : 1111141-09 Acquisition date : 2-DEC-2011 09:30:37

Total number of lines in spectrum	29	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	6	20.69%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.280E+02	4.280E+02	0.724E+02	16.91	
		Total Activity :	4.280E+02	4.280E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.426E+02	2.426E+02	0.424E+02	17.48	
		Total Activity :	2.426E+02	2.426E+02			

Grand Total Activity : 6.706E+02 6.706E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-09
Acquisition date : 2-DEC-2011 09:30:37

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.280E+02	4.280E+02	16.91	OK
	302.84	17.80	2.575E+00	6.252E+02	6.253E+02	35.04	OK
	356.01	60.00	4.312E+00	1.662E+02	1.662E+02	32.21	OK

Final Mean for 3 Valid Peaks = 4.280E+02+/- 7.237E+01 (16.91%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.426E+02	2.426E+02	17.48	OK

Final Mean for 1 Valid Peaks = 2.426E+02+/- 4.242E+01 (17.48%)

Flag: "*" = Keyline

Sample ID : 1111141-09 Acquisition date : 2-DEC-2011 09:30:37

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.280E+02	7.237E+01	1.333E+01	1.962E+00	32.119
TH-234	2.426E+02	4.242E+01	2.644E+01	3.402E-01	9.176

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.783E+00		1.444E+01	2.613E+01	8.857E+00	-0.107
CD-109	9.647E+01		8.957E+01	1.881E+02	1.810E+01	0.513
PA-231	1.452E-01		8.658E-01	1.638E+00	1.844E-02	0.089
PA-234	4.948E+00	+	1.259E+00	2.247E+00	2.530E-02	2.202
NP-237	-1.761E+01		2.499E+01	4.128E+01	3.641E+00	-0.427
AM-241	1.237E+00		1.336E+00	2.418E+00	2.722E-02	0.512

VAX/VMS Peak Search Report Generated 2-DEC-2011 10:03:08.59

12/2/11

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111114110_GE5_BAFIL_171664.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BKG-5E
Deposition Date :
Sample Date : 2-DEC-2011 00:00:00. Acquisition date : 2-DEC-2011 09:47:51.
Sample ID : 1111141-10 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	5	16.15	21	0	0.60	160.52	152	17	2.35E-02	25.0	1.16E+00
2	5	16.70	16	0	0.32	165.84	152	17	1.72E-02	24.1	
3	3	19.90	28	12	0.74	196.47	190	27	3.08E-02	32.4	1.14E+00
4	3	21.03	123	13	0.74	207.33	190	27	1.37E-01	11.8	
5	0	25.23	16	22	1.15	247.55	237	17	1.81E-02	69.5	
6	0	30.98	2138	159	0.63	302.75	289	30	2.38E+00	2.8	
7	3	35.10	390	42	0.63	342.24	334	28	4.33E-01	6.4	1.23E+00
8	3	35.99	141	26	0.73	350.79	334	28	1.56E-01	19.3	
9	2	61.36	77	20	0.71	593.94	584	30	8.51E-02	23.1	2.28E+00
10	2	61.89	195	23	0.80	599.06	584	30	2.17E-01	9.8	
11	1	66.03	103	28	0.73	638.74	629	30	1.15E-01	14.6	1.62E+00
12	1	67.24	35	14	0.74	650.36	629	30	3.91E-02	32.4	
13	0	81.27	833	73	0.63	784.83	773	26	9.25E-01	4.3	
14	0	84.15	31	6	0.34	812.49	803	17	3.48E-02	23.2	
15	0	112.17	170	57	0.66	1081.14	1069	27	1.89E-01	13.3	
16	0	116.63	49	20	1.02	1123.88	1112	20	5.47E-02	23.6	
17	0	161.09	27	9	0.51	1550.13	1540	18	3.03E-02	29.1	
18	0	190.19	14	4	1.14	1829.11	1819	17	1.54E-02	37.6	
19	0	276.84	44	10	0.66	2659.97	2646	24	4.91E-02	21.5	
20	3	302.84	27	1	0.85	2909.16	2903	24	3.02E-02	28.8	1.98E+00
21	3	303.47	103	6	0.85	2915.23	2903	24	1.15E-01	11.2	
22	0	308.09	25	11	0.82	2959.58	2945	22	2.78E-02	32.6	
23	6	334.21	59	16	1.07	3209.94	3201	22	6.58E-02	16.0	1.49E+00
24	6	335.18	12	5	0.52	3219.27	3201	22	1.35E-02	41.5	
25	0	356.82	422	14	0.80	3426.76	3412	28	4.69E-01	5.2	
26	1	384.28	41	4	0.92	3690.03	3680	26	4.51E-02	25.8	2.34E+00
27	1	384.90	84	9	1.02	3696.00	3680	26	9.38E-02	13.1	
28	0	387.76	147	14	0.63	3723.37	3708	28	1.63E-01	9.9	
29	0	392.13	18	18	0.68	3765.24	3750	20	2.05E-02	52.2	

Sample ID : 1111141-10 Acquisition date : 2-DEC-2011 09:47:51

Total number of lines in spectrum	29	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	7	24.14%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.205E+02	4.205E+02	0.735E+02	17.48	
			---	---			
	Total Activity :		4.205E+02	4.205E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.765E+02	1.765E+02	0.354E+02	20.05	
AM-241	432.20Y	1.00	6.410E+00	6.410E+00	2.970E+00	46.34	
			---	---			
	Total Activity :		1.829E+02	1.829E+02			

Grand Total Activity : 6.034E+02 6.035E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111141-10 Acquisition date : 2-DEC-2011 09:47:51

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.205E+02	4.205E+02	17.48	OK
	302.84	17.80	2.575E+00	1.783E+02	1.783E+02	63.28	OK
	356.01	60.00	4.312E+00	4.903E+02	4.903E+02	17.83	OK

Final Mean for 3 Valid Peaks = 4.205E+02+/- 7.351E+01 (17.48%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.765E+02	1.765E+02	20.05	OK

Final Mean for 1 Valid Peaks = 1.765E+02+/- 3.540E+01 (20.05%)

AM-241	59.54	35.90*	1.000E+02	6.410E+00	6.410E+00	46.34	OK

Final Mean for 1 Valid Peaks = 6.410E+00+/- 2.970E+00 (46.34%)

Flag: "*" = Keyline

Sample ID : 1111141-10 Acquisition date : 2-DEC-2011 09:47:51

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.205E+02	7.351E+01	2.008E+01	2.956E+00	20.947
TH-234	1.765E+02	3.540E+01	3.101E+01	3.989E-01	5.693
AM-241	6.410E+00	2.970E+00	2.362E+00	2.658E-02	2.714

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.638E+00		1.504E+01	2.689E+01	9.116E+00	-0.135
CD-109	-7.424E+00		9.710E+01	1.762E+02	1.695E+01	-0.042
PA-231	-6.664E-01		9.339E-01	1.522E+00	1.713E-02	-0.438
PA-234	5.702E+00	+	1.364E+00	2.204E+00	2.481E-02	2.587
NP-237	-1.609E+01		2.880E+01	4.418E+01	3.897E+00	-0.364

FOXFIRE SCIENTIFIC

Alcoa – TT ESL

STANDARD LEVEL IV
REPORT OF ANALYSIS

WORK ORDER #11-11163-OR

December 16, 2011

EBERLINE ANALYTICAL/OAK RIDGE LABORATORY
OAK RIDGE, TN

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Eberline Services – Oak Ridge Laboratory

LABORATORY DATA SUPPORT CHECKLIST

MP-001-3

Eberline Services Work Order # 11-11163

The checklist items listed below are to be initialed by appropriate staff upon completion/verification.

Date for Partial	Initials	Date	Initials	Checklist Items
		11-29-11	JWM	Sample Log-In
		12/14/11	KW	Data Compilation
		12-15-11	MLT	First Technical Data Review
		12/15/11	[illegible]	Second Technical Data Review
		12/16/11	[illegible]	Data Entry/Electronic Deliverable
		12/16/11	[illegible]	Case Narrative
		12/16/11	KBS	Electronic Deliverable Proof
		12/16/11	[illegible]	Samples Analyzed within Holding Time Yes? [ ] No? [ ]
		12/16/11	[illegible]	QA/QC Review
		12/15/11	[illegible]	Client in Possession of Data Electronic or Hard Copy
				Invoiced by Laboratory

Technical/Clerical Corrections, Signatures Needed, Problems, Etc	Date/Initials

Date package approved by: [illegible] 12/16/11

Laboratory Manager Date

Copy No. _____

SECTION I

CHAIN OF CUSTODY

EBERLINE SERVICES **Richmond Laboratory**

Chain of Custody

CLIENT: Forfire Scientific

ADDRESS: 4621 S. Cooper St #131-332
Arlington, TX 76017

PROJECT: Alcoa- ESL

PURCHASE ORDER NO.

DATE 11/28 PAGE 1 OF 1

TAT (IN DAYS) 14

SAMPLERS SIGNATURE:

OBSERVATIONS, COMMENTS, VOLUMES, SPECIAL OR ADDITIONAL TEST

11-11163

	SAMPLE NO.	DATE *	TIME	LOCATION	Ra-226	Ra-228	Total U									SAMPLE TYPE OR MATRIX	# CONTAINERS	
4	Core 1 0-1				x	x	x									soil	1	* Used Relinquish
5	Core 2 11-12																1	signature date as
6	Core 3 2-3																1	sample collection
7	Core 4 4-5																1	date. Eyt 11/29/11
8	Core 5 4-5																1	
9	Core 6 10-11																1	
10	Core 7 5-6																1	
11	Core 8 2-3																1	
12	Core 9 5-6																1	
13	Core 10 8-9																1	
																	1	

1) RELINQUISHED BY / DATE:	2) RECEIVED BY / DATE:	3) RELINQUISHED BY / DATE:	4) RECEIVED BY / DATE:
[signature] 11/28/11	Justin McKee 11-29-11 @ 0800		
COMPANY: Forfire	COMPANY: Eberline	COMPANY:	COMPANY:
5) RELINQUISHED BY / DATE:	6) RECEIVED BY / DATE:	7) RELINQUISHED BY / DATE:	8) RECEIVED BY / DATE:
COMPANY:	COMPANY:	COMPANY:	COMPANY:

TOTAL NO. OF CONTAINERS: 10

METHOD OF SHIPMENT: UPS

SPECIAL SHIPMENT-HANDLING, STORAGE REQUIREMENTS, OR POSSIBLE HAZARDS

REC'D NOV 29 2011

2030 Wright Avenue P.O. Box 4040 Richmond, CA 94804-0040 (510) 235-2633 FAX No. (510) 235-0438

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11163
		Lab Deadline	12/9/2011
		Analysis	UUISO - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	89	M1.4
	05	78	M1.4
	06	85	M1.4
	07	95	M1.4
	08	55	M1.4
	09	83	M1.4
	10	61	M1.4
	11	75	M1.4
	12	74	M1.4
	13	91	M1.4

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1230	Kenny Gray	11-29-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	Kenny Gray	11-30-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 1300
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	RM 12/8/11	0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	RM 12/8/11	0810
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12/8/11 0810
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/8/11 1721
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11163
		Lab Deadline	12/9/2011
		Analysis	Ra226 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	89	M1.4
	05	78	M1.4
	06	85	M1.4
	07	95	M1.4
	08	55	M1.4
	09	83	M1.4
	10	61	M1.4
	11	75	M1.4
	12	74	M1.4
	13	91	M1.4

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1230	Kenygeis	11-29-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	Kenygeis	11-30-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 1950
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-1-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-2-11 1510
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/2/11 1520
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	12/5/11 1330
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

EBERLINE SERVICES Oak Ridge Laboratory	Internal Chain of Custody	Work Order #	11-11163
		Lab Deadline	12/9/2011
		Analysis	Ra228 - Level 4
		Sample Matrix	Soil/Solid

Comments	Sample Fraction	HP 210 / 270 Detector Activity	Storage Location
	04	89	M1.4
	05	78	M1.4
	06	85	M1.4
	07	95	M1.4
	08	55	M1.4
	09	83	M1.4
	10	61	M1.4
	11	75	M1.4
	12	74	M1.4
	13	91	M1.4

	Location (circle one)					Initials	Date
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room 1230	[illegible]	11-29-11
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room 0800	[illegible]	11-30-11
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	11/30/11 1950
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-1-11 0800
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-2-11 1510
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/2/11 1520
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	AG	12/5/11 1345
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-5-11 1345
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-13-11 1235
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room	[illegible]	12-13-11 [illegible]
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room	ICB	12/13/11 1405
Received by	Sample Storage	Rough Prep	Prep	Separations	Count Room		
Relinquished by	Sample Storage	Rough Prep	Prep	Separations	Count Room		

SECTION II

SAMPLE ACKNOWLEDGEMENT

Client Name	Contract/PO	Project Type	Date Received	Required Turnaround Days	Eberline Services Work Order
Foxfire Scientific, Inc.	ALCOA - TT ESL	Environmental	11/29/2011	14	11-11163
Project Name	**Client WO**	**Sample Disp**	**Lab Deadline**	**Internal Deadline**	**Client Deadline**
ALCOA - TT ESL	Soil	H	12/09/2011	12/12/2011	12/13/2011

Internal ID	Client ID	Sample Date	Matrix	Storage	Ra226	Ra228	Th230	Ttl
01	LCS	11/29/11	SO	M1.4	X	X	X	3
02	BLANK	11/29/11	SO	M1.4	X	X	X	3
03	DUP	11/29/11	SO	M1.4	X	X	X	3
04	CORE 1 0-1	11/28/11 00:00	SO	M1.4	X	X	X	3
05	CORE 2 11-12	11/28/11 00:00	SO	M1.4	X	X	X	3
06	CORE 3 2-3	11/28/11 00:00	SO	M1.4	X	X	X	3
07	CORE 4 4-5	11/28/11 00:00	SO	M1.4	X	X	X	3
08	CORE 5 4-5	11/28/11 00:00	SO	M1.4	X	X	X	3
09	CORE 6 10-11	11/28/11 00:00	SO	M1.4	X	X	X	3
10	CORE 7 5-6	11/28/11 00:00	SO	M1.4	X	X	X	3
11	CORE 8 2-3	11/28/11 00:00	SO	M1.4	X	X	X	3
12	CORE 9 5-6	11/28/11 00:00	SO	M1.4	X	X	X	3
13	CORE 10 8-9	11/28/11 00:00	SO	M1.4	X	X	X	3
								0
								0
								0
								0
								0
								0
								0
	Totals Per Analysis (non QA samples)				10	10	10	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

EBERLINE SERVICES

Sample Log In Report

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830

Voice: (865) 481-0683
Fax: (865) 483-4621

Invoice	Accounts Payable Foxfire Scientific, Inc 4621 S. Cooper St. #131-332 Arlington, TX 76017
Voice	817-996-6762
Fax	
Contact	Matthew Arno
Voice	817-563-0579
Fax	877 433-2029

Report Data	Matthew Arno Foxfire Scientific, Inc. 4621 S Cooper St #131-332 Arlington, TX 76017
Voice	817-563-0579
Fax	877-433-2029

Printed: 11/29/2011 11:08 AM

Eberline Services – Oak Ridge Laboratory

SAMPLE RECEIPT CHECKLIST
MP-001-2

WORK ORDER # 11-11163

SAMPLE MATRIX/MATRICES: (CIRCLE ONE OR BOTH)

AQUEOUS NON-AQUEOUS

(CIRCLE EITHER YES, NO, OR N/A)

WERE SAMPLES:

Received in good condition?	Y	N	
If aqueous, properly preserved	Y	N	N/A

WERE CHAIN OF CUSTODY SEALS:

Present on outside of package?	Y	N
Unbroken on outside of package?	Y	N
Present on samples?	Y	N
Unbroken on samples?	Y	N
Was chain of custody present upon sample receipt?	Y	N

IF THE RESPONSE TO ANY OF THE ABOVE IS **NO**, A DISCREPANT SAMPLE RECEIPT REPORT (DSR) HAS BEEN ISSUED.

REMARKS: (10) ziploc bags of soil

SIGNATURE: Justin McKay DATE: 11·29·11

SECTION III

CASE NARRATIVE

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD
OAK RIDGE, TENNESSEE 37830
PHONE (865) 481-0683
FAX (865) 483-4621

EBS-OR-33147

December 16, 2011

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

CASE NARRATIVE
Work Order # 11-11163-OR

SAMPLE RECEIPT

This work order contains ten soil samples received 11/29/2011. Samples were analyzed for Isotopic Uranium, Total Uranium by Alpha and Radium-226/228.

CLIENT ID	LAB ID	CLIENT ID	LAB ID
CORE 1 0-1	11-11163-04	CORE 6 10-11	11-11163-09
CORE 2 11-12	11-11163-05	CORE 7 5-6	11-11163-10
CORE 3 2-3	11-11163-06	CORE 8 2-3	11-11163-11
CORE 4 4-5	11-11163-07	CORE 9 5-6	11-11163-12
CORE 5 4-5	11-11163-08	CORE 10 8-9	11-11163-13

ANALYTICAL METHODS

Isotopic Uranium was analyzed using Method EML U-02 Modified. Radium-226 was analyzed using EPA Method 903.0 Modified. Radium-228 was analyzed using EPA Method 904.0 Modified.

ANALYTICAL RESULTS

Combined Standard Uncertainty is reported at 2-sigma value.

ISOTOPIC URANIUM

Samples were prepared by removing representative aliquots followed by mixed acid digestions as appropriate. Uranium was selectively extracted by ion exchange. Uranium was eluted, micro-precipitated and mounted on micro-porous filter media. Sample activities were then determined by alpha spectroscopy using energy specific regions of interest for Uranium-234, Uranium-235 and Uranium-238. Chemical recovery was determined by the use of a Uranium-232 tracer. Activity of the Uranium-232 tracer was determined by alpha spectroscopy using an energy specific region of interest.

ANALYTICAL RESULTS CONTINUED

ISOTOPIC URANIUM CONTINUED

Samples demonstrated acceptable results for Uranium-234, Uranium-235 and Uranium-238 activity. Total Uranium results were calculated by mass conversion of Isotopic Uranium activity. Chemical recovery was low for the method blank. Chemical recovery was acceptable for all other samples. The Uranium-234, Uranium-235 and Uranium-238 method blank demonstrated acceptable results. Results for the Uranium-234 and Uranium-238 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Uranium-235 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Uranium-234 and Uranium-238 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-226

Samples were prepared by drying, pulverizing and homogenization. Representative aliquots were removed and digested using mixed acids. Radium-226 was precipitated as Radium sulfate using elemental Barium and Lead as carriers. Sulfates were dissolved in alkaline EDTA. Radium-226 was selectively precipitated from slightly acidic EDTA. Precipitates were then mounted by semi-micro-precipitations onto micro-porous filters. Samples were counted by alpha spectroscopy using an energy specific region of interest for Radium-226. Chemical recovery was calculated by the use of a Barium-133 tracer, which was determined by HPGe gamma spectroscopy.

Samples demonstrated acceptable results for Radium-226 activity. Chemical recovery was acceptable for all samples. The Radium-226 method blank demonstrated acceptable results. Results for the Radium-226 duplicate demonstrated a high relative percent difference; however, normalized difference is within acceptable limits for the analytical technique. Results for the Radium-226 laboratory control sample demonstrated an acceptable percent recovery.

RADIUM-228

Following alpha spectroscopy analysis of Radium-226, Barium/Radium Sulfate precipitates were redissolved and allowed for sufficient ingrowth of the Actinium-228 daughter. After ingrowth, Actinium-228 was selectively precipitated. Precipitates were filtered and beta emissions for Actinium-228 were then counted on a gas proportional counter. Chemical recovery was determined by the use of a Barium-133 tracer, the activity of which was determined by HPGe gamma spectroscopy and an elemental Yttrium carrier by gravimetric measurements. The product of these two recoveries was used to calculate chemical yield.

Samples demonstrated acceptable results for Radium-228 activity. Chemical recovery was acceptable for all samples. The Radium-228 method blank demonstrated acceptable results. Results for the Radium-228 duplicate demonstrated an acceptable relative percent difference and normalized difference. Results for the Radium-228 laboratory control sample demonstrated an acceptable percent recovery.

0014

CERTIFICATION OF ACCURACY

I certify that this data report is in compliance with the terms and conditions of the Purchase Order, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the cognizant project manager or his/her designee to be accurate as verified by the following signature.

M.R. McDougall
Laboratory Manager

Date: 12/16/2011

SECTION IV

ANALYTICAL RESULTS SUMMARY

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG: **11-11163**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11163-01	LCS	KNOWN	11/29/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	1.02E+01	4.71E-01			pCi/g
11-11163-01	LCS	SPIKE	11/29/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	1.13E+01	1.38E+00	2.77E+00	2.44E-01	pCi/g
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	7.39E-02	1.13E-01	1.14E-01	1.68E-01	pCi/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	9.39E+00	1.18E+00	2.31E+00	2.81E-01	pCi/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	1.25E+01	1.41E+00	2.99E+00	2.02E-01	pCi/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	7.53E+00	1.01E+00	1.89E+00	1.61E-01	pCi/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	8.77E+00	1.16E+00	2.19E+00	1.57E-01	pCi/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	7.09E+00	1.10E+00	1.86E+00	2.53E-01	pCi/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	3.69E+00	7.92E-01	1.11E+00	2.57E-01	pCi/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	5.95E+00	9.06E-01	1.55E+00	2.05E-01	pCi/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/4/2011	11-11163	Radium-226	EPA 903.0 Modified	4.45E+00	8.72E-01	1.28E+00	1.81E-01	pCi/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/5/2011	11-11163	Radium-226	EPA 903.0 Modified	6.43E+00	1.02E+00	1.70E+00	2.52E-01	pCi/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/5/2011	11-11163	Radium-226	EPA 903.0 Modified	6.23E+00	9.36E-01	1.62E+00	2.38E-01	pCi/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/5/2011	11-11163	Radium-226	EPA 903.0 Modified	8.22E-02	2.10E-02	2.73E-02	7.13E-03	pCi/g
11-11163-01	LCS	KNOWN	11/29/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	3.60E+01	1.84E+00			pCi/g
11-11163-01	LCS	SPIKE	11/29/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	3.66E+01	1.46E+00	8.41E+00	9.66E-01	pCi/g
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	5.75E-01	4.60E-01	4.78E-01	9.16E-01	pCi/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	9.77E+00	9.61E-01	2.41E+00	1.23E+00	pCi/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.10E+01	9.59E-01	2.67E+00	1.09E+00	pCi/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	7.52E+00	8.54E-01	1.90E+00	1.11E+00	pCi/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.04E+01	1.07E+00	2.58E+00	1.45E+00	pCi/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.31E+01	1.22E+00	3.21E+00	1.53E+00	pCi/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.78E+00	6.72E-01	7.84E-01	1.25E+00	pCi/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	3.83E+00	7.97E-01	1.18E+00	1.31E+00	pCi/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.07E+00	5.84E-01	6.32E-01	1.12E+00	pCi/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	7.14E+00	1.00E+00	1.90E+00	1.41E+00	pCi/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	1.45E+00	5.99E-01	6.83E-01	1.12E+00	pCi/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/13/2011	11-11163	Radium-228	EPA 904.0 Modified	7.81E+00	1.02E+00	2.04E+00	1.38E+00	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

Eberline Analytical
Final Report of Analysis

Report To:

Matthew Arno
Foxfire Scientific, Inc.
4621 S. Cooper St. #131-332
Arlington, TX 76017

Work Order Details:

SDG:	**11-11163**
Purchase Order:	ALCOA - TT ESL
Analysis Category:	ENVIRONMENTAL
Sample Matrix:	SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	4.40E+03	6.73E+03	6.74E+03	8.79E+01	ug/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	1.45E+01	2.18E+00	2.45E+00	2.74E-01	ug/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	1.42E+01	2.01E+00	2.29E+00	1.78E-01	ug/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	2.50E+01	3.67E+00	4.14E+00	3.55E-01	ug/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	1.24E+01	2.05E+00	2.26E+00	3.26E-01	ug/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	6.68E+00	1.15E+00	1.26E+00	1.81E-01	ug/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	4.01E+00	1.08E+00	1.12E+00	4.24E-01	ug/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	1.67E+01	2.20E+00	2.55E+00	2.54E-01	ug/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	8.60E+00	1.79E+00	1.90E+00	5.09E-01	ug/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	2.12E+01	2.92E+00	3.35E+00	2.07E-01	ug/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	2.71E+00	7.39E-01	7.68E-01	2.62E-01	ug/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Total Uranium	EML U-02 Modified	1.61E+01	2.21E+00	2.53E+00	2.31E-01	ug/g
11-11163-01	LCS	KNOWN	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	8.10E+00	2.92E-01			pCi/g
11-11163-01	LCS	SPIKE	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	7.65E+00	1.05E+00	1.18E+00	8.12E-02	pCi/g
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	-4.93E+00	9.92E+00	9.92E+00	2.13E+01	pCi/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	4.83E+00	7.28E-01	8.06E-01	6.50E-02	pCi/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	4.58E+00	6.57E-01	7.34E-01	7.08E-02	pCi/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	8.64E+00	1.27E+00	1.42E+00	6.99E-02	pCi/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	4.38E+00	7.18E-01	7.83E-01	9.22E-02	pCi/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	2.47E+00	4.15E-01	4.51E-01	4.80E-02	pCi/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	1.27E+00	3.48E-01	3.59E-01	1.02E-01	pCi/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	6.37E+00	8.23E-01	9.40E-01	6.94E-02	pCi/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	2.58E+00	5.59E-01	5.89E-01	1.43E-01	pCi/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	7.19E+00	9.97E-01	1.12E+00	7.59E-02	pCi/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	8.45E-01	2.42E-01	2.49E-01	7.13E-02	pCi/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-234	EML U-02 Modified	4.72E+00	6.71E-01	7.51E-01	7.74E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

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Final Report of Analysis

Report To:

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Work Order Details:

SDG: **11-11163**
Purchase Order: ALCOA - TT ESL
Analysis Category: ENVIRONMENTAL
Sample Matrix: SO

Lab ID	Sample Type	Client ID	Sample Date	Receipt Date	Analysis Date	Batch ID	Analyte	Method	Result	CU	CSU	MDA	Report Units
11-11163-01	LCS	SPIKE	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	4.84E-01	1.87E-01	1.90E-01	1.00E-01	pCi/g
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	2.97E+00	8.44E+00	8.44E+00	1.49E+01	pCi/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	2.32E-01	1.26E-01	1.27E-01	7.00E-02	pCi/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.70E-01	1.01E-01	1.01E-01	6.97E-02	pCi/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	5.99E-01	2.33E-01	2.37E-01	1.24E-01	pCi/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	2.09E-01	1.31E-01	1.32E-01	1.14E-01	pCi/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.13E-01	8.42E-02	8.45E-02	8.50E-02	pCi/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.98E-02	4.75E-02	4.75E-02	9.96E-02	pCi/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	3.62E-01	1.43E-01	1.45E-01	6.49E-02	pCi/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.73E-01	1.41E-01	1.41E-01	1.56E-01	pCi/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	2.57E-01	1.34E-01	1.35E-01	8.72E-02	pCi/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.65E-01	1.16E-01	1.16E-01	1.10E-01	pCi/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-235	EML U-02 Modified	1.38E-01	9.13E-02	9.18E-02	7.60E-02	pCi/g
11-11163-01	LCS	KNOWN	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	7.90E+00	2.84E-01			pCi/g
11-11163-01	LCS	SPIKE	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	7.64E+00	1.04E+00	1.18E+00	5.63E-02	pCi/g
11-11163-02	MBL	BLANK	11/29/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	1.48E+03	2.26E+03	2.27E+03	2.72E+01	pCi/g
11-11163-03	DUP	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	4.85E+00	7.31E-01	8.09E-01	8.11E-02	pCi/g
11-11163-04	DO	CORE 1 0-1	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	4.76E+00	6.76E-01	7.56E-01	4.91E-02	pCi/g
11-11163-05	TRG	CORE 2 11-12	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	8.31E+00	1.23E+00	1.37E+00	1.00E-01	pCi/g
11-11163-06	TRG	CORE 3 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	4.15E+00	6.89E-01	7.50E-01	9.18E-02	pCi/g
11-11163-07	TRG	CORE 4 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	2.23E+00	3.87E-01	4.18E-01	4.78E-02	pCi/g
11-11163-08	TRG	CORE 5 4-5	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	1.34E+00	3.62E-01	3.74E-01	1.27E-01	pCi/g
11-11163-09	TRG	CORE 6 10-11	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	5.56E+00	7.38E-01	8.39E-01	7.51E-02	pCi/g
11-11163-10	TRG	CORE 7 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	2.86E+00	6.00E-01	6.34E-01	1.47E-01	pCi/g
11-11163-11	TRG	CORE 8 2-3	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	7.08E+00	9.83E-01	1.11E+00	5.59E-02	pCi/g
11-11163-12	TRG	CORE 9 5-6	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	8.85E-01	2.48E-01	2.56E-01	7.10E-02	pCi/g
11-11163-13	TRG	CORE 10 8-9	11/28/11 00:00	11/29/2011	12/8/2011	11-11163	Uranium-238	EML U-02 Modified	5.40E+00	7.43E-01	8.37E-01	6.60E-02	pCi/g

CU=Counting Uncertainty;CSU=Combined Standard Uncertainty (2-sigma);MDA=Minimal Detected Activity;LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original

EBERLINE SERVICES

EBERLINE ANALYTICAL CORPORATION
601 SCARBORO ROAD OAK RIDGE, TN 37830 865/481-0683 FAX 865/483-4621

SECTION V

ANALYTICAL STANDARD

QA/QC REVIEWED
Date 1/16/95 Initials [illegible]

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

U-8

Radionuclide:	U-238NAT	Customer:	TMA EBERLINE
Half Life:	(4.468 ± 0.005) x 10^9 years	P.O.No.:	OR2778
Catalog No.:	7338	Reference Date:	January 1 1995 12:00 PST.
Source No.:	479-50	Contained Radioactivity:	(Total U) 8.016 μCi
		Contained Radioactivity:	(Total U) 297 kBq

Description of Solution

a. Mass of solution: 65.2896 g in a 50 ml flame sealed ampoule

b. Chemical form: Uranyl Nitrate in H2O

c. Carrier content: None

d. Density: Approximately 1.3202 g/ml @ 20°C.

Radioimpurities

Refer to attached technical data sheet

Radioactive Daughters

Refer to attached technical data sheet

Radionuclide Concentration

(Total U) 0.1228 μCi/g.

Method of Calibration

Activity calculations are based upon known specific activity and mass.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.0%
b. Random uncertainty in assay:	±0.0%
c. Random uncertainty in weighing(s):	±2.0%
d. Total uncertainty at the 99% confidence level:	±3.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

ERIC ALLAS
QUALITY CONTROL

29 DECEMBER 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
3017 N. SAN FERNANDO BLVD.
BURBANK, CALIFORNIA 91504
818·843·7000 FAX 818·843·6168

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11 MC

SOLUTION REFERENCE # IPL 479-50

CURRENT DATE ~~10/12/2010~~ 0:00
SOLUTION # U-8

Principal Radionuclide: $^{234, 235, 238}U$

Half Life, Years: 4.468E+09

Half Life, Days: 1.632E+12

Radionuclide: $^{234, 235, 238}U$
Certified Activity: 8.016E+00 µCi
Certified Concentration: µCi per gram

Reference Date: 1/1/1995 0:00

Ampoule /Solution Gross	97.6400	Weight, Grams
Empty Ampoule	32.5020	Weight, Grams
Solution Net	65.1380	Weight, Grams
Total Activity in Ampoule	8.0160	µCi

Chemical Composition of Standard Solution
Uranyl nitrate in dilute HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 8.0160 µCi Which Equals 1.780E+07 dpm at the date listed above

And after dilution the activity of this solution is 1.77965E+04 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Fuller Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.6; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # IPL 479-50

Date 10/12/2010 0:00
Solution # U-5a

Principal Radionuclide	Half Life, Years	Half Life, Days
$^{234,235,238}U$	4.468E+09	1.632E+12

Radionuclide of Interest $^{234,235,238}U$
Parent Solution Conc. 1.7796E+04 dpm/ml

Reference Date 1/1/1996 0:00

Chemical Composition of Standard Solution
Uranly Nitrate in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 4.0000 ml
Total Activity: 7.1182E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 7.1182E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Isotopic Distribution as:
U-238 Atom % = 48.239 U-238 = 71.182 dpm/ml X 0.48249 = 34.345 dpm/ml
U-235 Atom % = 2.25 U-235 = 71.182 dpm/ml X 0.0225 = 1.602 dpm/ml
U-234 Atom % = 49.501 U-238 = 71.182 dpm/ml X 0.49501 = 35.236 dpm/ml
All values +/- 3.6%

Isotopic ratios from manufacturer's data sheet

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By _____ Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

0023

RECORD COPY

Tracer Solution for Environmental Analysis & Disequilibrium Studies

Product Description & Measurement Certificate

Description	Principal radionuclide:	**uranium 232** (U-232)	Product code: **UDP10050**
	Daughter Nuclide:	Th-228	Batch Number: 92/232/67
Measurement	Reference date:		01 March 2000
	Radioactive concentration U-232		6.739E+03 becquerels per gram of solution
	which is equivalent to		1.821E-01 microcuries per gram of solution
	Mass of solution		5.356 grams
	Volume of solution		5.035 millilitres
	Total activity of U-232		3.61E+04 becquerels
	which is equivalent to		9.76E-01 microcuries

Accuracy

Method of measurement (see reverse of this certificate)
Random uncertainty is: ± 0.7% Systematic uncertainty: ± 0.5%
Overall uncertainty in the radioactive concentration quoted above: ± 1.7%
Overall uncertainty is defined on the reverse of this certificate.

Radionuclidic Purity

Any radioactive impurities measured are listed below, expressed as percentages of the activity of the principle radionuclide at the reference date .

Th-228 and daughter activity removed 2 Feb 2000
U-232 daughters activity will increase with time. By alpha 88% U-232, 12% daughters on 1/3/00

Isotopic Purity

The isotopic composition, expressed as atom per cent at the reference date .

Not measured

Chemical Composition

Calculated weight of U-232, 4.42E-08 grams, as 2M HNO3 solution in a flame sealed glass vial.
This Tracer solution has been produced 'carrier free'.

Physical Data

Recommended half life of uranium 232: 6.980E+01 years
Principle energies of alpha emissions (MeV): 5.263 31.7%, 5.320 68.0%
Branching ratio for alpha emission: 100%
Calculated specific activity of uranium 232: 8.167E+05 Bq per microgram U-232.

Remarks

For safety information and notes to ensure correct usage by all persons handling this radioactive Tracer solution please read the instructions accompanying the package.

AEA Technology operates a quality management system which has been independently audited and approved to ISO 9001.

Approved Signatory

Roger Wiltshire

Project Ref. AE2315

Roger Wiltshire

Prepared and characterised in the UK, for world wide distribution by **Isotrak, AEA Technology, QSA.**

0024

12/10/11

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

9/24/11

CURRENT DATE: ~~10/13/2010~~ 0:00

SOLUTION REFERENCE #: AEA/Amersham 92/232/67

SOLUTION #: U-10

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide: ^{232}U

Reference Date: 3/1/2000 0:00

Certified Activity: 9.760E-01 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams

Empty Ampoule: Weight, Grams

Solution Net: Weight, Grams

Total Activity in Ampoule: 0.9760 µCi

Chemical Composition of Standard Solution

$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used: 2M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.9760 µCi Which Equals 2.167E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.167E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 20, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Martin R. Kelly Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP-009

Rev.8; 11/01/03
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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

9/24/11

MP-009
Solution Reference # AEA/Amersham 92/232/67

Date 11/8/2009 0:00
Solution # U-10a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{232}U	7.200E+01	2.630E+04

Radionuclide of interest ^{232}U
Parent Solution Conc. 2.167E+03 dpm/ml

Reference Date 3/1/2000 0:00

Chemical Composition of Standard Solution
$^{232}U(NO_3)_6$ in 2M HNO_3

Dilution Instructions:

Dilution Solvent Used 2M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 10.0000 ml
Total Activity: 2.1670E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 2.1670E+01 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 15, 2012

Recertified By _____ Date: 9/24/2011 0:00

Verified & Approved By Mark R. Keller Date: 9/27/2011

QC Approval _____ Date: 9/27/2011

0026

Ba-6
(#6a)

National Institute of Standards & Technology

Certificate

Standard Reference Material 4251C
Barium-133 Radioactivity Standard

This Standard Reference Material (SRM) consists of radioactive barium-133 chloride, non-radioactive barium chloride, and hydrochloric acid dissolved in 5 mL of distilled water. The solution is contained in a flame-sealed NIST borosilicate-glass ampoule. The SRM is intended for the calibration of ionization chambers and solid-state gamma-ray spectrometry systems.

Radiological Hazard

The SRM ampoule contains barium-133 with a total activity of approximately 2.5 MBq. Barium-133 decays by electron capture and during the decay process X-rays and gamma rays with energies from 4 to 400 keV are emitted. Most of these photons escape from the SRM ampoule and can represent a radiation hazard. Approximate unshielded dose rates at several distances (as of the reference time) are given in note [a]*. Appropriate shielding and/or distance should be used to minimize personnel exposure. The SRM should be used only by persons qualified to handle radioactive material.

Chemical Hazard

The SRM ampoule contains hydrochloric acid (HCl) with a concentration of 1 mole per liter of water. The solution is corrosive and represents a health hazard if it comes in contact with eyes or skin. If the ampoule is to be opened to transfer the solution, the recommended procedure is given on page 2. The ampoule should be opened only by persons qualified to handle both radioactive material and strong acid solution.

Storage and Handling

The SRM should be stored and used at a temperature between 5 and 65 °C. The solution in an unopened ampoule should remain stable and homogeneous until at least June 2004.

The ampoule (or any subsequent container) should always be clearly marked as containing radioactive material. If the ampoule is transported it should be packed, marked, labeled, and shipped in accordance with the applicable national, international, and carrier regulations. The solution in the ampoule is a dangerous good (hazardous material) both because of the radioactivity and because of the strong acid.

Preparation

This Standard Reference Material was prepared in the Physics Laboratory, Ionizing Radiation Division, Radioactivity Group, J.M.R. Hutchinson, Group Leader. The overall technical direction and physical measurements leading to certification were provided by L.L. Lucas of the Radioactivity Group and D.B. Golas, Nuclear Energy Institute Research Associate.

The support aspects involved in the preparation, certification, and issuance of this SRM were coordinated through the Standard Reference Materials Program by N.M. Trahey.

Gaithersburg, Maryland 20899
October 1994

Thomas E. Gills, Chief
Standard Reference Materials Program

*Notes and references are on pages 5 and 6.

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

QCP-009

Rev.8; 11/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
QCP 009-1

CURRENT DATE: 9/30/2011 0:00

SOLUTION REFERENCE #: NIST SRM4251C

SOLUTION #: Ba-6

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Barium	1.048E+01	3.828E+03

Radionuclide: ^{133}Barium

Reference Date: 9/1/1993 0:00

Certified Activity: µCi

Certified Concentration: 1.318E+01 µCi per gram

Ampoule /Solution Gross: 9.3081 Weight, Grams

Empty Ampoule: 4.2582 Weight, Grams

Solution Net: 5.0499 Weight, Grams

Total Activity in Ampoule: 66.5577 µCi

Chemical Composition of Standard Solution

$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used: 1M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 66.5577 µCi Which Equals 1.478E+08 dpm at the date listed above

And after dilution the activity of this solution is 1.478E+05 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin R. Keller Date: 10/10/11

QC Approval _____ Date: 10/12/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

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EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

Solution Reference # QCP-009-1-A NIST SRM4251C

Date 9/30/11
Solution # Ba-6a

Principal Radionuclide	Half Life, Years	Half Life, Days
^{133}Ba	1.046E+01	3.828E+03

Radionuclide of Interest ^{133}Ba
Parent Solution Conc. 1.48E+05 dpm/ml

Reference Date 9/1/1993 0:00

Chemical Composition of Standard Solution
$^{133}BaCl_2$ in 1M HCl

Dilution Instructions:

Dilution Solvent Used 1M HCl

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 25.0000 ml
Total Activity: 3.6950E+06 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 3.6950E+03 dpm/ml

NOTES:

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: September 30, 2012

Recertified By _____ Date: 9/30/11

Verified & Approved By Martin A. Keller Date: 10/10/11

QC Approval _____ Date: 10/10/11

CERTIFICATE OF CALIBRATION
ALPHA STANDARD SOLUTION

Ra-5
QA/QC REVIEWED
Date 2/8/94 Initials WL

Radionuclide:	Ra-226	Customer:	TMA EBERLINE
Half Life:	1600 ± 7 years	P.O.No.:	VH1888
Catalog No.:	7226	Reference Date:	February 1 1994 12:00 PST.
Source No.:	453-26	Contained Radioactivity: (Ra-226)	1.001 μCi.
		Contained Radioactivity: (Ra-226)	37.0 kBq.

Description of Solution

a. Mass of solution:	5.1864 g (in a 5 ml Flame Sealed Ampoule)	
b. Chemical form:	Ra(NO3)2 in 1 N HNO3	
c. Carrier content:	None added	
d. Density:	1.0318	g/ml @ 20°C.

Radioimpurities None detected(other than daughters)

Radioactive Daughters
Rn-222, Po-218, At-218, Pb-214, Bi-214, Po-214, Tl-210, Pb-210, Bi-210, Po-210 and Tl-206.

Radionuclide Concentration

(Ra-226) 0.1929 μCi/g.

Method of Calibration

Weighed aliquots of the solution were assayed using gamma spectrometry:
Energy peak(s) integrated under: 186 keV.
Branching ratio(s) used: 0.0351 gamma rays per decay.

Uncertainty of Measurement

a. Systematic uncertainty in instrument calibration:	±3.4%
b. Random uncertainty in assay:	±3.1%
c. Random uncertainty in weighing(s):	±0.2%
d. Total uncertainty at the 99% confidence level:	±4.6%

NIST Traceability

This calibration is implicitly traceable to the National Institute of Standards and Technology.

Leak Test(s)

See reverse side for Leak Test(s) applied to this source.

Notes

1. Nuclear data were taken from "Table of Radioactive Isotopes", edited by Virginia S. Shirley, 1986.
2. IPL participates in an NIST measurement assurance program to establish and maintain implicit traceability for a number of nuclides, based on the blind assay (and later NIST certification) of Standard Reference Materials (As in NRC Regulatory Guide 4.15).

Anna U. Hu
QUALITY CONTROL

Feb. 3, 1994
Date Signed

ISOTOPE PRODUCTS LABORATORIES
1800 North Keystone Street
Burbank, California 91504
(818) 843 - 7000

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 11/30/2011 0:00

SOLUTION REFERENCE #: IPL 453-26 SOLUTION #: Ra-5

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide: ^{226}Radium
Reference Date: 2/1/1994 0:00
Certified Activity: 1.001E+00 µCi
Certified Concentration: µCi per gram

Ampoule /Solution Gross: Weight, Grams
Empty Ampoule: Weight, Grams
Solution Net: Weight, Grams
Total Activity in Ampoule: 1.0010 µCi

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used: 1M HNO_3

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 1.0010 µCi Which Equals 2.222E+06 dpm at the date listed above

And after dilution the activity of this solution is 2.222E+03 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: November 30, 2012

Diluted By: Date: 11/30/2011

Verified & Approved By: Martin R. Kella Date: 11/30/11

QC Approval: Date: 11/30/11

EBERLINE SERVICES

QUALITY CONTROL PROGRAM
MP 009

Rev.8; 11/01/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE STANDARD SOLUTIONS
SECONDARY DILUTION RECERTIFICATION

MP 009
Solution Reference # IPL-453-26

Date 11/30/2011 0:00
Solution # Ra-5b

Principal Radionuclide	Half Life, Years	Half Life, Days
^{226}Radium	1.600E+03	5.844E+05

Radionuclide of Interest ^{226}Radium
Parent Solution Conc. 2.22E+03 dpm/ml

Reference Date 2/1/1994 0:00

Chemical Composition of Standard Solution
$^{226}Ra(NO_3)_2$ in 1M HNO_3

Dilution Instructions:

Dilution Solvent Used 1M HNO_3

SECONDARY VOLUMETRIC DILUTION

Vol. Parent Solution: 20.0000 ml
Total Activity: 4.4440E+04 dpm
Final Volume: 1000.00 ml

Final Activity Concentration: 4.4440E+01 dpm/ml
This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

NOTES:

Expiration Date: November 30, 2012

Recertified By _____ Date: 11/30/2011 0:00

Verified & Approved By Martin R. Heller Date: 11/30/11

QC Approval _____ Date: 11/30/11

RA-11

ANALYTICS

1380 Seaboard Industrial Blvd.
Atlanta, Georgia 30318 · U.S.A.

Phone (404) 352-8677
Fax (404) 352-2837

CERTIFICATE OF CALIBRATION

Standard Radionuclide Source

62680-416

Ra-228 5 mL Liquid in Flame Sealed Vial

This standard radionuclide source was prepared gravimetrically from a calibrated master solution. The master solution was calibrated using a germanium gamma spectrometer system.

Radionuclide purity and calibration were checked using a germanium gamma spectrometer system. The nuclear decay rate and assay date for this source are given below.

ANALYTICS maintains traceability to the National Institute of Standards and Technology through Measurements Assurance Programs as described in USNRC Reg. Guide 4.15, Revision 1.

New vial from the 6/11/01 Shipment.
P.S. Different activity Level
8/19/11

ISOTOPE:	Ra-228
ACTIVITY (dps):	2.585 E3
HALF-LIFE:	5.75 years
CALIBRATION DATE:	November 7, 2001 12:00 EST
TOTAL UNCERTAINTY*:	4.0%
SYSTEMATIC:	3.0%
RANDOM:	1.0%

*99% Confidence Level

Impurities: γ-impurities (other than decay products) <0.1%

5.07198 grams 0.1M HCl solution with 50 μg/g Ba carrier.

P O NUMBER 9508, Item 1 (Part #4339A)

SOURCE PREPARED BY: M. D. Currie
M. D. Currie, Radiochemist

Q A APPROVED: [illegible] 11/7/01

EBERLINE SERVICES

QUALITY CONTROL PROGRAM

MP-009

Rev.8; 1/10/03
Title: Radioactive Reference Standards Solutions & Records

EBERLINE SERVICES - OAK RIDGE LABORATORY
RADIOACTIVE REFERENCE SOLUTIONS
PRIMARY DILUTION RECERTIFICATION
MP 009

CURRENT DATE: 4/13/2011 0:00

SOLUTION REFERENCE #: Analytics 62680-416

SOLUTION #: Ra-11

Principal Radionuclide	Half Life, Years	Half Life, Days
^{228}Ra	5.750E+00	2.100E+03

Radionuclide: ^{228}Ra

Reference Date: 11/7/2001 0:00

Certified Activity: 6.986E-02 µCi

Certified Concentration: µCi per gram

Ampoule /Solution Gross	9.4982	Weight, Grams
Empty Ampoule	4.4895	Weight, Grams
Solution Net	5.0087	Weight, Grams
Total Activity in Ampoule	0.0699	µCi

Chemical Composition of Standard Solution

$^{228}Ra(NO_3)_2$ in 0.5 M HCl

Dilution Instructions:

Dilution Solvent Used: 0.5 M HCl

Dilute to a volume of 1000.00 milliliters

Certified Total Activity of 0.0699 µCi Which Equals 1.551E+05 dpm at the date listed above

And after dilution the activity of this solution is 1.551E+02 dpm/ml

This activity concentration is based on the original reference date listed above. All activities are corrected to the date and time of analysis by the laboratory data processing software.

Expiration Date: April 13, 2012

Recertified By _____ Date: 4/20/11

Verified & Approved By _____ Date: 8/9/11

QC Approval _____ Date: 8/9/11

SECTION VI

QUALITY CONTROL SAMPLE RESULTS SUMMARY

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	UUISO	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
U-234	0.74	94.44%	15.42%	100.00%	3.60%	8.10E+00	2.92E-01	7.65E+00	1.18E+00	U-8a	3.52E+01	3.60E+00	5.10E-01
U-238	0.42	96.78%	15.41%	100.00%	3.60%	7.90E+00	2.84E-01	7.64E+00	1.18E+00	U-8a	3.44E+01	3.60E+00	5.10E-01

Matrix Spike

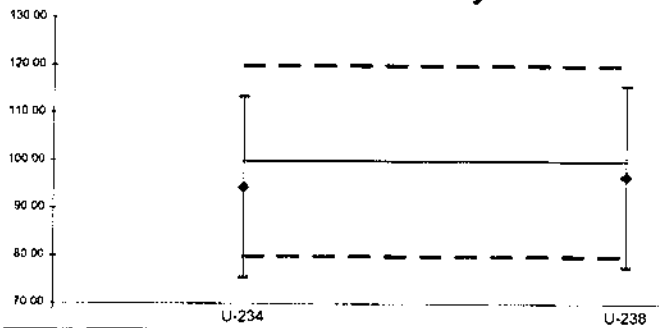
Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample / QC Summary

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU	LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
U-234	0.43	5.11	4.58E+00	7.34E-01	4.83E+00	8.06E-01	0.94	OK	OK			OK	OK
U-238	0.16	1.85	4.76E+00	7.56E-01	4.85E+00	8.09E-01	0.97	OK	OK			OK	OK
U-235	0.75	30.92	1.70E-01	1.01E-01	2.32E-01	1.27E-01		OK	OK			NA	OK

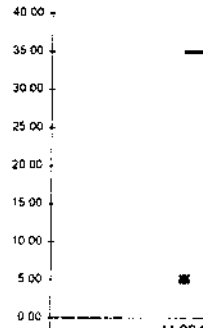
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	UUISO	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



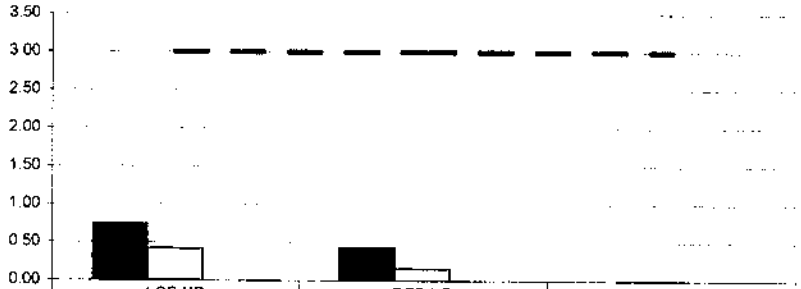
	U-234	U-238
Lower Error	75.42	77.78
Upper Error	113.45	115.79
%R	94.44	96.78
LCL	80	80
Mean	100	100
UCL	120	120

Replicate Sample RPD



	U-234	U-238	U-235
Lower Error	5.53	2.00	39.70
Upper Error	4.70	1.70	22.14
RPD	5.11	1.85	30.92
CL	35	35	35

Normalized Difference



	LCS ND	REP ND	MS ND
U-234	0.74	0.43	0.00
U-238	0.42	0.16	0.00
	0.00	0.00	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	Ra226	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-226	0.77	110.68%	24.39%	100.00%	4.60%	1.02E+01	4.71E-01	1.13E+01	2.77E+00	Ra-5b	4.41E+01	4.60E+00	5.16E-01

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-226	1.59	28.09	1.25E+01	2.99E+00	9.39E+00	2.31E+00

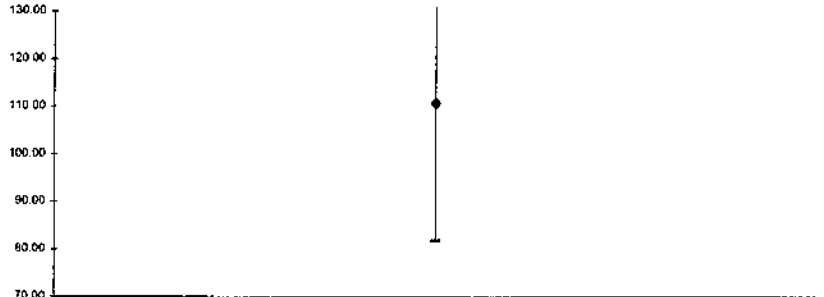
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
1.11	OK	OK			INV	OK

Version

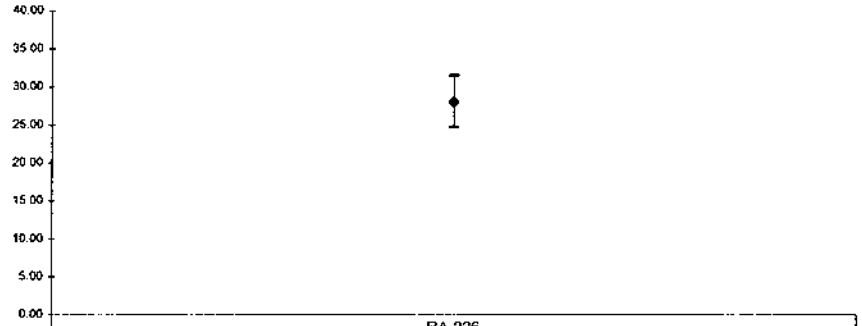
WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	Ra226	1	pCi	g	Foxfire Scientific, Inc.

LCS % Recovery



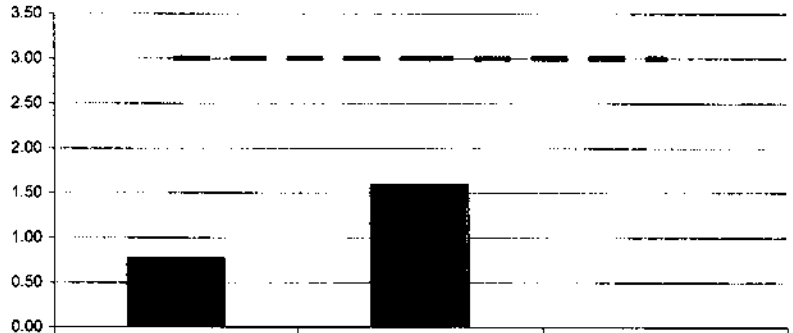
	RA-226
Lower Error	81.69
Upper Error	139.67
%R	110.68
LCL	80
Mean	100
UCL	120

Replicate Sample RPD



	RA-226
Lower Error	31.50
Upper Error	24.68
RPD	28.09
CL	35

Normalized Difference



	LCS ND	REP ND	MS ND
RA-226	0.77	1.59	0.00
UCL	3	3	3

No Matrix Spike

Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	Ra228	1	pCi	g	Foxfire Scientific, Inc.

Laboratory Control Sample

Analyte	Normalized Difference	LCS Measured	CSU Measured	LCS Expected	Uncert. Expected	Known	Known Error	Result	CSU	Standard ID	Standard ACT (dpm)	Standard Error	Standard Added (g)
RA-228	0.13	101.59%	22.99%	100.00%	5.10%	3.60E+01	1.84E+00	3.66E+01	8.41E+00	Ra-11	4.59E+01	5.10E+00	1.74E+00

Matrix Spike

Analyte	Normalized Difference	MS Actual % Rec	Expected MS Result	Expected MS Uncert	Actual MS Result	Actual MS CSU	Sample Result	Sample CSU	Sample Aliquot	Standard ID	Standard ACT (dpm)	Standard Error %	Standard Added (g)

Replicate Sample

Analyte	Normalized Difference	RPD	Original Result	Original CSU	Replicate Result	Replicate CSU
RA-228	0.66	11.71	1.10E+01	2.67E+00	9.77E+00	2.41E+00

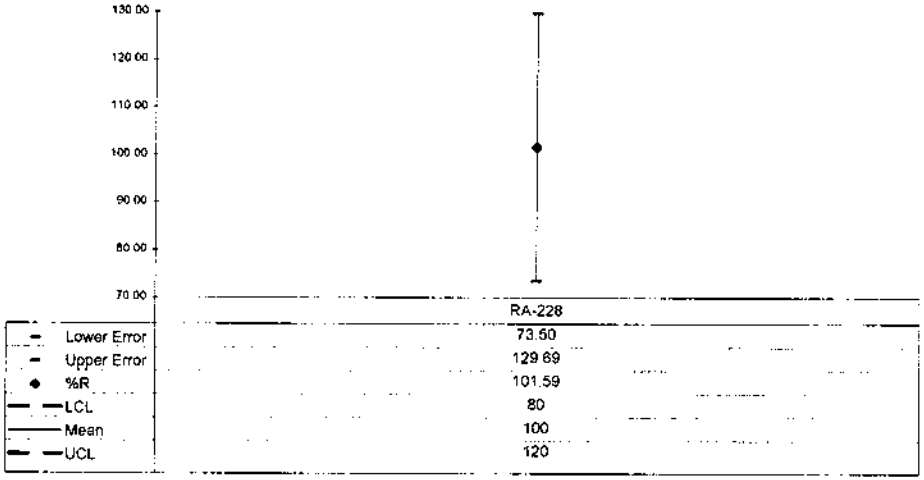
QC Summary

LCS Relative Bias	LCS % R	LCS ND	MS % R	MS ND	Rep RPD	Rep ND
1.02	OK	OK			OK	OK

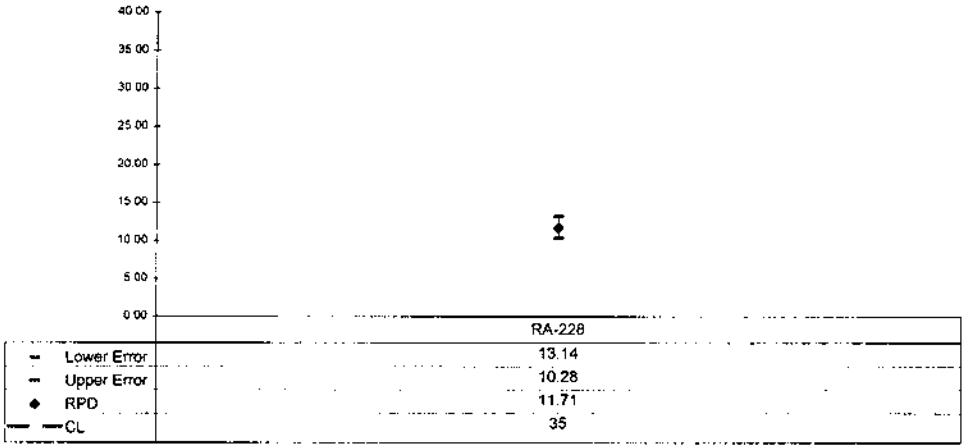
Version

WO	Analysis	Run	Activity Units	Aliquot Units	Client Name
11-11163	Ra228	1	pCi	g	Foxfire Scientific, Inc.

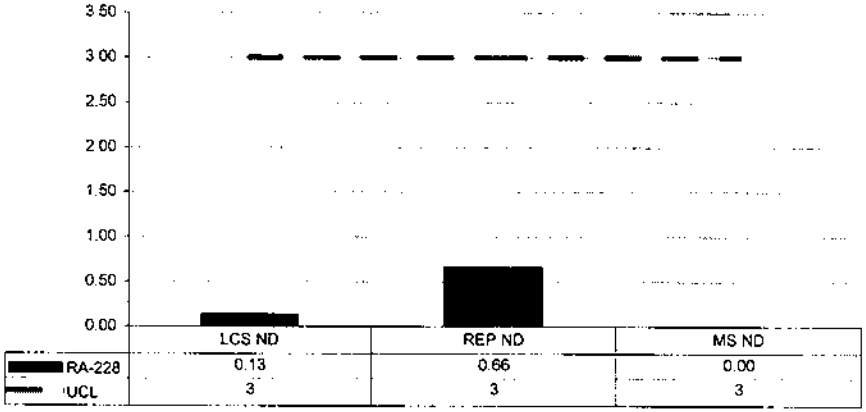
LCS % Recovery



Replicate Sample RPD



Normalized Difference



No Matrix Spike

Version

SECTION VII

LABORATORY TECHNICIAN'S NOTES

ISO-U NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED TO SEPARATIONS

JB
11/30/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	UUISO
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED TO SEPARATIONS
2	12/07/11 18:10	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.

John DeMelas
12/7/11

EBERLINE SERVICES

Work Order Analysis Notes

Oak Ridge Laboratory
601 Scarboro Rd.
Oak Ridge, TN 37830
Voice: 865.481.0683
www.eberlineservices.com

Internal Work Order	11-11163
Analysis Code	UUISO
Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- SUBMITTED TO SEPARATIONS
2	12/07/11 18:10	CHEM	JDEMELAS	Prepared and conditioned anion exchange columns with 35-40 ml 8N HCl; Centrifuged samples and passed through columns; Rinsed C-Tubes with 20 ml 8N HCl and passed through columns; Washed columns with 35 ml 8N HCl – 0.1N NH4I, 35 ml of 6.5N HCl – 0.04N HF, and 10 ml of 6.5N HCl; Eluted Uranium with 50 ml of 0.5N HCl into clean, labeled 100-ml beakers; Dried-down samples on hotplate; Dissolved samples in ~10 ml of concentrated HCl; Transferred to new, labeled C-Tubes with deiononized water. Set samples aside for later precipitation and filtering.
3	12/08/11 06:00	CHEM	RMARTZ	ADDED 0.1 ML NEODYMIUM CARRIER, 0.3 ML TITANOUS CHLORIDE, & 1 ML HF TO C-TUBES, LET SET SIT IN ICE BATH FOR ONE HOUR. SET UP FILTERS BY ADDING ALCOHOL & CARBON SUBSTRATE THEN ADDED SAMPLES; WHEN SAMPLES WERE THROUGH FILTERS, ADDED 10 ML DI H2O RINSES FROM C-TUBES, REMOVED FILTERS, LET DRY, COMPLETED PAPERWORK & SENT SET TO COUNT ROOM.

RZ
12/8/11

Alpha #2

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
12/3/11	Daily Pulsers	Lab	1012	10 mins	NA	KB
12/3/11	Annual Cal	Lab	1208	10 Hr	α	AG
~~12/3/11~~	~~Bkgd~~ AG	~~12/3/11 Lab~~	~~1514~~	~~16 hr 40m~~	~~α~~	~~AG~~
12/3/11	Annual Cal	Lab	1020	10 hr	α	AG
12/3/11	Bkgd	Lab	1041 ~~1020~~	16 hr 40m	α	AG
12/4/11	Daily Pulser	Lab	0835	10 min	NA	AG
12/4/11	1111008A (9-12)	USA	0839	2hr 50m	iso-U	AG
12/4/11	1111008A (1-6)	USA	0850	2hr 50m	iso-Th	AG
12/5/11	Daily Pulser	Lab	0835	10 min	NA	AG
12/5/11	1111167A (1-4)	UCOR	1042	2hr 50min	Am	AG
12/5/11	1111167A (1-4)	UCOR	1046	2hr 50min	Am 243	AG
12/5/11	1110136B (1,2)	USA	1108	2hr 50min	iso-U	AG
12/5/11	1111083A (1-4)	UCOR	1430	2hr 50min	Am243	KB
12/5/11	1111132A (1-5)	ND	1434	2hr 50min	Ra 4	KB
12/6/11	Daily Pulser	LAB	0726	10min	N/A	[illegible]
12/6/11	1111120A (1-10)	UCOR	0707	2hr 50m	Ra 6	[illegible]
12/6/11	1110140A (8-17)	USA	1026	2hr 50m	U 238	[illegible]
12/6/11	1111085A (1-5)	WASTRON	1345	2hr 50min	PU	KB
12/6/11	1111063A (1-4)	Weston	1349	2hr 50min	Th	KB
12/6/11	1111087A (1-5)	Limville Lab	1737	2hr 50min	PU	KB
12/6/11	1111085A (1-5)	WASTRON	0743	2hr 50min	U	KB
12/7/11	Daily Pulser	LAB	0728	10min	N/A	[illegible]
12/7/11	1111137A (9-18)	Teledyne	0700	2hr 50m	Ra 6	[illegible]
12/7/11	1111110A (16-20)	USA	1014	2hr 50m	Th Iso	[illegible]
12/7/11	1112006A (1-3, 4)	UCOR	1014	2hr 50m	NP-237	[illegible]
12/7/11	1112006A (4,6,9)	UCOR	1009	2hr 50min	PU	KB
12/7/11	1112006A (4,6)	UCOR	1013	2hr 50min	PUNT	KB
12/7/11	1112006A (1-4,6)	UCOR	1017	2hr 50min	Am 243	KB
12/8/11	Daily Pulser	LAB	0729	10min	N/A	[illegible]
12/8/11	1112005A (1-4)	UCOR	0608	2hr 50m	Pu Iso	[illegible]
12/8/11	1112006A (1-4,6)	UCOR	0608	2hr 50m	Ra 6	[illegible]
12/8/11	1111110A (1-10)	USA	0926	2hr 50m	U 238	[illegible]
12/8/11	1111163A (9-13)	Foxfire	1420	2hr 50min	U	KB
12/8/11	1112005A (1-4)	UCOR	1425	2hr 50min	Am241	KB

Alpha # 3

DATE	Sample #	Client	Log Time	CT Time	Analysis	Tech.
12/7/11	1112006A(1-3)	UCOR	1134	2hr50	TL47	[illegible]
12/7/11	1112006A(1-3)	UCOR	1136	2hr50	Pu239	[illegible]
12/7/11	1112005A(2)	UCOR	1625	2hr50	Th	KB
12/7/11	1112006A(2)	UCOR	1627	2hr50	Th	KB
12/7/11	1111170A(1-35)	UCOR	1631	2hr50	Am241	KB
12/7/11	1112005A(1-4)	UCOR	1636	2hr50	U4	KB
12/7/11	1112006A(1-4,6)	UCOR	1645	2hr50	Am241	KB
12/8/11	Daily Pulse	LAB	0529	10	N/A	[illegible]
12/8/11	Daily Pulse	LAB	0547	10	N/A	[illegible]
12/8/11	1111110A(9-20)	USA	0947	2hr50	TL750	[illegible]
12/8/11	1111110A(9-20)	USA	1104	2hr50	U4750	[illegible]
12/8/11	1112006A(1-4,6)	UCOR	1105	2hr50	Am241	[illegible]
12/8/11	1111163A(1-3)	Fortine	1108	2hr50	U4750	[illegible]

RA-226 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

JB 11/30/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	Ra226
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/02/11 15:03	CHEM	TSMITH	Followed steps 12.2 to 12.8 in AP-006 rev. 9 . (Sringe filtered samples. Precipitated and filtered samples, obtained final weights, and took to count room)

12-2-11
JL

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11163	
Analysis Code	Run
Ra226	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/30/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/30/2011
011719S	EDTA	0.25M	JBARNARD	11/30/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/30/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/30/2011
010849P	Nitric Acid	Reagent Grade	JBARNARD	11/30/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/30/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/30/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/30/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/30/2011
011383P	Acetic Acid	Reagent Grade	TSMITH	12/2/2011
011381D03	Ammonium Sulfate	200 mg/ml	TSMITH	12/2/2011

Alpha #3

DATE	Sample #	Client	Load Time	Ctime	Analysis	Tech.
12/2/11	Daily Pulser	LAB	0526	10min	NA	C
12/2/11	Daily Pulser	LAB	0555	10min	NA	C
12/2/11	11111040A(1-4)	Fox Fire	0627	24hr50min	Ra6	C
12/2/11	11110104A(1-6)	USA	0627	24hr50min	Th210	C
12/2/11	11111674(4)	UCOR	0525	24hr50min	Ra6	C
12/2/11	11111574(1-4)	UCOR	0527	24hr50min	NP-237	C
12/2/11	11111674A(1-4)	UCOR	0526	24hr50min	NP-237	C
12/2/11	11110624(1-4,6,8)	UCOR	0527	24hr50min	[illegible]	C
12/2/11	11111041A(1-4)	Fox Fire	1307	24hr50min	Ra6	C
12/2/11	11111674A(1-4)	UCOR	1256	24hr50min	Pu250	C
12/2/11	11111674A(1-4)	UCOR	1258	24hr50min	PuNT	C
12/2/11	System Blksd	Lab	1816	16.40hrs	α	KB
12/3/11	Daily Pulsers	Lab	1012	10mins	NA	KB
12/3/11	Daily Pulser #43	Lab	1129	10min	NA	KB
12/3/11	11111674(4)	UCOR	1154	2hr50min	Ra6	KB
12/3/11	11111674(1-4)	UCOR	1156	2hr50min	U4	KB
12/3/11	11111094(1-7)	Materion	1200	2hr50min	Th	KB
12/3/11	11111014(1-4)	UCOR	1205	2hr50min	Ra6	KB
12/3/11	11110624(1-4,6,8,11)	UCOR	1508	2hr50min	Pu	KB
12/3/11	11110624(4,6,8)	UCOR	1515	2hr50min	PuNT	KB
12/3/11	11110624(1-4,6,8)	UCOR	1519	2hr50min	U4	KB
12/3/11	Annual Cal	Lab	1020	10 HR	α	AG
12/4/11	Daily Pulser	Lab	0938	10min	NA	KB
12/4/11	Daily Pulser (SN 43)	Lab	0854	10min	NA	KB
12/4/11	11110624(1-4,6,8)	UCOR	0949	2hr50min	Th	KB
12/4/11	11110624(4,6,8)	UCOR	0953	2hr50min	ThNT	KB
12/4/11	11111194(1-6)	UCOR	0956	2hr50min	Ra6	KB
12/4/11	11111194(12)	UCOR	1301	2hr50min	Ra6	KB
12/4/11	11110094(1-12)	USA	1309	2hr50min	Th	KB
12/4/11	11110084(1-2)	USA	1319	2hr50min	U4	KB
12/4/11	Daily Pulser	Lab	0805	10min	NA	AG
12/4/11	11110084(6-12)	USA	0851	2hr50min	iso-Th	AG
12/4/11	11111634(1-10)	Fox Fire	0908	2hr50min	Ra-220	AG

Alpha #1

DATE	Sample #	Client	Start Time	CT Time	Analysis	Tech
12/1/11	1111139A(17-20)	Fox fire	1704	2hr 50 min	Ra-6	KB
12/1/11	1111010A(1-3)	USA	1709	2hr 50 min	Th	KB
12/2/11	Daily Pulser	LTB	0826	10 min	NA	—
12/2/11	Annual Cal	Lab	0926	10 Hr	α	AG
12/2/11	System Bkgd	Lab	1814	16.40 hrs	α	KB
12/3/11	Bkgd	Lab	1514	16hr 40min	α	AG
12/4/11	Daily Pulser	Lab	0938	10 min	NA	KB
12/4/11	1111119A(7-11)	UCOR	0957	2hr 50 min	Ra-6	KB
12/4/11	1111008A(3-10)	USA	1319	2hr 50 min	U	KB
12/4/11	Daily Pulser	Lab	0901	10 min	NA	AG
12/4/11	1111008A(1-8)	USA	0837	2hr 50	iso-U	AG
12/5/11	Daily Pulser	Lab	0835	10 min	NA	AG
12/5/11	1111163A(11-13)	Foxfire	1012	2hr 50 min	Ra-226	AG
12/5/11	1111167A(1-4)	UCOR	1015	2hr 50 min	iso-Th	AG
12/5/11	1111167A NT(4)	UCOR	1016	2hr 50 min	iso-Th (NT)	AG

RA-228 NOTES

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS

11/30/11

EBERLINE SERVICES Work Order Analysis Notes	Oak Ridge Laboratory 601 Scarboro Rd. Oak Ridge, TN 37830 Voice: 865.481.0683 www.eberlineservices.com	Internal Work Order	11-11163
		Analysis Code	Ra228
		Run Number	1

#	Date	Dept	User	Notes
1	11/30/11 08:27	PREP	JBARNARD	ALIQUOTED AND ADDED SPIKES AND TRACERS- ADDED HF AND DRIED SAMPLES DOWN- ADDED MIXED ACIDS AND TOOK SAMPLES TO DRYNESS- PH'D SAMPLES- PRECIPITATED WITH POTASSIUM SULFATE AND BA AND PB CARRIERS- DECANTED SAMPLES AND CENTRIFUGED- ADDED .25M EDTA AND PHENOLPTHALEIN TO PRECIP, VORTEXED AND PUT SAMPLES IN A HOT WATER BATH- VORTEXED AND CHECKED PH- CENTRIFUGED AND TRANSFERRED SUPERNATE INTO CLEAN C-TUBES AND SUBMITTED TO SEPARATIONS
2	12/05/11 18:09	CHEM	TSMITH	Placed filters from count room into labeled centrifuge tubes. Added EDTA to samples and swirled.
3	12/06/11 17:02	CHEM	TSMITH	Followed steps 12.2 to 12.9 in AP-007 rev. 14 . (Chemical cleanup for Ra 228)
4	12/13/11 08:02	CHEM	TSMITH	Followed steps 12.10 to 12.18 in AP-007 rev. 14 . (Precipitated samples, hot bathed, centrifgued, and discarded supernate. Dissolved precip, precipitated samples, hot bathed, centrifgued, and discarded supernate. Dissolved precip, precipitated and filtered samples, obtained final weights, covered with aluminum foil, and took to count room)

12-13-11
TSM

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11163	
Analysis Code	Run
Ra228	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011809P	Ammonium Hydroxide	Reagent Grade	JBARNARD	11/30/2011
009718D21	Barium Carrier	1 mg/ml	JBARNARD	11/30/2011
011719S	EDTA	0.25M	JBARNARD	11/30/2011
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/30/2011
008973D16	Lead Carrier	40 mg/ml	JBARNARD	11/30/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/30/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/30/2011
011723S	Phenolphthalein Indicator	0.1%	JBARNARD	11/30/2011
010545P	Potassium Sulfate	Reagent Grade	JBARNARD	11/30/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/30/2011
011851S	EDTA	0.25M	TSMITH	12/5/2011
010689D32	Ammonium Sulfide	2%	TSMITH	12/6/2011
011283D02	Lead Carrier	1.5 mg/ml	TSMITH	12/6/2011
011708P	Nitric Acid	Reagent Grade	TSMITH	12/6/2011
011314S	Yttrium Carrier	9 mg/ml	TSMITH	12/6/2011
011660S	Ammonium Oxalate	5%	TSMITH	12/13/2011
011382D12	Nitric Acid	1N	TSMITH	12/13/2011
011708D02	Nitric Acid	6N	TSMITH	12/13/2011
010411D15	Sodium Hydroxide	10M	TSMITH	12/13/2011
010411D16	Sodium Hydroxide	18M	TSMITH	12/13/2011

LB4110 Aqua

DATE	Sample #	Client	Load Time	CT Time	Analyst	Tech
12/10/11	Weekly Bkgd	Lab	1526	12hr	ORR	AG
12/11/11	Plateaus	Lab	1010	—	LB	AG
12/12/11	BLKGD QC	LAB	0506	60min	LB	←
12/12/11	EFF QC	LAB	0612	30min	LB	←
12/12/11	11111100RA(1-6)	MPA	1327	2hrs	RaX	ICB
12/13/11	BLKGD QC	LAB	0504	60min	LB	←
12/13/11	EFF QC	LAB	0615	30min	LB	←
12/13/11	11 11142S1(1-46)	UCOR	0911	2hr	SR50/4	←
12/13/11	11120594R(2-7.6)	UCOR	0972	2hr	SR707	←
12/13/11	11120585R1(1)	UCOR	1127	30min	TOT Sr	ICB
12/13/11	11111163RA(9-13)	Foxfire	1159	2hrs	Ra8	ICB

LB4110 Red

DATE	Sample #	Client	Load Time	CT Time	Analysis	Tech
12/9/11	1112026CL(1-3,5)	UCOR	1539	30min	CL36	ICB
12/9/11	1112036CL(1-3,5,7)	UCOR	1540	30min	CL36	ICB
12/10/11	Weekly Bkgd	Lab	1527	12 HR	αβ	AG
12/11/11	Sr eff	Lab	1021	30 MIN	β	AG
12/11/11	Sr1 Eff	Lab	1102	30MIN	β	AG
12/11/11	Cl36 Eff	Lab	1104	30m	β	AG
12/11/11	Cl36 1 Eff	Lab	1144	30m	β	AG
12/11/11	Th Eff	Lab	1147	30min	α	AG
12/11/11	Th1 Eff	Lab	1231	30min	α	AG
12/11/11	GB Eff	Lab	1233	30m	β	AG
12/11/11	GB1 Eff	Lab	1306	30min	β	AG
12/11/11	Cs Eff	Lab	1308	30min	β	AG
12/11/11	Cs1 Eff	Lab	1341	30min	β	AG
12/11/11	PbRa Eff	Lab	1344	30min	β	AG
12/11/11	PbRa1 Eff	Lab	1421	30min	β	AG
12/11/11	Tot Ra Eff	Lab	1425	30min	Tot Ra	AG
12/11/11	Tot Ra Eff	Lab	1510	30m	Tot Ra	AG
12/12/11	EFF QC	LAB	0505	30min	αβ	
12/12/11	BKGD QC	LAB	0548	60min	αβ	
12/12/11	1112003RA(1-3,5)	Sevenson	1330	2hrs	Ra	ICB
12/12/11	1111132RA(1-5)	ND	1333	2hrs	Ra	ICB
12/13/11	EFF QC	LAB	0503	30min	αβ	
12/13/11	BKGD QC	LAB	0544	60min	αβ	
12/13/11	1111142NP(1-4)	UCOR	0722	10min	NP-237	
12/13/11	1112036NP(1-4)	UCOR	0722	10min	NP-237	
12/13/11	1112058NP(1-4)	UCOR	0724	10min	NP-237	
12/13/11	1111134(1-17)	UCOR	0857	2	Sr90/Sr	
12/13/11	1112036RA(1-4,6)	UCOR	1101	2hrs	Ra	ICB
12/13/11	1111163RA(1-8)	Foxfire	1105	2hrs	Ra	ICB

SECTION VIII

ANALYTICAL DATA (ISOTOPIC URANIUM)

11-11163
UUISO
Run 1

Work Order	11-11163
Analysis Code	UUISO
Run	1
Date Received	11/29/2011
Lab Deadline	12/9/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EML U-02 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	U-232
Radiometric Sol#	U-10a
Tracer Act (dpm/g)	19.353
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/29/11 00:00	1.0000E+00
02	MBL	BLANK		11/29/11 00:00	1.0000E+00
03	DUP	CORE 1 0-1	89	11/28/11 00:00	1.0042E+00
04	DO	CORE 1 0-1	89	11/28/11 00:00	1.0031E+00
05	TRG	CORE 2 11-12	78	11/28/11 00:00	1.0022E+00
06	TRG	CORE 3 2-3	85	11/28/11 00:00	1.0091E+00
07	TRG	CORE 4 4-5	95	11/28/11 00:00	1.0011E+00
08	TRG	CORE 5 4-5	55	11/28/11 00:00	1.0045E+00
09	TRG	CORE 6 10-11	83	11/28/11 00:00	9.9990E-01
10	TRG	CORE 7 5-6	61	11/28/11 00:00	1.0031E+00
11	TRG	CORE 8 2-3	75	11/28/11 00:00	1.0198E+00
12	TRG	CORE 9 5-6	74	11/28/11 00:00	1.0674E+00
13	TRG	CORE 10 8-9	91	11/28/11 00:00	1.0069E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
UUISO
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.6104	11.8		0.00								
02	MBL	0.6110	11.8		0.00								
03	DUP	0.6098	11.8		0.00								
04	DO	0.6111	11.8		0.00								
05	TRG	0.6088	11.8		0.00								
06	TRG	0.6087	11.8		0.00								
07	TRG	0.6108	11.8		0.00								
08	TRG	0.6102	11.8		0.00								
09	TRG	0.6099	11.8		0.00								
10	TRG	0.6091	11.8		0.00								
11	TRG	0.6102	11.8		0.00								
12	TRG	0.6091	11.8		0.00								
13	TRG	0.6102	11.8		0.00								

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
UUISO
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/30/11 07:06	JBARNARD				
02	MBL			11/30/11 07:06	JBARNARD				
03	DUP			11/30/11 07:06	JBARNARD				
04	DO	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
05	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
06	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
07	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
08	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
09	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
10	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
11	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
12	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				
13	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:06	JBARNARD				

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-234	LCS	LCS	pCi/g	7.65E+00	1.05E+00	8.12E-02	8.10E+00	94.44	OK		OK	
02	U-234	MBL	BLANK	pCi/g	-4.93E+00	9.92E+00	2.13E+01					INV	OK
03	U-234	DUP	CORE 1 0-1	pCi/g	4.83E+00	7.28E-01	6.50E-02				OK	OK	
04	U-234	DO	CORE 1 0-1	pCi/g	4.58E+00	6.57E-01	7.08E-02					OK	
05	U-234	TRG	CORE 2 11-12	pCi/g	8.64E+00	1.27E+00	6.99E-02					OK	
06	U-234	TRG	CORE 3 2-3	pCi/g	4.38E+00	7.18E-01	9.22E-02					OK	
07	U-234	TRG	CORE 4 4-5	pCi/g	2.47E+00	4.15E-01	4.80E-02					OK	
08	U-234	TRG	CORE 5 4-5	pCi/g	1.27E+00	3.48E-01	1.02E-01					OK	
09	U-234	TRG	CORE 6 10-11	pCi/g	6.37E+00	8.23E-01	6.94E-02					OK	
10	U-234	TRG	CORE 7 5-6	pCi/g	2.58E+00	5.59E-01	1.43E-01					OK	
11	U-234	TRG	CORE 8 2-3	pCi/g	7.19E+00	9.97E-01	7.59E-02					OK	
12	U-234	TRG	CORE 9 5-6	pCi/g	8.45E-01	2.42E-01	7.13E-02					OK	
13	U-234	TRG	CORE 10 8-9	pCi/g	4.72E+00	6.71E-01	7.74E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-234	LCS	11/29/11 00:00	1.00E+00	105.18	0.00	0.00			
02	U-234	MBL	11/29/11 00:00	1.00E+00	0.48	0.00	0.00			
03	U-234	DUP	11/28/11 00:00	1.00E+00	104.03	0.00	0.00			
04	U-234	DO	11/28/11 00:00	1.00E+00	110.96	0.00	0.00			
05	U-234	TRG	11/28/11 00:00	1.00E+00	81.58	0.00	0.00			
06	U-234	TRG	11/28/11 00:00	1.01E+00	90.49	0.00	0.00			
07	U-234	TRG	11/28/11 00:00	1.00E+00	135.20	0.00	0.00			
08	U-234	TRG	11/28/11 00:00	1.00E+00	77.99	0.00	0.00			
09	U-234	TRG	11/28/11 00:00	1.00E+00	145.22	0.00	0.00			
10	U-234	TRG	11/28/11 00:00	1.00E+00	86.34	0.00	0.00			
11	U-234	TRG	11/28/11 00:00	1.02E+00	114.93	0.00	0.00			
12	U-234	TRG	11/28/11 00:00	1.07E+00	97.27	0.00	0.00			
13	U-234	TRG	11/28/11 00:00	1.01E+00	118.72	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-234	LCS	12/08/11 11:09		A_Spec	Alpha_040	170	5.65 E+02	0.00 E+00	18.6
02	U-234	MBL	12/08/11 11:09		A_Spec	Alpha_041	170	-1.70 E+00	1.00 E-02	18.9
03	U-234	DUP	12/08/11 11:09		A_Spec	Alpha_042	170	3.55 E+02	2.00 E-03	18.7
04	U-234	DO	12/08/11 11:09		A_Spec	Alpha_043	170	3.88 E+02	0.00 E+00	20.2
05	U-234	TRG	12/08/11 11:09		A_Spec	Alpha_044	170	5.16 E+02	1.00 E-03	19.4
06	U-234	TRG	12/08/11 11:09		A_Spec	Alpha_045	170	2.85 E+02	0.00 E+00	18.9
07	U-234	TRG	12/08/11 11:09		A_Spec	Alpha_048	170	2.15 E+02	1.00 E-03	17.1
08	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_017	170.02	6.55 E+01	3.00 E-03	17.5
09	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_018	170.02	5.79 E+02	6.00 E-03	16.6
10	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_021	170.03	1.28 E+02	9.00 E-03	15.3
11	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_024	170	5.34 E+02	4.00 E-03	16.8
12	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_026	170.02	5.67 E+01	2.00 E-03	17.2
13	U-234	TRG	12/08/11 14:20		A_Spec	Alpha_027	170.02	4.02 E+02	7.00 E-03	18.9

Eberline Services
Oak Ridge Laboratory

Preliminary Data Report & Analytical Calculations

Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-238	LCS	LCS	pCi/g	7.64E+00	1.04E+00	5.63E-02	7.90E+00	96.78	OK		OK	
02	U-238	MBL	BLANK	pCi/g	1.48E+03	2.26E+03	2.72E+01					INV	OK
03	U-238	DUP	CORE 1 0-1	pCi/g	4.85E+00	7.31E-01	8.11E-02				OK	OK	
04	U-238	DO	CORE 1 0-1	pCi/g	4.76E+00	6.76E-01	4.91E-02					OK	
05	U-238	TRG	CORE 2 11-12	pCi/g	8.31E+00	1.23E+00	1.00E-01					OK	
06	U-238	TRG	CORE 3 2-3	pCi/g	4.15E+00	6.89E-01	9.18E-02					OK	
07	U-238	TRG	CORE 4 4-5	pCi/g	2.23E+00	3.87E-01	4.78E-02					OK	
08	U-238	TRG	CORE 5 4-5	pCi/g	1.34E+00	3.62E-01	1.27E-01					OK	
09	U-238	TRG	CORE 6 10-11	pCi/g	5.56E+00	7.38E-01	7.51E-02					OK	
10	U-238	TRG	CORE 7 5-6	pCi/g	2.86E+00	6.00E-01	1.47E-01					OK	
11	U-238	TRG	CORE 8 2-3	pCi/g	7.08E+00	9.83E-01	5.59E-02					OK	
12	U-238	TRG	CORE 9 5-6	pCi/g	8.85E-01	2.48E-01	7.10E-02					OK	
13	U-238	TRG	CORE 10 8-9	pCi/g	5.40E+00	7.43E-01	6.60E-02					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-238	LCS	11/29/11 00:00	1.00E+00	105.18	0.00	0.00			
02	U-238	MBL	11/29/11 00:00	1.00E+00	0.48	0.00	0.00			
03	U-238	DUP	11/28/11 00:00	1.00E+00	104.03	0.00	0.00			
04	U-238	DO	11/28/11 00:00	1.00E+00	110.96	0.00	0.00			
05	U-238	TRG	11/28/11 00:00	1.00E+00	81.58	0.00	0.00			
06	U-238	TRG	11/28/11 00:00	1.01E+00	90.49	0.00	0.00			
07	U-238	TRG	11/28/11 00:00	1.00E+00	135.20	0.00	0.00			
08	U-238	TRG	11/28/11 00:00	1.00E+00	77.99	0.00	0.00			
09	U-238	TRG	11/28/11 00:00	1.00E+00	145.22	0.00	0.00			
10	U-238	TRG	11/28/11 00:00	1.00E+00	86.34	0.00	0.00			
11	U-238	TRG	11/28/11 00:00	1.02E+00	114.93	0.00	0.00			
12	U-238	TRG	11/28/11 00:00	1.07E+00	97.27	0.00	0.00			
13	U-238	TRG	11/28/11 00:00	1.01E+00	118.72	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-238	LCS	12/08/11 11:09		A_Spec	Alpha_040	170	5.67 E+02	1.00 E-03	18.6
02	U-238	MBL	12/08/11 11:09		A_Spec	Alpha_041	170	5.12 E+02	2.10 E-02	18.9
03	U-238	DUP	12/08/11 11:09		A_Spec	Alpha_042	170	3.58 E+02	5.00 E-03	18.7
04	U-238	DO	12/08/11 11:09		A_Spec	Alpha_043	170	4.05 E+02	1.00 E-03	20.2
05	U-238	TRG	12/08/11 11:09		A_Spec	Alpha_044	170	4.98 E+02	0.00 E+00	19.4
06	U-238	TRG	12/08/11 11:09		A_Spec	Alpha_045	170	2.71 E+02	0.00 E+00	18.9
07	U-238	TRG	12/08/11 11:09		A_Spec	Alpha_048	170	1.95 E+02	1.00 E-03	17.1
08	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_017	170.02	6.98 E+01	7.00 E-03	17.5
09	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_018	170.02	5.08 E+02	8.00 E-03	16.6
10	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_021	170.03	1.43 E+02	1.00 E-02	15.3
11	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_024	170	5.28 E+02	1.00 E-03	16.8
12	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_026	170.02	5.97 E+01	2.00 E-03	17.2
13	U-238	TRG	12/08/11 14:20		A_Spec	Alpha_027	170.02	4.61 E+02	4.00 E-03	18.9

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	U-235	LCS	LCS	pCi/g	4.84E-01	1.87E-01	1.00E-01					OK	
02	U-235	MBL	BLANK	pCi/g	2.97E+00	8.44E+00	1.49E+01					INV	OK
03	U-235	DUP	CORE 1 0-1	pCi/g	2.32E-01	1.26E-01	7.00E-02				NA	OK	
04	U-235	DO	CORE 1 0-1	pCi/g	1.70E-01	1.01E-01	6.97E-02					OK	
05	U-235	TRG	CORE 2 11-12	pCi/g	5.99E-01	2.33E-01	1.24E-01					OK	
06	U-235	TRG	CORE 3 2-3	pCi/g	2.09E-01	1.31E-01	1.14E-01					OK	
07	U-235	TRG	CORE 4 4-5	pCi/g	1.13E-01	8.42E-02	8.60E-02					OK	
08	U-235	TRG	CORE 5 4-5	pCi/g	1.98E-02	4.75E-02	9.96E-02					OK	
09	U-235	TRG	CORE 6 10-11	pCi/g	3.62E-01	1.43E-01	6.49E-02					OK	
10	U-235	TRG	CORE 7 5-6	pCi/g	1.73E-01	1.41E-01	1.56E-01					OK	
11	U-235	TRG	CORE 8 2-3	pCi/g	2.57E-01	1.34E-01	8.72E-02					OK	
12	U-235	TRG	CORE 9 5-6	pCi/g	1.65E-01	1.16E-01	1.10E-01					OK	
13	U-235	TRG	CORE 10 8-9	pCi/g	1.38E-01	9.13E-02	7.60E-02					OK	

Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	U-235	LCS	11/29/11 00:00	1.00E+00	105.18	0.00	0.00			
02	U-235	MBL	11/29/11 00:00	1.00E+00	0.48	0.00	0.00			
03	U-235	DUP	11/28/11 00:00	1.00E+00	104.03	0.00	0.00			
04	U-235	DO	11/28/11 00:00	1.00E+00	110.96	0.00	0.00			
05	U-235	TRG	11/28/11 00:00	1.00E+00	81.58	0.00	0.00			
06	U-235	TRG	11/28/11 00:00	1.01E+00	90.49	0.00	0.00			
07	U-235	TRG	11/28/11 00:00	1.00E+00	135.20	0.00	0.00			
08	U-235	TRG	11/28/11 00:00	1.00E+00	77.99	0.00	0.00			
09	U-235	TRG	11/28/11 00:00	1.00E+00	145.22	0.00	0.00			
10	U-235	TRG	11/28/11 00:00	1.00E+00	86.34	0.00	0.00			
11	U-235	TRG	11/28/11 00:00	1.02E+00	114.93	0.00	0.00			
12	U-235	TRG	11/28/11 00:00	1.07E+00	97.27	0.00	0.00			
13	U-235	TRG	11/28/11 00:00	1.01E+00	118.72	0.00	0.00			

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-UUISO-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: UUISO
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	U-235	LCS	12/08/11 11:09		A_Spec	Alpha_040	170	2.90 E+01	0.00 E+00	18.6
02	U-235	MBL	12/08/11 11:09		A_Spec	Alpha_041	170	8.30 E-01	1.00 E-03	18.9
03	U-235	DUP	12/08/11 11:09		A_Spec	Alpha_042	170	1.38 E+01	1.00 E-03	18.7
04	U-235	DO	12/08/11 11:09		A_Spec	Alpha_043	170	1.17 E+01	2.00 E-03	20.2
05	U-235	TRG	12/08/11 11:09		A_Spec	Alpha_044	170	2.90 E+01	0.00 E+00	19.4
06	U-235	TRG	12/08/11 11:09		A_Spec	Alpha_045	170	1.10 E+01	0.00 E+00	18.9
07	U-235	TRG	12/08/11 11:09		A_Spec	Alpha_048	170	8.00 E+00	0.00 E+00	17.1
08	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_017	170.02	8.30 E-01	1.00 E-03	17.5
09	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_018	170.02	2.67 E+01	2.00 E-03	16.6
10	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_021	170.03	6.98 E+00	6.00 E-03	15.3
11	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_024	170	1.55 E+01	3.00 E-03	16.8
12	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_026	170.02	9.00 E+00	0.00 E+00	17.2
13	U-235	TRG	12/08/11 14:20		A_Spec	Alpha_027	170.02	9.49 E+00	3.00 E-03	18.9

Count Room Report
Client: Foxfire Scientific, Inc.

11-11163-UUISO-1 (pCi/g) in SO
Tracer ID: U-10a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/29/11 00:00	1.0000	0.6104	11.8131		0.00		
02	MBL	BLANK	11/29/11 00:00	1.0000	0.6110	11.8247		0.00		
03	DUP	CORE 1 0-1	11/28/11 00:00	1.0042	0.6098	11.8015		0.00		
04	DO	CORE 1 0-1	11/28/11 00:00	1.0031	0.6111	11.8266		0.00		
05	TRG	CORE 2 11-12	11/28/11 00:00	1.0022	0.6088	11.7821		0.00		
06	TRG	CORE 3 2-3	11/28/11 00:00	1.0091	0.6087	11.7802		0.00		
07	TRG	CORE 4 4-5	11/28/11 00:00	1.0011	0.6108	11.8208		0.00		
08	TRG	CORE 5 4-5	11/28/11 00:00	1.0045	0.6102	11.8092		0.00		
09	TRG	CORE 6 10-11	11/28/11 00:00	0.9999	0.6099	11.8034		0.00		
10	TRG	CORE 7 5-6	11/28/11 00:00	1.0031	0.6091	11.7879		0.00		
11	TRG	CORE 8 2-3	11/28/11 00:00	1.0198	0.6102	11.8092		0.00		
12	TRG	CORE 9 5-6	11/28/11 00:00	1.0674	0.6091	11.7879		0.00		
13	TRG	CORE 10 8-9	11/28/11 00:00	1.0069	0.6102	11.8092		0.00		

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/30/2011 7:07 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11163	1	UUISO	11/30/2011 7:06	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
U-234	U-8a	35.240	11/30/2011	0.500	0.5104				8.10	0.292	0.00	0.000	0.00	0.000	0.00	0.000
U-238	U-8a	34.350	11/30/2011	0.500	0.5104				7.90	0.284	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	U-232	U-10a	19.353	11/30/2011	0.6104	0.6200
02	U-232	U-10a	19.353	11/30/2011	0.6110	0.6200
03	U-232	U-10a	19.353	11/30/2011	0.6098	0.6200
04	U-232	U-10a	19.353	11/30/2011	0.6111	0.6200
05	U-232	U-10a	19.353	11/30/2011	0.6088	0.6200
06	U-232	U-10a	19.353	11/30/2011	0.6087	0.6200
07	U-232	U-10a	19.353	11/30/2011	0.6108	0.6200
08	U-232	U-10a	19.353	11/30/2011	0.6102	0.6200
09	U-232	U-10a	19.353	11/30/2011	0.6099	0.6200
10	U-232	U-10a	19.353	11/30/2011	0.6091	0.6200
11	U-232	U-10a	19.353	11/30/2011	0.6102	0.6200
12	U-232	U-10a	19.353	11/30/2011	0.6091	0.6200
13	U-232	U-10a	19.353	11/30/2011	0.6102	0.6200

Balance Printer Tapes

Tracer	LCS
0.6104 g 0.6110 g 0.6098 g 0.6111 g 0.6088 g 0.6087 g 0.6108 g 0.6102 g 0.6099 g 0.6091 g 0.6102 g 0.6091 g 0.6102 g	0.5104 g

Matrix Spike

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11163	1	UUISO	grams	12/9/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	CORE 1 0-1	DUP					1.0042E+00	1.0042E+00				
04	CORE 1 0-1	DO					1.0031E+00	1.0031E+00				
05	CORE 2 11-12	TRG					1.0022E+00	1.0022E+00				
06	CORE 3 2-3	TRG					1.0091E+00	1.0091E+00				
07	CORE 4 4-5	TRG					1.0011E+00	1.0011E+00				
08	CORE 5 4-5	TRG					1.0045E+00	1.0045E+00				
09	CORE 6 10-11	TRG					9.9990E-01	9.9990E-01				
10	CORE 7 5-6	TRG					1.0031E+00	1.0031E+00				
11	CORE 8 2-3	TRG					1.0198E+00	1.0198E+00				
12	CORE 9 5-6	TRG					1.0674E+00	1.0674E+00				
13	CORE 10 8-9	TRG					1.0069E+00	1.0069E+00				

1.0042 g
1.0031 g
1.0022 g
1.0091 g
1.0011 g
1.0045 g
0.9999 g
1.0031 g
1.0198 g
1.0674 g
1.0069 g

Comments	

Technician: JB Date: 11-30-11

0176

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11163	12/9/2011	11/29/2011	11/30/2011	12/1/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	CORE 1 0-1	13.6600	460.7900	329.5100	447.1300	315.8500	29.36%	70.64%	0.0000	0.0000	
05	CORE 2 11-12	13.6700	313.6900	206.0800	300.0200	192.4100	35.87%	64.13%	0.0000	0.0000	
06	CORE 3 2-3	13.6600	304.7900	209.9400	291.1300	196.2800	32.58%	67.42%	0.0000	0.0000	
07	CORE 4 4-5	13.6200	260.5100	177.5100	246.8900	163.8900	33.62%	66.38%	0.0000	0.0000	
08	CORE 5 4-5	13.6100	314.6400	258.2700	301.0300	244.6600	18.73%	81.27%	0.0000	0.0000	
09	CORE 6 10-11	13.6500	234.5200	206.5800	220.8700	192.9300	12.65%	87.35%	0.0000	0.0000	
10	CORE 7 5-6	13.6400	330.9100	243.8100	317.2700	230.1700	27.45%	72.55%	0.0000	0.0000	
11	CORE 8 2-3	13.7100	345.0700	226.6300	331.3600	212.9200	35.74%	64.26%	0.0000	0.0000	
12	CORE 9 5-6	13.6800	493.3800	377.2500	479.7000	363.5700	24.21%	75.79%	0.0000	0.0000	
13	CORE 10 8-9	13.6300	389.0700	275.1300	375.4400	261.5000	30.35%	69.65%	0.0000	0.0000	

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sells Date: Analysis: Rough Prep Logbook

ICB 12/8/11

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012123.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10878
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 12/8/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:26 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6104 mL
Effective Efficiency: 0.1961 +/- 0.0109
Counting Efficiency: 0.1864 +/- 0.0030 on 12/4/2011 8:21:57 AM
Chem. Recovery Factor: 1.0518 +/- 0.0607

Control Certificate Name: NatU_U-8A
Chem. Recov. of Control: 0.9434
Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

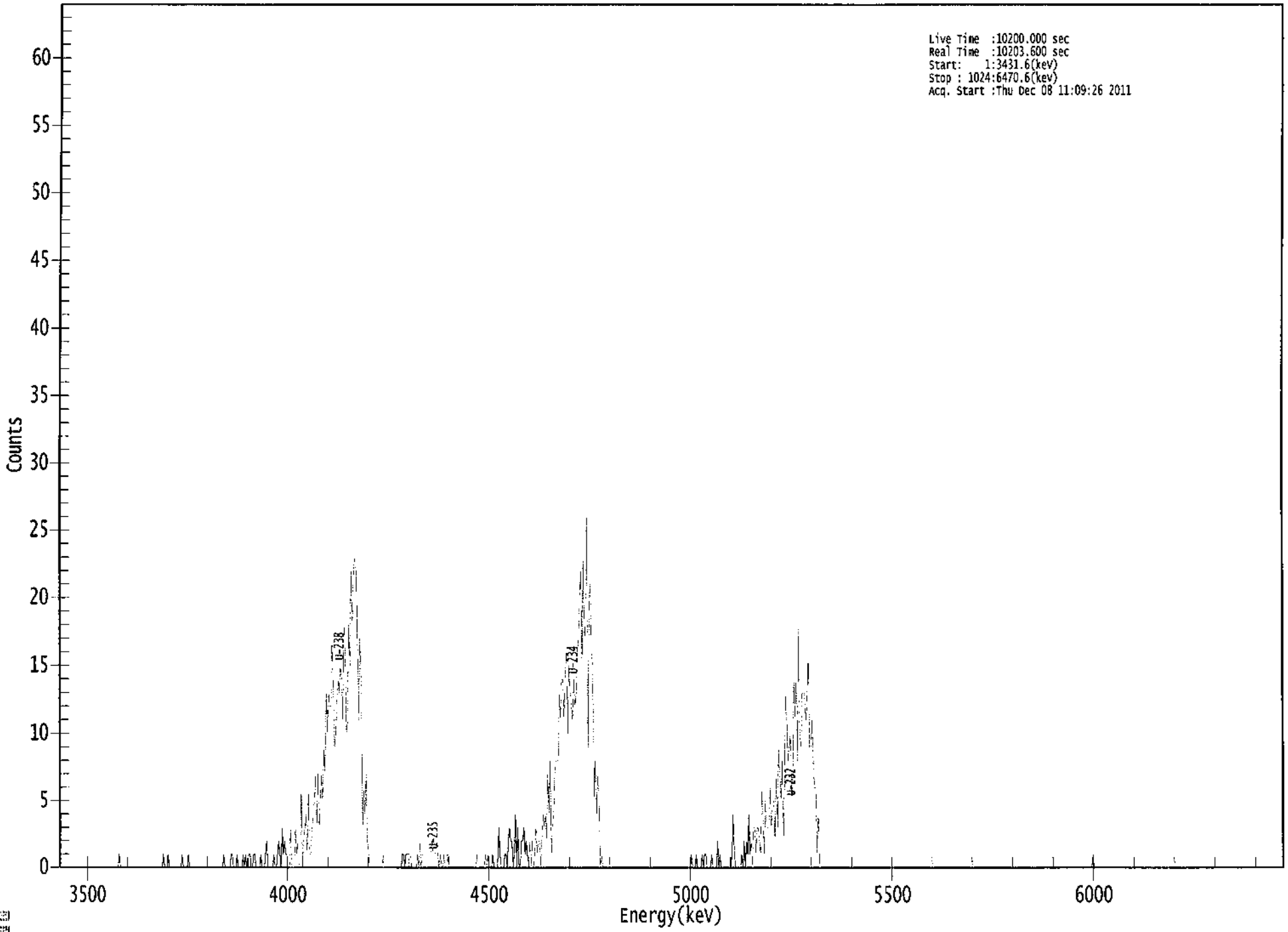
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.254	391.66	9.91	0.34	0.00E+000	8.6
U-234		4.713	565.00	8.25	0.00	0.00E+000	29.0
U-235		4.365	29.00	37.02	0.00	0.00E+000	3.0
U-238		4.132	566.83	8.23	0.17	0.00E+000	26.3

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.963	5302.50*	5.30E+000 +/- 5.77E-001	6.47E-002 +/- 7.05E-003
U-234	0.963	4761.50*	7.65E+000 +/- 1.05E+000	8.12E-002 +/- 8.84E-003
U-235	0.994	4385.50*	4.84E-001 +/- 1.87E-001	1.00E-001 +/- 1.09E-002
U-238	0.957	4184.40*	7.64E+000 +/- 1.04E+000	5.63E-002 +/- 6.13E-003

0000012123.CNF



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*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10204

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	1	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	1
89:	0	0	0	1	0	0	0	0
97:	0	0	0	0	0	0	0	1
105:	0	0	0	0	1	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	1	1	0	0	0	1	0	0
153:	0	0	1	0	1	0	0	1
161:	1	0	0	1	1	0	0	0
169:	0	1	0	0	0	1	2	0
177:	0	0	0	0	1	0	0	1
185:	2	1	0	3	1	2	1	1
193:	0	0	3	0	0	0	3	1
201:	2	0	0	6	0	2	3	4
209:	1	6	1	1	3	4	5	7
217:	3	7	3	5	7	5	9	7
225:	13	10	13	12	12	17	13	9
233:	10	12	14	13	15	14	11	18
241:	17	10	11	18	15	22	18	22
249:	23	22	18	11	17	14	3	6
257:	4	7	2	1	0	0	0	0
265:	0	0	0	0	0	0	0	1
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	1
289:	1	0	1	1	1	1	1	0
297:	0	0	0	0	1	0	2	0
305:	1	1	1	1	1	1	1	1
313:	2	1	1	1	2	1	0	1
321:	0	0	1	0	0	1	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	1	0
353:	0	0	0	0	0	1	0	1
361:	0	0	0	1	0	0	0	0

369:	3	1	0	0	0	1	1	0

Sample Title: 01

Channel								
377:	2	3	2	2	0	1	4	0
385:	3	0	0	2	2	3	1	2
393:	1	0	2	0	2	0	1	3
401:	1	2	2	0	2	4	3	4
409:	2	7	4	8	1	3	4	7
417:	8	8	8	13	11	14	14	11
425:	15	16	10	15	13	12	11	14
433:	12	13	16	17	20	22	15	23
441:	17	18	26	9	20	21	16	15
449:	5	8	4	7	5	0	1	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	1	0	0	0	1	0	0
537:	0	0	1	0	1	1	0	0
545:	0	0	1	0	0	0	0	2
553:	0	1	0	0	0	0	0	0
561:	0	0	0	1	4	1	0	0
569:	0	0	0	1	0	2	0	2
577:	1	4	1	2	0	3	3	1
585:	3	3	2	1	6	4	1	5
593:	3	3	3	6	3	5	5	2
601:	7	3	9	7	5	8	2	7
609:	13	11	8	9	10	5	7	14
617:	11	14	8	18	10	9	13	13
625:	13	11	12	16	9	9	11	8
633:	6	6	1	4	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 01

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	1	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012122.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 10879
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Sample Date/Time: 12/8/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:33 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6110 mL
Effective Efficiency: 0.0009 +/- 0.0007
Counting Efficiency: 0.1888 +/- 0.0030 on 12/4/2011 8:21:55 AM
Chem. Recovery Factor: 0.0048 +/- 0.0038

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

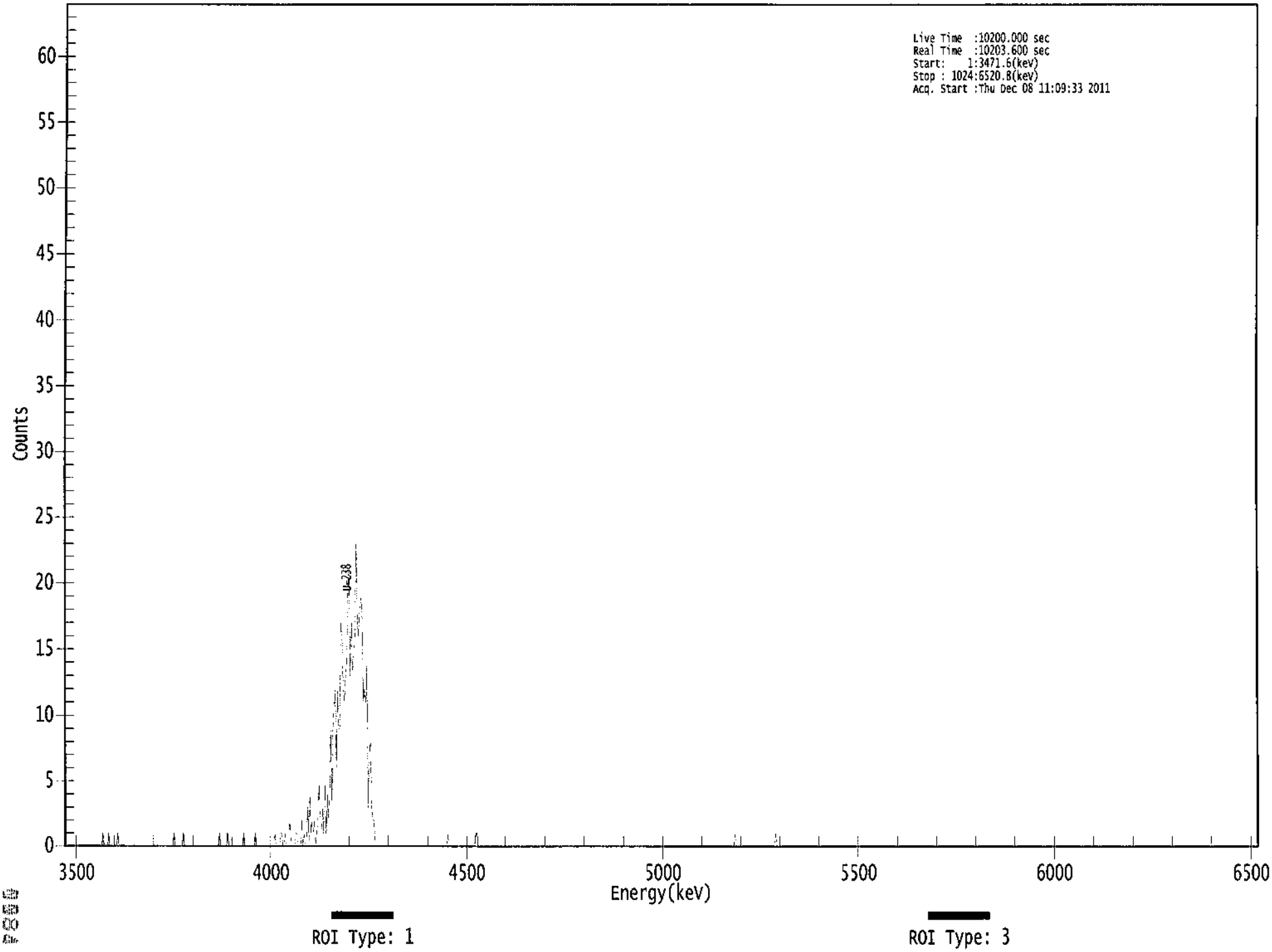
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.238	1.83	152.56	0.17	0.00E+000	3.0
U-234		4.718	-1.70	130.90	1.70	0.00E+000	0.0
U-235		4.452	0.83	239.53	0.17	0.00E+000	3.0
U-238		4.197	512.43	8.69	3.57	0.00E+000	46.7

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.935	5302.50*	5.31E+000 +/- 8.10E+000	1.21E+001 +/- 1.85E+001
U-234	0.970	4761.50*	-4.93E+000 +/- 9.92E+000	2.13E+001 +/- 3.25E+001
U-235	0.931	4385.50*	2.97E+000 +/- 8.44E+000	1.49E+001 +/- 2.28E+001
U-238	0.997	4184.40*	1.48E+003 +/- 2.26E+003	2.72E+001 +/- 4.16E+001

0000012122.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10204

Channel								
1:	1	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	1	0	0	0	0	1	0
41:	0	0	0	0	0	0	1	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	1	0
97:	0	0	0	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	1	0	0
137:	0	0	0	0	1	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	1	0	0	0	0	0
161:	0	0	0	0	1	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	1	0	0
185:	0	0	1	1	0	0	1	0
193:	0	0	2	0	0	0	0	1
201:	1	0	0	0	2	0	1	0
209:	0	3	1	4	1	2	1	2
217:	0	1	2	5	1	1	3	1
225:	5	1	4	2	4	9	3	9
233:	11	12	6	12	9	9	17	16
241:	12	11	13	14	19	21	13	17
249:	13	15	16	23	17	16	18	19
257:	18	11	12	11	14	3	7	8
265:	3	2	2	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	1	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	1	1	0	0	0	0	0
361:	0	0	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	1
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	1	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

IGB 12/8/11

Apex-Alpha™

Sample Description: CORE 1 0-1-DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012121.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 10880
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:35 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6098 mL
Effective Efficiency: 0.1943 +/- 0.0108
Counting Efficiency: 0.1868 +/- 0.0030 on 12/4/2011 8:21:53 AM
Chem. Recovery Factor: 1.0403 +/- 0.0603

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

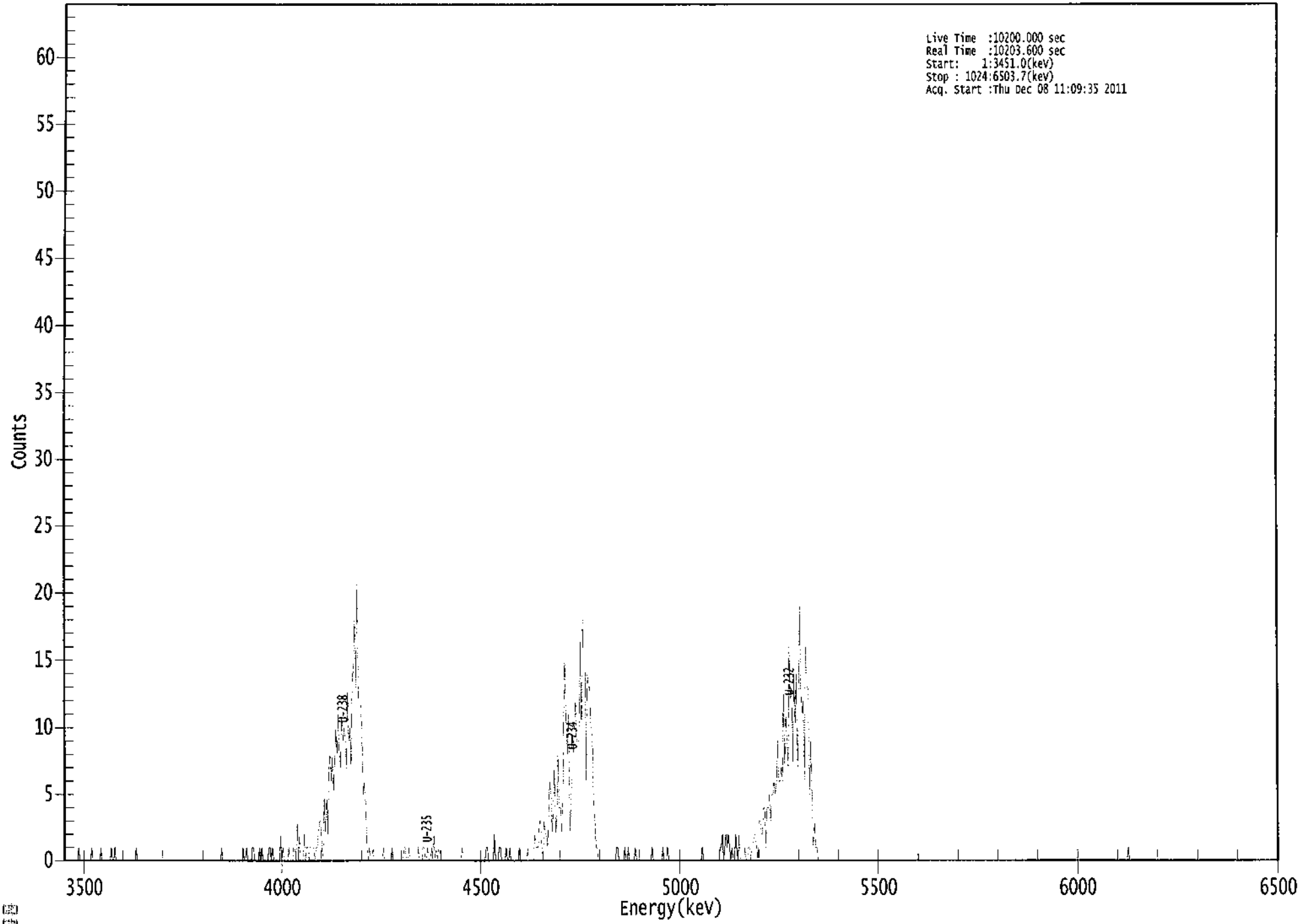
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.279	387.83	9.96	0.17	0.00E+000	14.7
U-234		4.734	354.66	10.41	0.34	0.00E+000	16.9
U-235		4.367	13.83	53.08	0.17	0.00E+000	3.0
U-238		4.158	358.15	10.37	0.85	0.00E+000	23.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.991	5302.50*	5.28E+000 +/- 5.77E-001	5.68E-002 +/- 6.21E-003
U-234	0.988	4761.50*	4.83E+000 +/- 7.28E-001	6.50E-002 +/- 7.11E-003
U-235	0.994	4385.50*	2.32E-001 +/- 1.26E-001	7.00E-002 +/- 7.66E-003
U-238	0.989	4184.40*	4.85E+000 +/- 7.31E-001	8.11E-002 +/- 8.86E-003

0000012121.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10204

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	1	0	0	0
17:	0	0	0	0	0	0	0	1
25:	0	0	0	0	0	0	0	1
33:	0	0	0	0	0	0	0	0
41:	1	0	0	1	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	1	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	1
153:	0	0	1	0	0	0	0	1
161:	1	0	0	0	0	1	0	1
169:	0	0	0	0	0	1	1	0
177:	1	0	0	0	0	0	0	2
185:	0	1	0	0	0	0	1	0
193:	0	0	1	1	0	3	0	2
201:	0	0	0	2	0	1	1	0
209:	1	1	1	1	0	1	1	2
217:	3	3	1	0	5	2	5	2
225:	7	8	6	8	5	8	10	8
233:	11	8	7	11	9	10	9	7
241:	13	9	10	7	14	14	18	13
249:	21	12	12	12	9	5	6	4
257:	1	0	1	0	0	1	0	0
265:	0	0	0	0	0	0	1	0
273:	0	0	0	0	0	1	0	0
281:	0	0	0	0	0	0	0	1
289:	1	0	0	1	0	0	0	0
297:	0	0	0	1	0	0	0	1
305:	1	0	0	1	0	0	1	0
313:	2	0	1	0	1	1	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	1	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	1	1	0	0
361:	0	0	0	2	0	0	0	1

369:	1	0	0	0	0	1	0	0

Sample Title: 03

Channel								
377:	1	0	0	0	0	0	0	0
385:	1	0	0	0	0	0	0	1
393:	0	0	0	0	0	2	1	1
401:	1	3	3	1	0	3	2	2
409:	1	4	6	5	2	4	7	2
417:	3	8	4	4	2	4	10	15
425:	10	8	11	2	5	10	8	10
433:	12	9	9	9	17	10	18	15
441:	15	6	14	13	13	10	10	5
449:	3	1	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	1	1	0	0	0	0
473:	0	1	0	0	1	0	0	0
481:	0	0	1	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	0
505:	0	1	0	0	0	1	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	1	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	1	1	2	0	1	2	1
561:	2	1	0	1	0	0	2	1
569:	0	2	0	0	0	0	1	0
577:	0	1	1	0	1	1	2	2
585:	1	0	3	3	2	2	4	4
593:	1	4	4	5	3	5	5	6
601:	5	6	9	6	6	7	6	13
609:	7	11	9	7	16	12	13	7
617:	14	10	14	7	12	19	13	11
625:	12	6	16	13	13	5	9	5
633:	1	3	1	1	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 03

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	1	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: CORE 1 0-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012125.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 10881
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:28 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6111 mL
Effective Efficiency: 0.2240 +/- 0.0118
Counting Efficiency: 0.2019 +/- 0.0032 on 12/4/2011 8:21:52 AM
Chem. Recovery Factor: 1.1096 +/- 0.0609

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

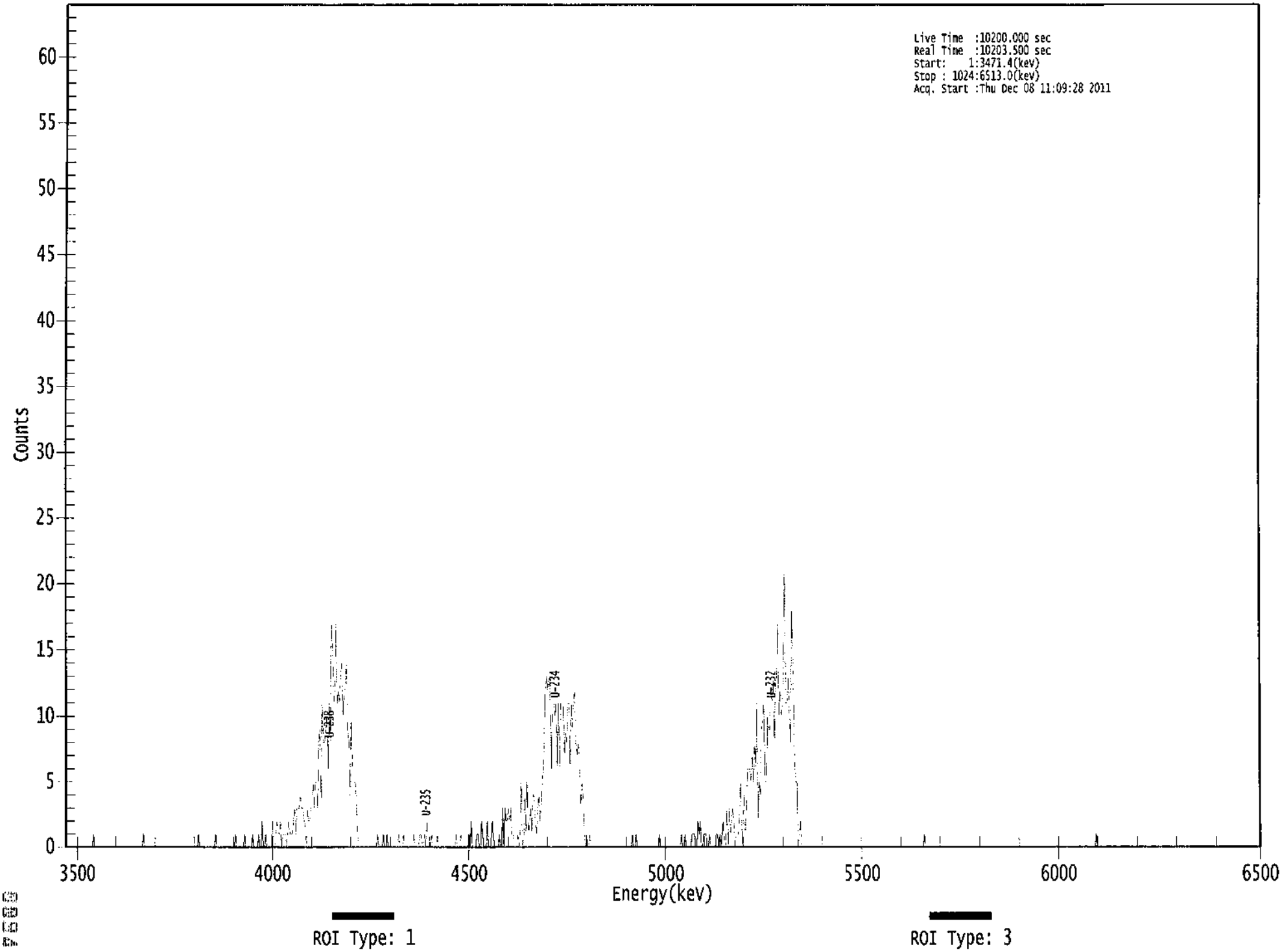
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.273	448.00	9.27	0.00	0.00E+000	18.8
U-234		4.723	388.00	9.96	0.00	0.00E+000	20.1
U-235		4.393	11.66	58.37	0.34	0.00E+000	3.0
U-238		4.148	404.83	9.74	0.17	0.00E+000	45.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.986	5302.50*	5.30E+000 +/- 5.46E-001	7.09E-002 +/- 7.31E-003
U-234	0.976	4761.50*	4.58E+000 +/- 6.57E-001	7.08E-002 +/- 7.30E-003
U-235	0.999	4385.50*	1.70E-001 +/- 1.01E-001	6.97E-002 +/- 7.18E-003
U-238	0.979	4184.40*	4.76E+000 +/- 6.76E-001	4.91E-002 +/- 5.06E-003

0000012125.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10204

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	1	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	1	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	1	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	1	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	1	0	0	0	0	0
153:	0	0	1	0	0	0	0	0
161:	0	1	0	0	0	0	1	0
169:	0	2	0	0	1	0	0	0
177:	0	0	2	0	0	1	2	1
185:	1	2	0	1	1	1	0	1
193:	2	1	1	1	2	3	1	3
201:	3	3	4	3	3	2	2	0
209:	3	2	2	3	3	5	3	5
217:	5	3	8	9	3	11	8	8
225:	9	10	6	11	8	17	15	11
233:	12	17	11	12	11	13	14	10
241:	12	12	14	9	8	4	10	5
249:	5	5	4	1	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	1	0	0	0
273:	0	1	0	0	1	0	0	0
281:	0	0	0	0	0	0	1	0
289:	0	0	1	0	0	0	0	0
297:	0	0	0	1	0	0	0	0
305:	1	1	0	0	1	0	2	0
313:	0	0	1	0	0	0	0	1
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	1
337:	0	0	0	1	0	0	0	0
345:	0	0	1	0	2	0	0	0
353:	0	1	1	0	0	2	1	0
361:	0	0	2	0	0	0	2	1

369:	0	0	0	0	1	0	0	3

Sample Title: 04

Channel								
377:	0	3	2	2	3	2	3	1
385:	1	0	0	0	1	0	1	5
393:	0	1	4	1	5	1	2	3
401:	1	4	4	2	1	3	4	2
409:	3	5	6	9	12	13	12	13
417:	13	6	11	11	10	11	6	11
425:	6	11	11	11	7	9	8	11
433:	11	6	11	9	11	12	8	7
441:	8	7	3	5	4	1	0	1
449:	0	0	1	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	1	0
489:	0	1	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	1	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	0	0	1	0	0	0	0
537:	0	1	1	1	0	0	2	1
545:	2	0	0	1	1	1	0	0
553:	1	0	0	0	0	0	1	1
561:	0	1	0	1	2	0	0	3
569:	0	3	1	2	3	2	0	1
577:	1	1	3	5	0	2	4	1
585:	3	6	6	6	5	7	5	8
593:	6	11	2	5	4	9	10	11
601:	5	5	10	9	9	12	11	13
609:	8	12	13	17	10	12	10	11
617:	15	21	11	11	13	10	8	18
625:	15	8	5	5	0	1	2	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	1	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 04

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	1	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/14

Apex-Alpha™

Sample Description: CORE 2 11-12
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012124.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 10882
Reagent Blank: <not performed>

Sample Size: 1.002E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:30 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6088 mL
Effective Efficiency: 0.1581 +/- 0.0096
Counting Efficiency: 0.1938 +/- 0.0031 on 12/4/2011 8:21:50 AM
Chem. Recovery Factor: 0.8158 +/- 0.0514

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

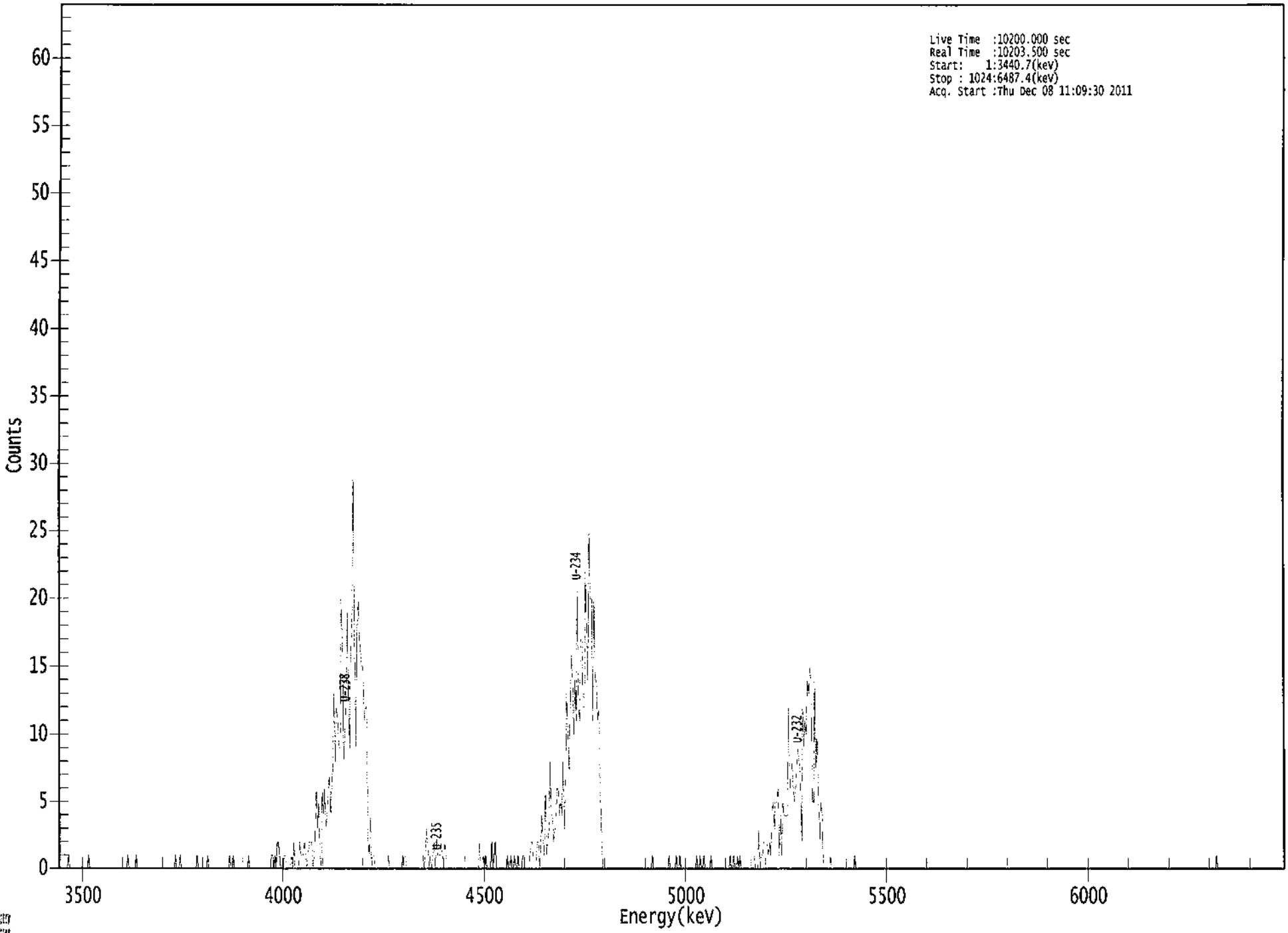
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	315.00	11.06	0.00	0.00E+000	24.3
U-234		4.735	515.83	8.63	0.17	0.00E+000	20.2
U-235		4.384	29.00	37.02	0.00	0.00E+000	6.0
U-238		4.158	498.00	8.79	0.00	0.00E+000	10.1

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.993	5302.50*	5.28E+000 +/- 6.31E-001	1.01E-001 +/- 1.20E-002
U-234	0.989	4761.50*	8.64E+000 +/- 1.27E+000	6.99E-002 +/- 8.35E-003
U-235	1.000	4385.50*	5.99E-001 +/- 2.33E-001	1.24E-001 +/- 1.48E-002
U-238	0.989	4184.40*	8.31E+000 +/- 1.23E+000	1.00E-001 +/- 1.20E-002

0000012124.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10204

Channel								
1:	0	0	0	0	0	0	0	0
9:	1	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	1	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	1	0	0	0	0	0
65:	0	1	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	1	0	0	0	1	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	1	0	0	0
121:	0	0	0	0	0	1	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	1
145:	0	0	1	0	0	0	0	0
153:	0	0	0	0	0	0	0	1
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	1	1	0	1	0	2
185:	2	1	0	0	0	1	1	0
193:	0	0	0	1	0	2	0	0
201:	0	0	2	1	1	1	2	1
209:	0	1	2	2	2	0	1	3
217:	6	3	5	1	0	6	4	6
225:	3	4	6	7	4	6	8	13
233:	8	12	11	9	9	20	17	8
241:	10	12	19	13	9	16	18	30
249:	17	9	17	20	17	16	15	15
257:	11	12	12	2	1	4	0	1
265:	1	0	0	0	0	0	0	0
273:	0	0	0	0	1	0	0	0
281:	0	0	0	0	0	0	0	0
289:	1	1	1	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	1	0	1	3	2	0	1
313:	0	1	2	0	2	1	1	1
321:	2	1	0	2	1	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	1	0	0	0
345:	0	0	0	0	0	0	0	0
353:	2	0	0	1	0	1	0	0
361:	0	0	2	0	1	2	0	0

369:	0	0	0	0	0	0	0	1

Sample Title: 05

Channel								
377:	0	0	1	0	0	1	0	0
385:	1	0	0	0	1	1	0	0
393:	0	0	1	2	2	0	0	0
401:	2	2	0	2	4	2	1	6
409:	1	2	3	8	4	4	2	3
417:	4	6	6	4	5	4	8	3
425:	7	13	10	7	12	16	14	10
433:	14	11	21	12	11	17	17	12
441:	12	22	17	14	25	20	20	11
449:	20	14	14	11	12	6	2	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	1	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	1	0	0	1
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	1	0	0
537:	1	0	0	1	0	0	0	0
545:	0	1	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	1	0	0	1	0	0	1
569:	0	1	0	0	0	0	0	0
577:	0	0	0	1	1	1	0	0
585:	0	3	0	1	1	2	2	2
593:	2	1	2	1	4	5	3	5
601:	5	6	1	4	1	5	4	4
609:	4	4	12	6	7	8	6	5
617:	6	8	9	8	7	2	12	9
625:	11	10	14	13	15	14	5	5
633:	14	7	10	5	2	5	4	0
641:	0	0	0	0	0	1	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	1	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 05

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	1	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

RB 12/8/11

Apex-Alpha™

Sample Description: CORE 3 2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012120.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 10883
Reagent Blank: <not performed>

Sample Size: 1.009E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:31 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6087 mL
Effective Efficiency: 0.1712 +/- 0.0101
Counting Efficiency: 0.1892 +/- 0.0030 on 12/4/2011 8:21:49 AM
Chem. Recovery Factor: 0.9049 +/- 0.0552

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

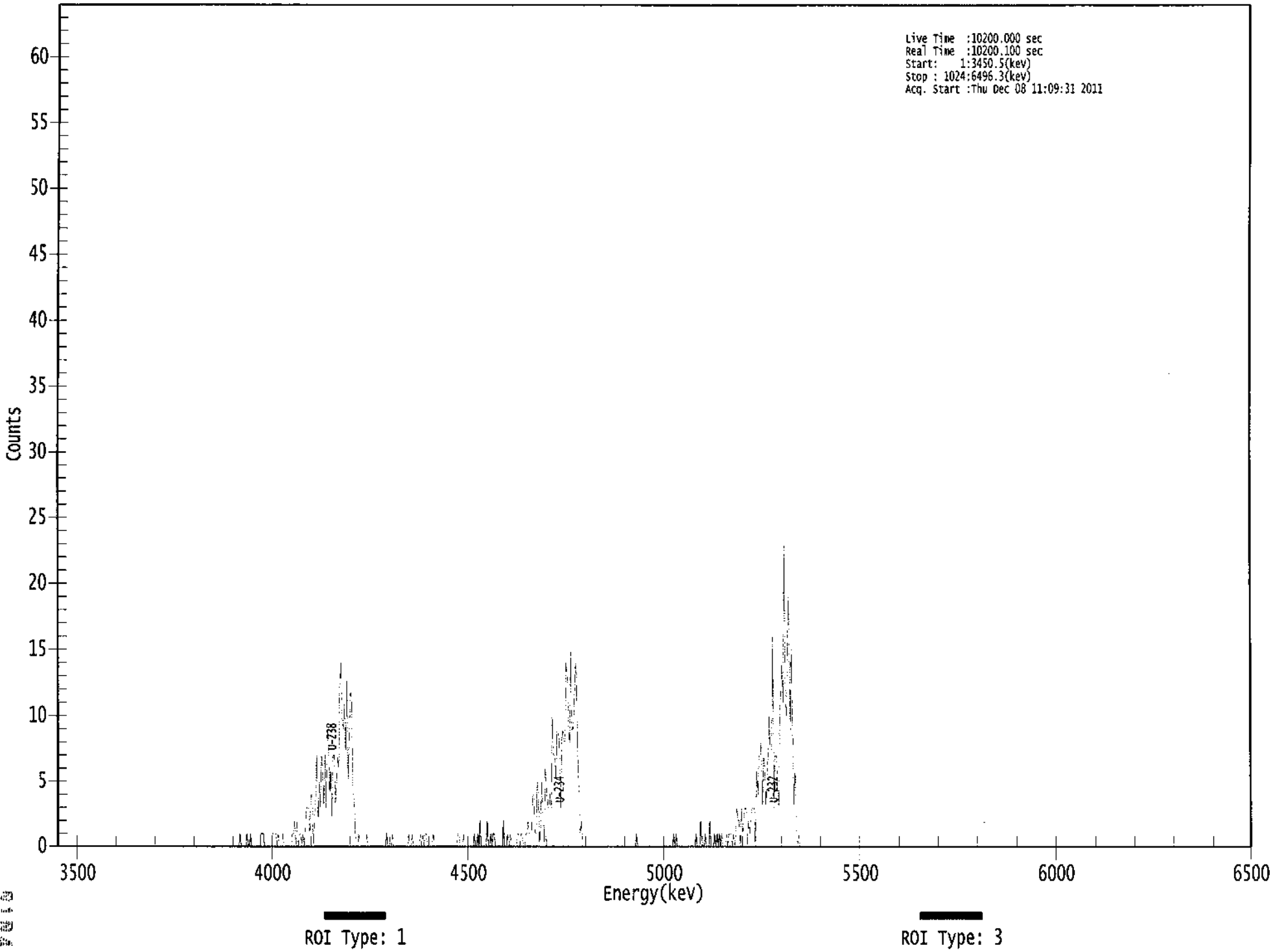
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.283	341.00	10.63	0.00	0.00E+000	5.7
U-234		4.736	285.00	11.63	0.00	0.00E+000	41.7
U-235		4.402	11.00	61.72	0.00	0.00E+000	3.0
U-238		4.155	271.00	11.93	0.00	0.00E+000	17.4

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.994	5302.50*	5.24E+000 +/- 6.05E-001	9.22E-002 +/- 1.06E-002
U-234	0.990	4761.50*	4.38E+000 +/- 7.18E-001	9.22E-002 +/- 1.06E-002
U-235	0.996	4385.50*	2.09E-001 +/- 1.31E-001	1.14E-001 +/- 1.31E-002
U-238	0.987	4184.40*	4.15E+000 +/- 6.89E-001	9.18E-002 +/- 1.06E-002

0000012120.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	1	0	0
161:	0	0	0	1	0	0	1	0
169:	0	0	0	0	0	0	0	1
177:	1	1	0	0	0	0	0	0
185:	0	1	1	1	1	0	1	0
193:	0	0	1	0	0	0	0	0
201:	0	0	1	1	2	0	2	0
209:	1	1	0	1	0	1	3	3
217:	3	1	4	4	0	2	4	7
225:	2	5	3	7	6	3	7	3
233:	8	9	4	6	2	7	7	3
241:	5	7	6	12	14	10	9	11
249:	7	13	5	9	12	11	4	4
257:	1	0	0	1	0	0	0	0
265:	0	0	1	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	1	0	0	0	0
289:	1	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	1	0
305:	0	1	0	0	0	0	0	0
313:	1	0	1	0	1	1	0	0
321:	0	0	0	1	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	1	1	0	0	0	1	0	0
353:	0	0	0	0	0	0	1	0
361:	0	1	0	2	0	0	0	0

369:	0	2	0	0	1	0	1	1

Sample Title: 06

Channel								
377:	0	0	0	0	0	0	0	2
385:	0	0	0	1	0	1	0	0
393:	0	0	0	1	1	0	1	1
401:	0	0	1	1	2	1	1	1
409:	4	4	1	1	5	4	0	2
417:	5	2	0	6	5	3	3	4
425:	3	10	7	7	5	9	9	8
433:	3	8	9	8	8	14	13	9
441:	8	15	9	9	11	14	13	7
449:	4	1	2	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	1	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	1	0	1	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	1	0	0	0
553:	2	0	0	0	1	0	0	0
561:	2	0	0	0	1	0	1	0
569:	1	0	1	0	0	0	1	0
577:	1	1	1	0	1	0	1	3
585:	2	2	0	3	1	2	3	3
593:	0	2	1	2	3	3	3	0
601:	6	4	7	7	8	3	7	6
609:	3	6	7	10	7	7	16	3
617:	7	7	5	3	10	12	14	11
625:	23	11	10	17	19	9	15	9
633:	3	6	2	0	1	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 06

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KLB
12/8/11

Apex-Alpha™

Sample Description: CORE 4 4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012126.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 10886
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 11:09:25 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6108 mL
Effective Efficiency: 0.2308 +/- 0.0120
Counting Efficiency: 0.1707 +/- 0.0027 on 12/4/2011 8:22:09 AM
Chem. Recovery Factor: 1.3520 +/- 0.0735

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

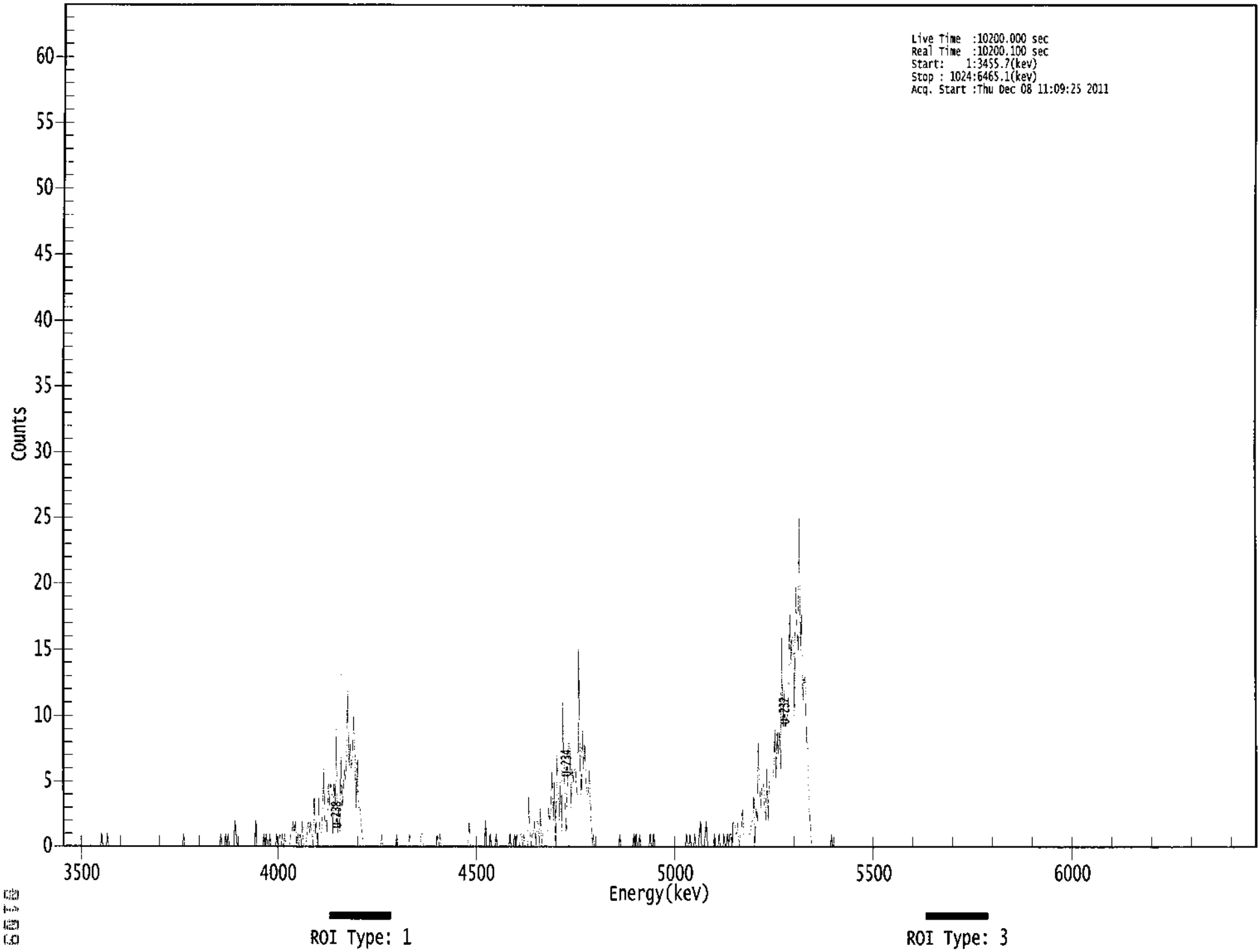
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.281	461.32	9.13	0.68	0.00E+000	19.2
U-234		4.729	214.83	13.38	0.17	0.00E+000	4.5
U-235		4.392	8.00	73.50	0.00	0.00E+000	2.9
U-238		4.150	194.83	14.05	0.17	0.00E+000	7.4

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.993	5302.50*	5.30E+000 +/- 5.40E-001	6.48E-002 +/- 6.60E-003
U-234	0.983	4761.50*	2.47E+000 +/- 4.15E-001	4.80E-002 +/- 4.89E-003
U-235	0.999	4385.50*	1.13E-001 +/- 8.42E-002	8.50E-002 +/- 8.66E-003
U-238	0.981	4184.40*	2.23E+000 +/- 3.87E-001	4.78E-002 +/- 4.86E-003

0000012126.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	1	0	0	0	0	1	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	1	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	1	0	0	0	1	0	1	0
145:	0	0	0	0	2	1	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	2	0
169:	0	0	0	0	0	1	0	1
177:	0	0	1	0	0	0	0	0
185:	1	0	0	1	0	1	0	1
193:	0	0	0	0	1	1	2	1
201:	2	0	1	0	1	0	2	0
209:	0	0	1	2	1	2	1	0
217:	4	1	2	0	4	1	1	2
225:	6	2	2	1	5	3	5	4
233:	1	5	3	9	1	3	1	7
241:	3	4	6	5	7	12	6	8
249:	6	7	10	7	3	7	3	3
257:	2	1	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	1	0	0	0	0	0
281:	0	0	0	0	0	0	0	1
289:	0	0	0	0	0	0	0	0
297:	0	0	1	0	0	0	0	0
305:	0	0	0	0	1	1	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	1	0	1	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	2	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	2	0	0	0	1

369:	0	0	0	0	1	0	0	0

Sample Title: 07

Channel								
377:	0	0	0	0	0	0	0	0
385:	1	0	0	0	1	0	1	0
393:	0	1	1	0	1	0	0	0
401:	4	1	0	1	1	2	0	2
409:	2	0	3	0	1	1	1	1
417:	1	3	2	3	6	2	5	0
425:	7	5	2	5	1	11	7	3
433:	1	5	8	8	3	6	5	6
441:	6	4	4	15	6	4	9	6
449:	8	5	4	4	6	3	0	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	1	0
481:	0	0	0	0	0	0	0	0
489:	0	0	1	0	1	0	0	1
497:	0	0	0	0	0	0	0	0
505:	1	0	0	1	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	1
537:	0	0	1	0	0	0	1	0
545:	0	0	1	2	0	0	0	1
553:	2	0	0	0	0	0	0	1
561:	0	0	0	1	0	0	0	1
569:	0	0	1	0	1	1	0	2
577:	2	1	1	2	0	1	1	3
585:	1	1	1	1	1	1	1	2
593:	2	4	0	3	2	8	4	3
601:	5	5	3	2	6	2	5	5
609:	5	5	6	9	5	9	7	9
617:	6	16	9	12	9	10	10	12
625:	18	14	16	16	10	20	17	15
633:	25	15	18	11	13	13	8	8
641:	3	2	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	1	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 07

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: CORE 5 4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012140.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_017
Chamber Serial Number:
Detector Serial Number: 17
Env. Background: System Bkgd 11050
Reagent Blank: <not performed>

Sample Size: 1.005E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:37 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6102 mL
Effective Efficiency: 0.1366 +/- 0.0089
Counting Efficiency: 0.1751 +/- 0.0028 on 12/3/2011 10:12:29 PM
Chem. Recovery Factor: 0.7799 +/- 0.0521

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

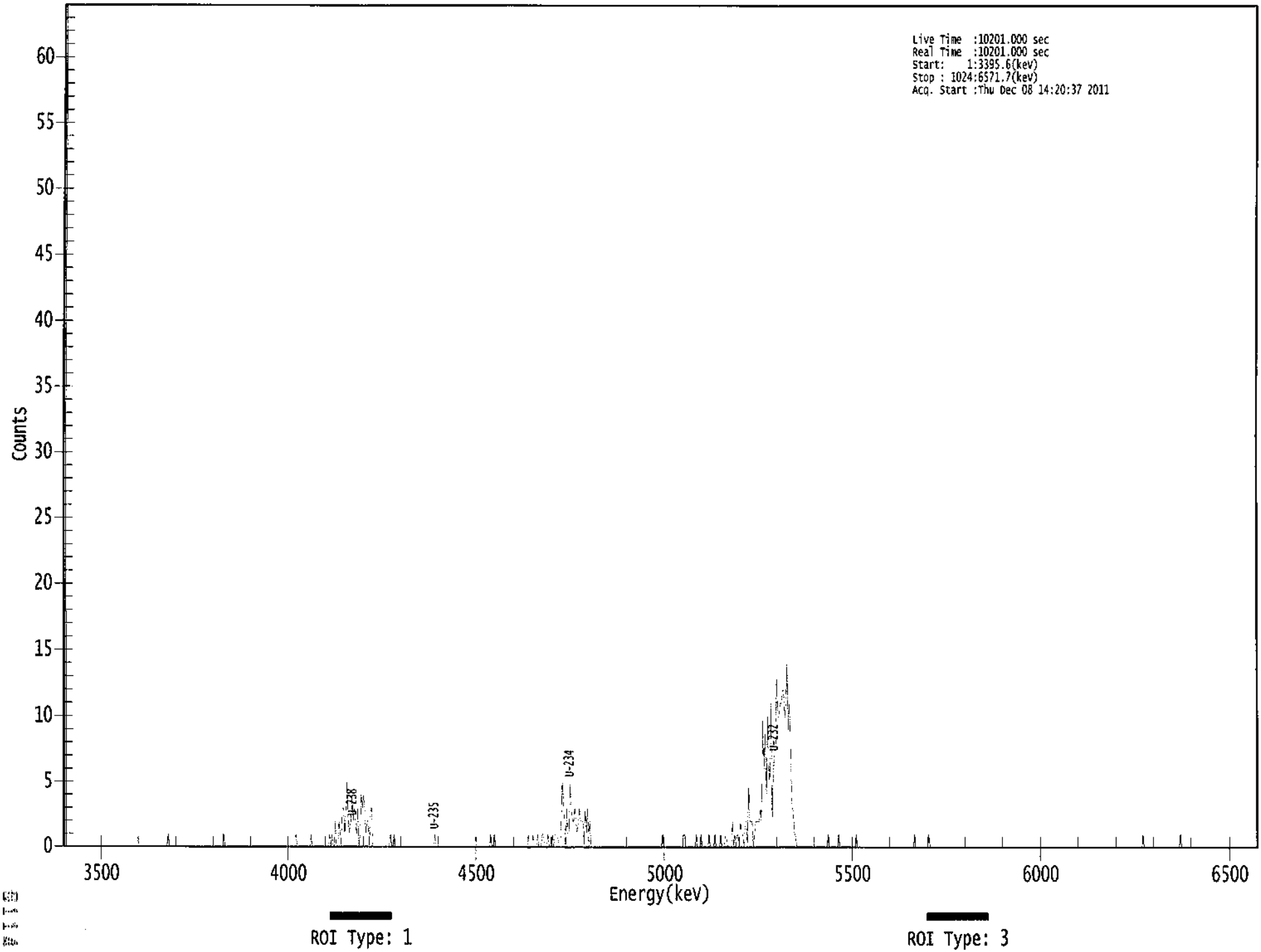
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.289	272.81	11.90	1.19	0.00E+000	44.1
U-234		4.745	65.49	24.33	0.51	0.00E+000	7.4
U-235		4.386	0.83	239.54	0.17	0.00E+000	3.1
U-238		4.170	69.81	23.69	1.19	0.00E+000	6.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.997	5302.50*	5.28E+000 +/- 6.72E-001	1.28E-001 +/- 1.62E-002
U-234	0.996	4761.50*	1.27E+000 +/- 3.48E-001	1.02E-001 +/- 1.29E-002
U-235	1.000	4385.50*	1.98E-002 +/- 4.75E-002	9.96E-002 +/- 1.27E-002
U-238	0.997	4184.40*	1.34E+000 +/- 3.62E-001	1.27E-001 +/- 1.61E-002

0000012140.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 08

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	1	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	1	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	1	0	0	0	0	0	0	0
209:	0	0	0	0	0	1	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	1	0	1
233:	0	0	2	0	0	2	1	0
241:	3	3	1	3	5	2	1	2
249:	4	2	3	2	1	3	0	1
257:	4	3	4	3	1	2	2	0
265:	3	3	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	1	0	0	1	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	0	0	0	0	0
313:	0	0	0	0	0	0	0	1
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	0	0	0	0	0	0	1

369:	0	0	1	0	0	0	0	0

Sample Title: 08

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	1
401:	0	0	0	1	0	0	0	1
409:	0	0	0	1	1	0	0	0
417:	1	0	0	0	1	0	1	1
425:	1	0	0	1	5	4	2	0
433:	3	1	1	5	3	2	2	3
441:	2	1	2	3	2	2	2	0
449:	3	1	3	1	2	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	1	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	1	1	0	0
537:	0	0	0	0	0	0	0	1
545:	0	0	0	1	0	0	0	0
553:	0	0	1	0	0	0	0	1
561:	0	0	0	0	1	0	0	0
569:	1	1	0	0	0	0	2	0
577:	1	0	1	1	0	2	1	1
585:	0	2	2	0	5	2	2	2
593:	0	1	2	2	2	2	3	2
601:	10	6	9	4	10	6	5	11
609:	2	6	7	8	13	10	10	11
617:	11	12	12	10	11	14	9	11
625:	8	3	3	1	1	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	1	0	0	0	0	0	0	0
665:	0	1	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	1	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	1	0	0	0	0	0
737:	0	0	0	0	0	0	1	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	1	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	1	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: CORE 6 10-11
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012141.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_018
Chamber Serial Number:
Detector Serial Number: 18
Env. Background: System Bkgd 11051
Reagent Blank: <not performed>

Sample Size: 9.999E-001 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:38 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6099 mL
Effective Efficiency: 0.2412 +/- 0.0123
Counting Efficiency: 0.1661 +/- 0.0026 on 12/3/2011 10:12:27 PM
Chem. Recovery Factor: 1.4522 +/- 0.0777

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

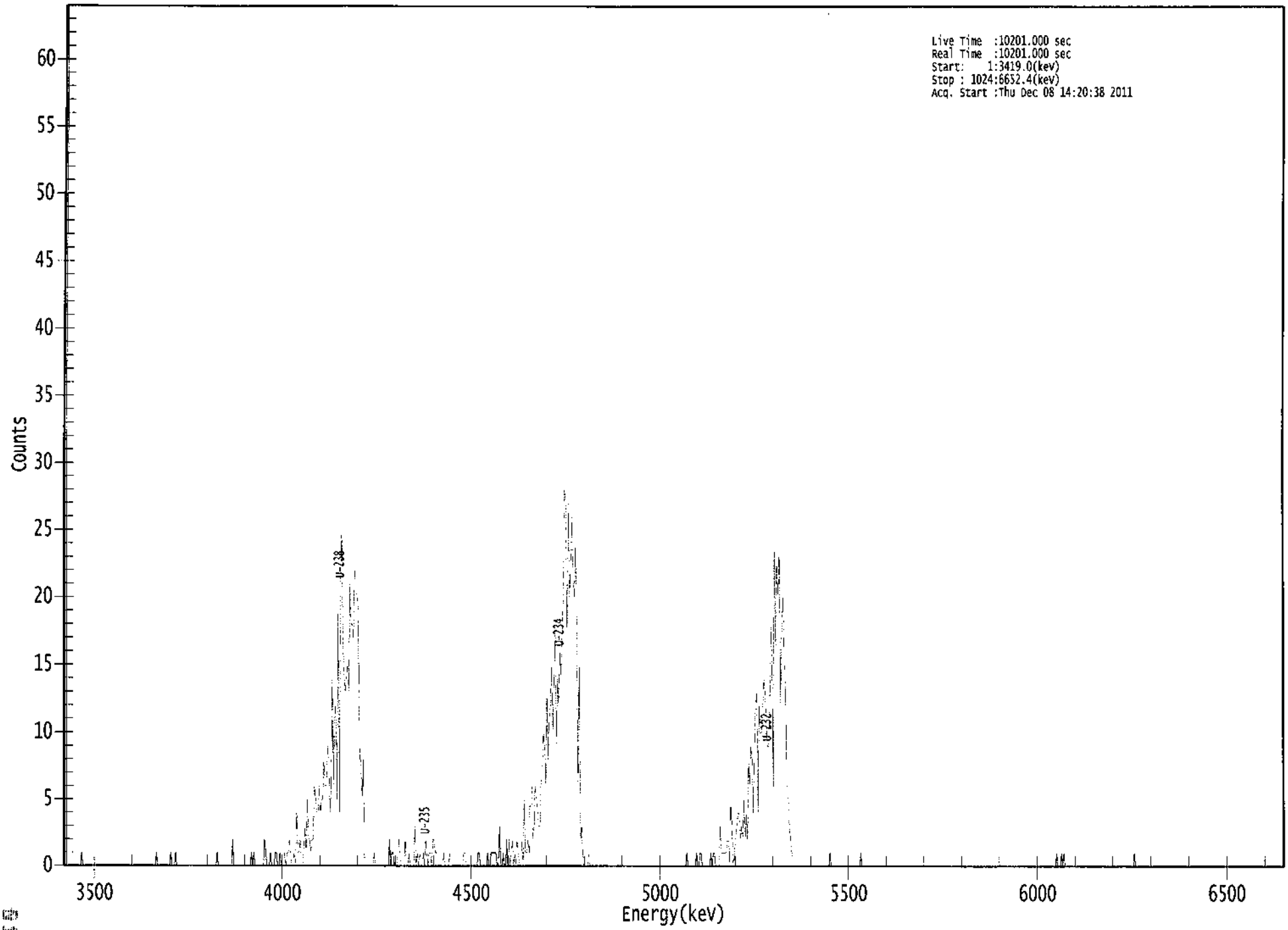
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.285	481.49	8.94	0.51	0.00E+000	17.9
U-234		4.737	578.98	8.15	1.02	0.00E+000	42.1
U-235		4.379	26.66	38.24	0.34	0.00E+000	3.2
U-238		4.156	507.64	8.71	1.36	0.00E+000	50.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.995	5302.50*	5.30E+000 +/- 5.31E-001	5.78E-002 +/- 5.78E-003
U-234	0.990	4761.50*	6.37E+000 +/- 8.23E-001	6.94E-002 +/- 6.94E-003
U-235	0.999	4385.50*	3.62E-001 +/- 1.43E-001	6.49E-002 +/- 6.50E-003
U-238	0.987	4184.40*	5.56E+000 +/- 7.38E-001	7.51E-002 +/- 7.52E-003

0000012141.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 09

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	1
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	1	0
81:	0	0	0	0	0	0	0	0
89:	0	0	1	0	0	0	1	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	1	0	0	0	0	0	0
137:	0	0	0	0	0	0	2	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	1	0
161:	1	0	0	0	0	0	0	0
169:	0	2	1	0	0	0	1	0
177:	0	0	1	1	0	0	1	0
185:	0	0	1	0	1	1	2	1
193:	0	0	1	0	4	1	1	2
201:	0	0	1	3	1	5	2	2
209:	1	2	2	6	5	4	4	6
217:	4	5	5	8	6	6	9	8
225:	4	6	14	6	11	12	5	19
233:	4	21	25	17	14	13	14	15
241:	13	21	18	18	17	22	21	20
249:	19	8	8	5	8	0	0	0
257:	0	0	0	0	0	1	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	2	0	1	1	0	0
281:	0	1	2	0	0	0	0	2
289:	0	0	1	0	0	0	0	3
297:	0	1	0	1	0	0	1	0
305:	2	1	0	1	1	0	2	2
313:	1	1	0	0	0	0	0	1
321:	0	0	0	0	1	0	0	0
329:	0	0	0	0	0	0	0	0
337:	1	1	0	0	0	0	0	0
345:	0	0	0	0	1	1	0	0
353:	0	0	0	0	1	0	0	1
361:	1	1	1	1	0	0	3	0

369:	0	1	0	0	2	0	2	0

Sample Title: 09

Channel								
377:	1	2	0	1	0	2	1	0
385:	0	2	0	5	1	1	2	1
393:	6	6	2	3	6	5	4	3
401:	3	7	7	10	9	6	13	8
409:	11	12	15	10	13	18	9	14
417:	12	16	14	18	20	28	27	17
425:	27	20	23	26	21	20	24	18
433:	6	16	2	3	0	0	0	0
441:	0	1	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	1	0	0	0	0
529:	0	0	0	1	0	0	1	1
537:	0	0	0	0	0	0	0	1
545:	0	1	1	0	0	0	0	3
553:	1	1	1	1	1	2	2	0
561:	5	3	0	1	2	3	4	4
569:	2	3	2	5	2	4	2	8
577:	6	9	8	4	9	12	13	4
585:	12	10	10	11	14	13	11	9
593:	9	11	18	16	6	24	16	23
601:	20	24	12	18	20	16	14	6
609:	6	3	2	1	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	1	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	1	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 09

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	1	0	0	0	1	0	1
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	1	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: CORE 7 5-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012144.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_021
Chamber Serial Number:
Detector Serial Number: 21
Env. Background: System Bkgd 11052
Reagent Blank: <not performed>

Sample Size: 1.003E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:39 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6091 mL
Effective Efficiency: 0.1318 +/- 0.0087
Counting Efficiency: 0.1527 +/- 0.0024 on 12/3/2011 10:12:51 PM
Chem. Recovery Factor: 0.8634 +/- 0.0586

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

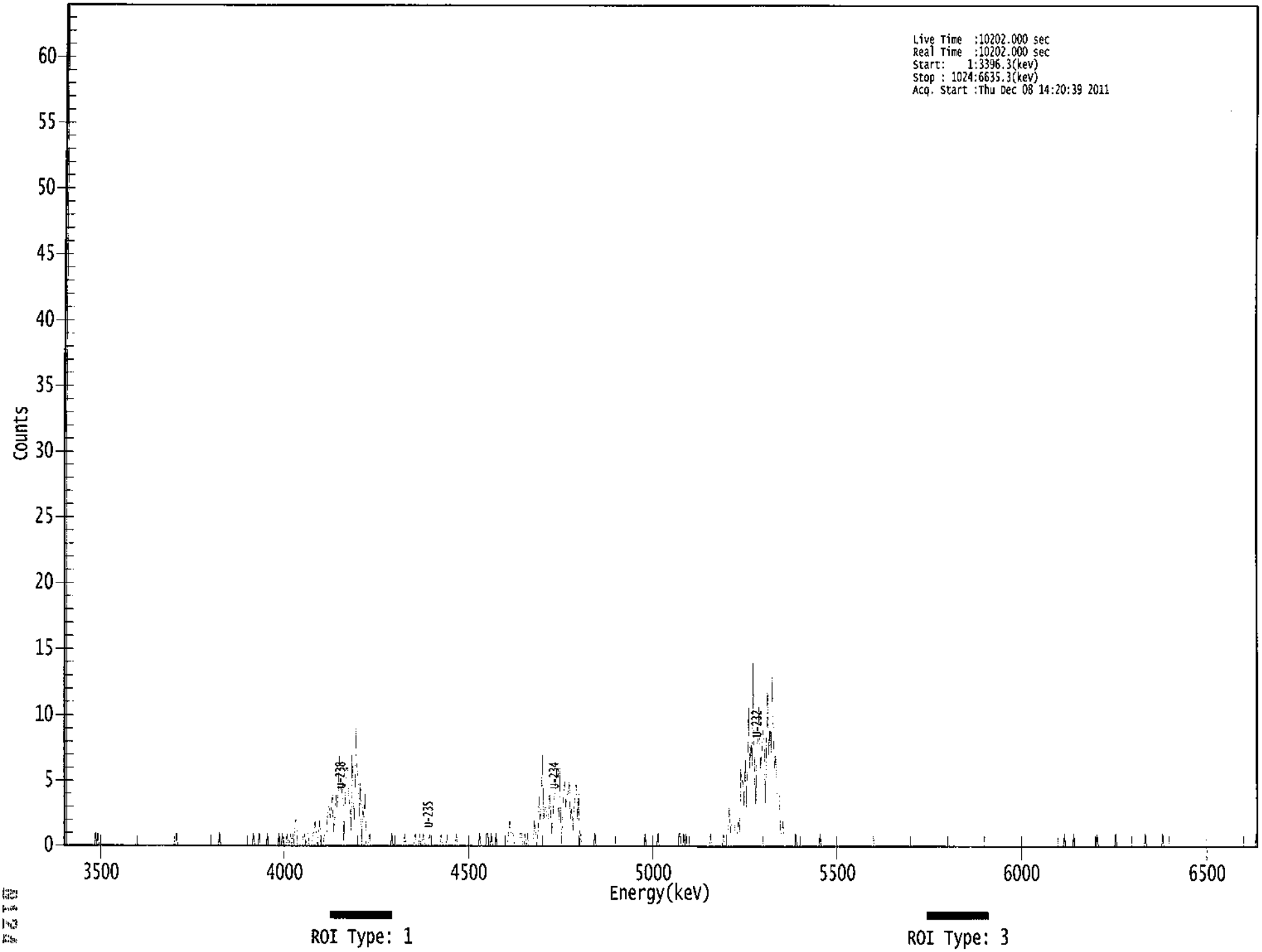
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.285	262.81	12.12	1.19	0.00E+000	5.5
U-234		4.732	128.47	17.41	1.53	0.00E+000	5.0
U-235		4.391	6.98	80.28	1.02	0.00E+000	3.2
U-238		4.152	143.30	16.49	1.70	0.00E+000	8.9

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.995	5302.50*	5.28E+000 +/- 6.83E-001	1.32E-001 +/- 1.71E-002
U-234	0.986	4761.50*	2.58E+000 +/- 5.59E-001	1.43E-001 +/- 1.85E-002
U-235	0.999	4385.50*	1.73E-001 +/- 1.41E-001	1.56E-001 +/- 2.02E-002
U-238	0.983	4184.40*	2.86E+000 +/- 6.00E-001	1.47E-001 +/- 1.90E-002

0000012144.CNF



```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 10

Elapsed Live time: 10202
Elapsed Real Time: 10202

Channel								
1:	10202	10202	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	1	0	1	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	1	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	1	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	1	0	0	0	0
169:	1	0	0	0	0	0	0	1
177:	0	0	0	0	0	0	0	0
185:	0	1	0	0	1	0	0	0
193:	1	0	0	1	0	1	0	2
201:	2	0	0	0	0	0	1	1
209:	0	1	1	0	0	0	1	1
217:	2	1	0	1	2	0	0	0
225:	1	1	1	3	3	2	3	4
233:	1	2	4	3	4	7	5	4
241:	5	0	4	6	6	4	3	1
249:	7	3	2	9	6	5	2	5
257:	0	3	2	4	0	0	0	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	1	0	0	0	0	0
289:	0	0	0	0	0	1	0	0
297:	0	0	0	0	0	0	1	0
305:	0	0	1	0	0	1	0	0
313:	0	0	1	0	0	0	0	0
321:	0	0	0	0	1	0	0	0
329:	0	1	0	0	0	0	0	0
337:	0	1	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	1	0	0
361:	0	0	0	1	1	0	0	1

369:	0	0	0	1	0	0	0	0

Sample Title: 10

Channel								
377:	0	0	0	0	0	0	1	2
385:	1	1	1	0	0	0	0	0
393:	1	1	0	0	1	0	1	0
401:	0	0	0	0	2	1	0	1
409:	4	2	3	7	2	3	3	2
417:	2	4	3	1	2	4	4	6
425:	4	2	6	0	2	4	5	3
433:	4	4	5	2	3	1	3	4
441:	5	2	4	0	1	0	0	0
449:	0	0	0	0	0	0	0	0
457:	1	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	1	0	0	0	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	1	1	0	0	1	0	1	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	1	0	0	0	0
561:	0	0	0	0	0	0	1	0
569:	0	1	1	3	1	2	2	2
577:	1	1	1	2	1	6	5	5
585:	3	7	3	6	11	6	8	6
593:	14	6	3	8	8	11	6	7
601:	9	8	3	8	12	7	9	7
609:	13	9	6	7	4	4	4	1
617:	1	2	1	0	0	0	0	0
625:	0	0	0	0	1	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	1	0	0	0	0	0
865:	0	0	1	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	1	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	1	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	1	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	1	0	0

ICB 12/8/11

Apex-Alpha™

Sample Description: CORE 8 2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012143.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_024
Chamber Serial Number:
Detector Serial Number: 24
Env. Background: System Bkgd 11054
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:40 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6102 mL
Effective Efficiency: 0.1934 +/- 0.0108
Counting Efficiency: 0.1682 +/- 0.0027 on 12/3/2011 10:12:52 PM
Chem. Recovery Factor: 1.1493 +/- 0.0668

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

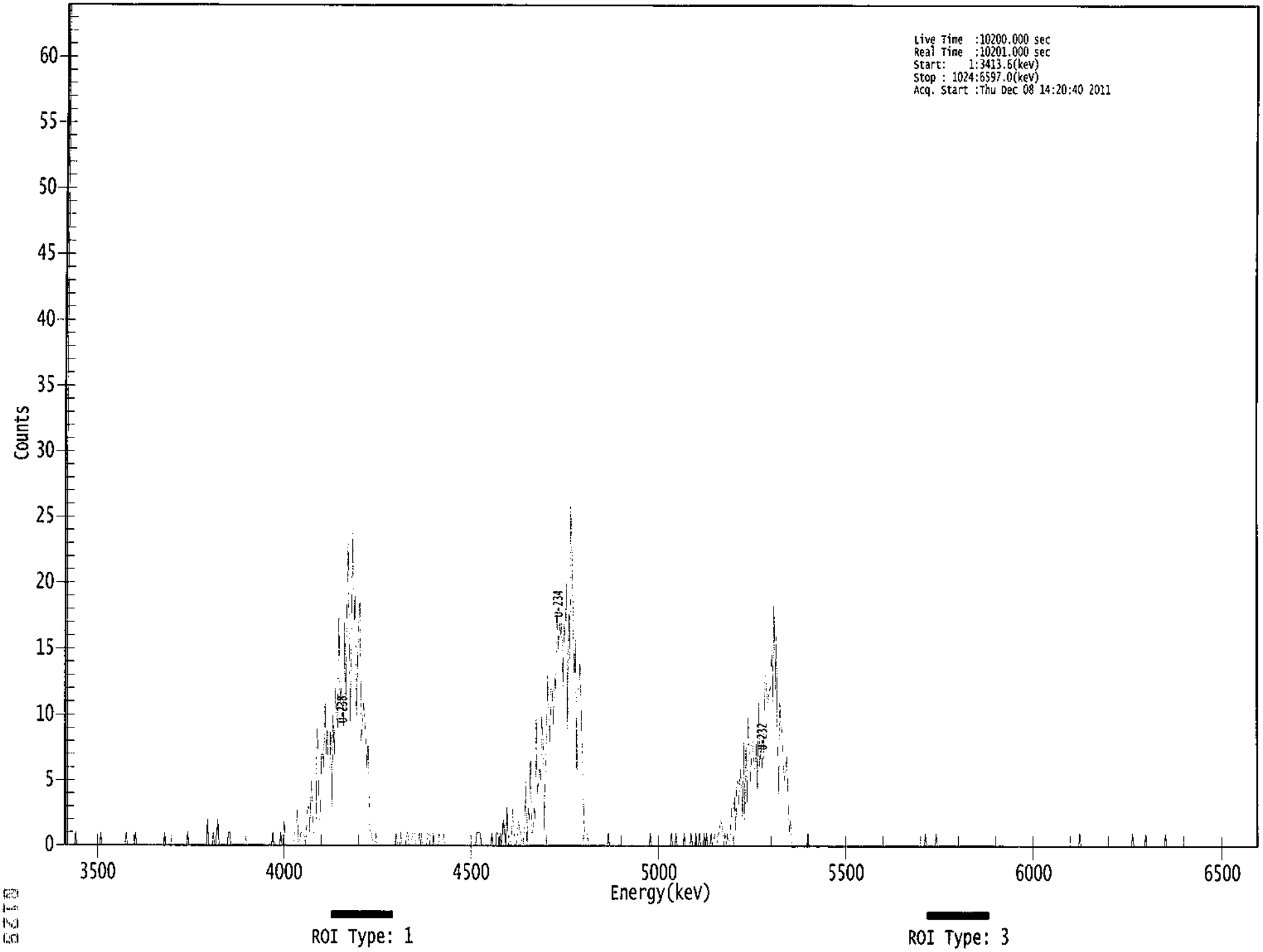
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.280	386.15	9.99	0.85	0.00E+000	35.5
U-234		4.737	534.32	8.49	0.68	0.00E+000	17.3
U-235		4.366	15.49	50.75	0.51	0.00E+000	3.1
U-238		4.160	527.83	8.53	0.17	0.00E+000	13.7

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.992	5302.50*	5.20E+000 +/- 5.70E-001	8.06E-002 +/- 8.84E-003
U-234	0.991	4761.50*	7.19E+000 +/- 9.97E-001	7.59E-002 +/- 8.32E-003
U-235	0.994	4385.50*	2.57E-001 +/- 1.34E-001	8.72E-002 +/- 9.55E-003
U-238	0.991	4184.40*	7.08E+000 +/- 9.83E-001	5.59E-002 +/- 6.13E-003

0000012143.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 11

Elapsed Live time: 10200
Elapsed Real Time: 10201

Channel								
1:	10201	10200	0	0	0	0	0	0
9:	0	1	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	1
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	1	0	0
57:	0	0	0	0	0	1	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	1	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	1	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	2	0	0	0	0
129:	1	0	0	1	2	0	0	0
137:	0	0	0	0	0	1	1	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	1	0	0	0	0
185:	0	0	1	0	0	2	0	0
193:	0	0	0	0	0	0	1	1
201:	3	0	0	1	1	1	1	0
209:	1	3	3	1	5	4	1	1
217:	1	9	8	2	2	7	7	6
225:	11	7	9	6	6	9	3	10
233:	7	12	10	9	18	11	12	11
241:	9	17	11	18	23	16	9	17
249:	24	17	19	10	14	17	19	8
257:	9	11	10	8	6	8	2	1
265:	1	0	0	0	1	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	1	0	0
289:	0	1	0	0	0	0	1	1
297:	0	0	0	1	1	1	0	0
305:	0	1	0	1	0	0	0	0
313:	1	1	0	1	1	1	0	0
321:	0	0	1	0	0	0	1	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	1	1	1	1	0	0
361:	0	0	0	0	0	0	0	1

369:	0	0	0	1	1	0	1	0

Sample Title: 11

Channel								
377:	1	2	1	0	3	1	1	0
385:	0	3	1	0	0	1	2	1
393:	1	0	0	2	5	0	3	2
401:	7	1	1	3	2	10	4	5
409:	6	5	10	8	1	6	8	13
417:	10	8	12	12	9	13	12	18
425:	15	17	16	17	12	17	16	20
433:	9	18	14	26	22	16	13	16
441:	5	12	12	14	10	6	2	1
449:	1	1	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	1	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	1
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	1	0	0	0	1	0	0
529:	0	0	0	0	1	0	0	0
537:	0	0	1	0	0	0	1	0
545:	0	1	0	0	0	1	0	1
553:	0	0	0	1	0	0	1	0
561:	0	1	1	2	2	1	0	1
569:	0	1	0	0	3	2	2	4
577:	1	5	5	3	6	5	2	8
585:	2	8	3	10	7	5	8	8
593:	6	6	8	4	11	6	8	6
601:	7	13	13	11	11	12	12	15
609:	11	19	12	16	8	4	11	9
617:	9	6	5	6	7	4	1	2
625:	1	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	1	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	1	0	0	0	0
745:	0	0	0	0	1	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 11

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	1
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	1	0	0	0
921:	0	0	0	0	0	0	0	1
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

1CB
12/8/14

Apex-Alpha™

Sample Description: CORE 9 5-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012142.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_026
Chamber Serial Number:
Detector Serial Number: 26
Env. Background: System Bkgd 11055
Reagent Blank: <not performed>

Sample Size: 1.067E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:41 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6091 mL
Effective Efficiency: 0.1669 +/- 0.0099
Counting Efficiency: 0.1716 +/- 0.0027 on 12/3/2011 10:12:47 PM
Chem. Recovery Factor: 0.9727 +/- 0.0599

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

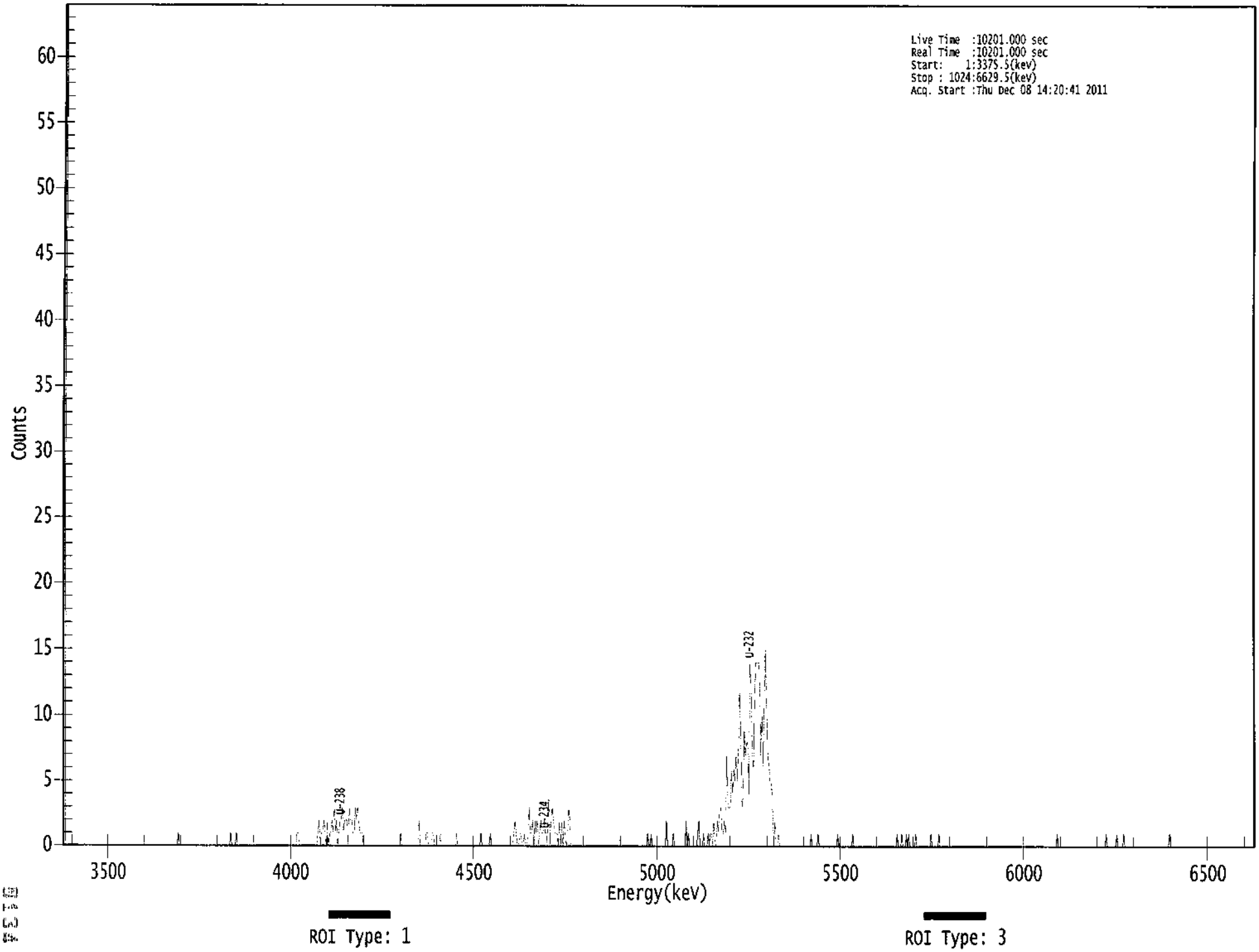
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.256	332.66	10.75	0.34	0.00E+000	11.4
U-234		4.694	56.66	26.13	0.34	0.00E+000	3.7
U-235		4.377	9.00	68.87	0.00	0.00E+000	3.2
U-238		4.138	59.66	25.46	0.34	0.00E+000	4.8

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.966	5302.50*	4.96E+000 +/- 5.78E-001	7.13E-002 +/- 8.31E-003
U-234	0.930	4761.50*	8.45E-001 +/- 2.42E-001	7.13E-002 +/- 8.31E-003
U-235	0.999	4385.50*	1.65E-001 +/- 1.16E-001	1.10E-001 +/- 1.29E-002
U-238	0.966	4184.40*	8.85E-001 +/- 2.48E-001	7.10E-002 +/- 8.27E-003

0000012142.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 12

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	1	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	1	0	0	0	0	1	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	1	1	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	1	2	0	1
225:	1	2	1	0	2	0	1	1
233:	2	1	3	1	2	0	1	2
241:	2	3	1	2	2	2	0	3
249:	2	2	1	1	3	2	3	2
257:	1	1	1	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	1	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	0	2	0	0	0	0
313:	0	1	1	0	0	0	1	1
321:	0	0	0	0	0	1	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	1	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	1	0	0	0	0	0	0	0

369:	1	0	0	0	0	0	0	0

Sample Title: 12

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	1	2	1	0
393:	0	1	1	0	0	1	0	0
401:	1	3	1	1	2	0	2	1
409:	2	0	1	2	1	1	2	1
417:	1	1	4	0	2	3	2	1
425:	1	1	0	2	0	2	0	2
433:	1	0	1	3	2	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	1
505:	0	0	1	0	0	0	0	0
513:	0	0	0	0	0	0	0	2
521:	0	0	0	0	0	1	0	0
529:	0	0	0	0	0	0	0	0
537:	2	0	1	0	0	0	0	0
545:	0	0	1	2	0	0	0	1
553:	0	0	0	1	0	1	1	0
561:	2	0	0	2	1	3	3	1
569:	1	2	1	7	3	3	3	6
577:	4	6	5	7	5	7	12	9
585:	3	4	9	7	8	8	4	14
593:	12	7	6	11	14	14	14	14
601:	7	10	6	11	15	11	7	6
609:	5	5	3	0	2	0	0	1
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	1	0	0	0	0
649:	0	1	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	1	0	0	0	0	0
673:	0	0	0	0	0	0	0	1
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	1	0	0
721:	0	1	0	0	0	1	0	1
729:	0	0	0	0	0	1	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	1	0	0	0	0	0
753:	0	1	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 12

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	1	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	1	0	0	0	0	0	0	0
905:	0	1	0	0	0	0	0	1
913:	0	0	0	0	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	1	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB
12/8/14

Apex-Alpha™

Sample Description: CORE 10 8-9
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000012145.Cnf
Batch Identification: 1111163A-UU
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: U iso

Detector Name: Alpha_027
Chamber Serial Number:
Detector Serial Number: 27
Env. Background: System Bkgd 11056
Reagent Blank: <not performed>

Sample Size: 1.007E+000 +/- 0.000E+000 gram
Sample Date/Time: 11/28/2011 10:10:43 AM
Acquisition Date/Time: 12/8/2011 2:20:42 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Tracer Certificate: U232_UU-10A
Tracer Quantity: 0.6102 mL
Effective Efficiency: 0.2245 +/- 0.0118
Counting Efficiency: 0.1891 +/- 0.0030 on 12/3/2011 10:12:47 PM
Chem. Recovery Factor: 1.1872 +/- 0.0652

Peak Match Tolerance: 0.100 MeV

PEAK AREA REPORT

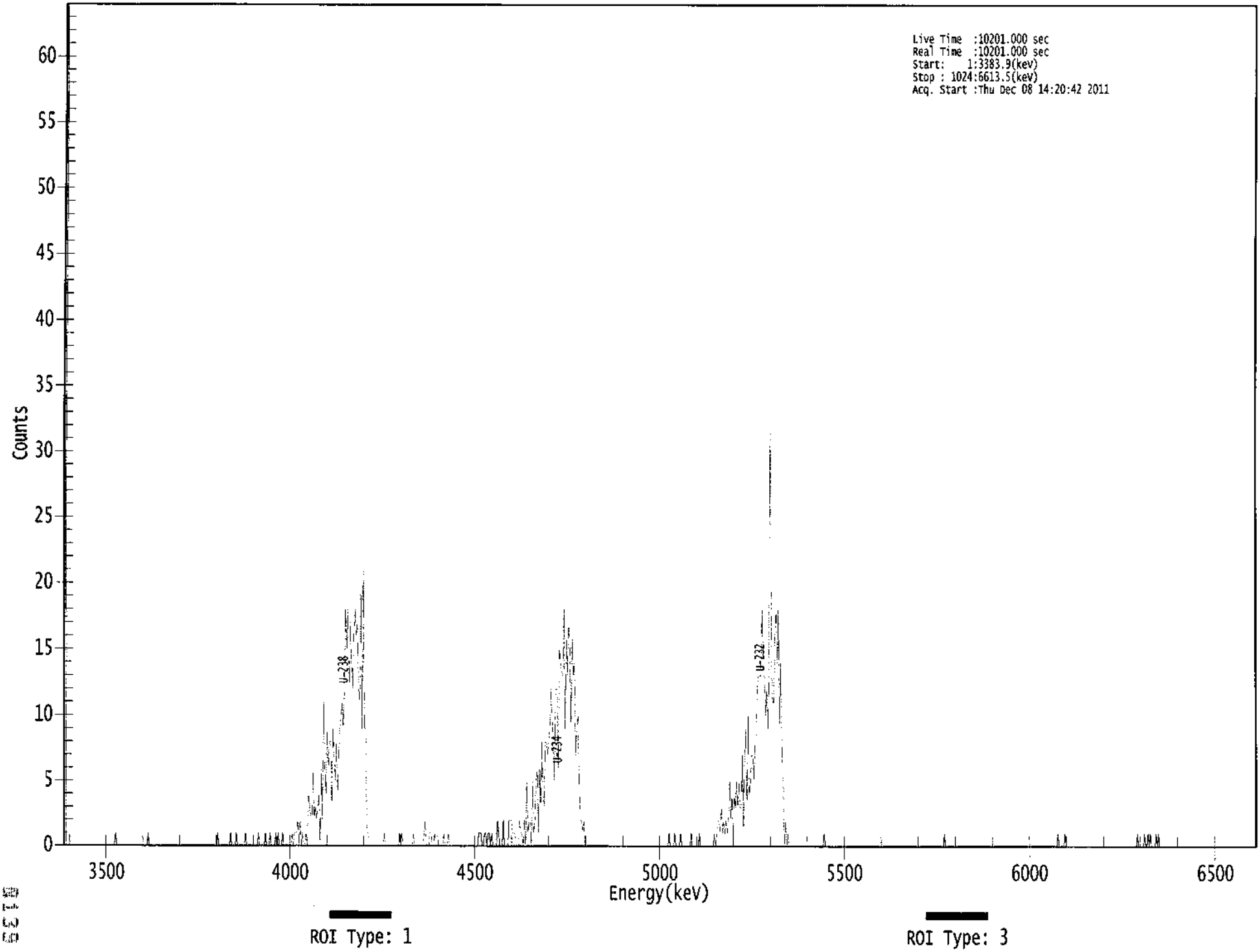
Nuclide		Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
U-232	T	5.276	448.32	9.27	0.68	0.00E+000	5.6
U-234		4.727	401.81	9.79	1.19	0.00E+000	17.9
U-235		4.373	9.49	65.59	0.51	0.00E+000	4.7
U-238		4.147	461.32	9.13	0.68	0.00E+000	5.5

T = Tracer Peak used for Effective Efficiency

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
U-232	0.989	5302.50*	5.27E+000 +/- 5.43E-001	6.63E-002 +/- 6.83E-003
U-234	0.981	4761.50*	4.72E+000 +/- 6.71E-001	7.74E-002 +/- 7.97E-003
U-235	0.997	4385.50*	1.38E-001 +/- 9.13E-002	7.60E-002 +/- 7.84E-003
U-238	0.978	4184.40*	5.40E+000 +/- 7.43E-001	6.60E-002 +/- 6.80E-003

0000012145.CNF



****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 13

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	1	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	1	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	1	0	0
137:	0	0	0	0	0	0	0	0
145:	1	0	0	0	0	1	0	0
153:	0	0	0	0	0	1	0	0
161:	0	0	0	0	0	0	0	0
169:	1	0	0	0	0	0	1	0
177:	0	0	1	0	0	0	0	1
185:	0	1	0	0	0	1	0	0
193:	0	0	0	0	0	1	0	1
201:	1	1	2	0	2	0	1	0
209:	0	1	0	4	3	2	2	6
217:	2	3	2	3	4	0	6	2
225:	11	6	4	9	6	8	8	3
233:	9	7	5	8	4	7	9	10
241:	11	9	12	18	15	18	12	17
249:	14	12	16	18	16	17	12	11
257:	20	9	21	9	9	1	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	1	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	1	0	1	0	0	0	0
297:	0	0	0	0	0	1	0	0
305:	0	0	0	0	0	0	1	2
313:	0	0	0	1	1	0	0	1
321:	0	0	0	0	0	0	0	1
329:	0	0	0	1	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	1	1	1
361:	0	0	1	1	0	1	1	0

369:	1	0	0	0	0	2	1	0

Sample Title: 13

Channel								
377:	0	0	2	0	0	0	0	2
385:	2	2	1	1	1	0	0	0
393:	2	1	1	0	2	0	5	1
401:	2	2	0	5	1	2	5	6
409:	1	6	3	8	4	3	8	8
417:	7	8	9	12	10	8	5	12
425:	12	6	15	14	13	13	18	9
433:	16	13	17	15	9	16	13	14
441:	7	9	10	5	2	2	1	2
449:	0	0	0	0	0	0	0	0
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	1	0	0	0	0	1	0	0
529:	0	0	1	0	0	0	0	0
537:	0	0	0	1	0	0	0	0
545:	0	0	1	0	0	0	0	0
553:	0	0	0	0	0	0	0	1
561:	0	1	2	2	1	3	1	2
569:	1	2	1	2	5	2	4	0
577:	4	3	5	3	5	3	3	7
585:	1	7	9	3	10	4	5	7
593:	7	5	8	8	12	13	13	13
601:	18	13	13	10	12	9	14	32
609:	14	11	11	16	18	14	18	9
617:	14	7	5	0	2	0	1	0
625:	0	0	0	0	0	0	0	0
633:	0	0	0	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	1	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	1	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	1	0	0
857:	0	0	0	1	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	0	0	0	0	0
921:	0	1	0	0	0	0	0	1
929:	0	0	1	0	1	0	0	0
937:	0	1	0	1	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

EBERLINE SERVICES

Reagents Used in an Analysis

Internal Work Order	
11-11163	
Analysis Code	Run
UUISO	1

Reagent ID	Reagent Name	Reagent Concentration	Analyst ID	Date Recorded
011706P	Hydrofluoric Acid	Reagent Grade	JBARNARD	11/30/2011
011708P	Nitric Acid	Reagent Grade	JBARNARD	11/30/2011
011704P	Perchloric Acid	Reagent Grade	JBARNARD	11/30/2011
009098P	Sulfuric Acid	Reagent Grade	JBARNARD	11/30/2011
011801P	Anion Exchange Resin	Reagent Grade	JDEMELAS	12/7/2011
011852S	HCl - HF	6.5N - 0.04N	JDEMELAS	12/7/2011
011707D01	Hydrochloric Acid	0.5N	JDEMELAS	12/7/2011
011790S	Hydrochloric Acid	6.5N	JDEMELAS	12/7/2011
011707P	Hydrochloric Acid	Reagent Grade	JDEMELAS	12/7/2011
011865S	Hydrochloric Acid	8N	JDEMELAS	12/7/2011
011874S	HCl - NH4I	8N - 0.1M	JDEMELAS	12/7/2011
011549S	Neodymium Carrier	1 mg/ml	RMARTZ	12/8/2011
011433P	Reagent Alcohol	Reagent Grade	RMARTZ	12/8/2011
011655P	Titanous Chloride	Reagent Grade	RMARTZ	12/8/2011
011854S	Carbon substrate	Solution	RMARTZ	12/8/2011
011744P	Hydrofluoric Acid	Reagent Grade	RMARTZ	12/8/2011

12/8/2011 5:42:59 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 12/8/2011
Time : 5:42:59 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_003	AIM21F	ALL	Passed	12/8/2011 5:29:11 AM
Alpha_004	AIM21F	ALL	Passed	12/8/2011 5:29:12 AM
Alpha_010	AIM21F	ALL	Passed	12/8/2011 5:29:13 AM
Alpha_011	AIM21F	ALL	Passed	12/8/2011 5:29:13 AM
Alpha_012	AIM21F	ALL	Passed	12/8/2011 5:29:14 AM
Alpha_013	AIM21F	ALL	Passed	12/8/2011 5:29:15 AM
Alpha_014	AIM21F	ALL	Passed	12/8/2011 5:29:16 AM
Alpha_015	AIM21F	ALL	Passed	12/8/2011 5:29:17 AM
Alpha_017	AIM730	ALL	Passed	12/8/2011 5:29:17 AM
Alpha_018	AIM730	ALL	Passed	12/8/2011 5:29:18 AM
Alpha_021	AIM730	ALL	Passed	12/8/2011 5:29:19 AM
Alpha_024	AIM730	ALL	Passed	12/8/2011 5:29:20 AM
Alpha_026	AIM730	ALL	Passed	12/8/2011 5:29:21 AM
Alpha_027	AIM730	ALL	Passed	12/8/2011 5:29:22 AM
Alpha_028	AIM730	ALL	Passed	12/8/2011 5:29:22 AM
Alpha_029	AIM730	ALL	Passed	12/8/2011 5:29:23 AM
Alpha_030	AIM730	ALL	Passed	12/8/2011 5:29:24 AM
Alpha_031	AIM730	ALL	Passed	12/8/2011 5:29:25 AM
Alpha_033	Alpha Analyst100DC	ALL	Not Done	
Alpha_034	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:27 AM
Alpha_035	Alpha Analyst100DC	ALL	Not Done	
Alpha_036	Alpha Analyst100DC	ALL	Not Done	
Alpha_037	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:32 AM
Alpha_038	Alpha Analyst100DC	ALL	Not Done	
Alpha_039	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:34 AM
Alpha_040	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:36 AM
Alpha_041	Alpha Analyst100DC	ALL	Not Done	
Alpha_042	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:39 AM
Alpha_043	Alpha Analyst100DC	ALL	Not Done	
Alpha_044	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:43 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:44 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	12/8/2011 5:29:46 AM

APPROVED BY: _____

APPROVAL DATE: 12/8/11

SECTION IX

ANALYTICAL DATA (RADIUM-226)

11-11163
Ra226
Run 1

Work Order	11-11163
Analysis Code	Ra226
Run	1
Date Received	11/29/2011
Lab Deadline	12/9/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 903.0 Modified
Instrument Type	Alpha Spectroscopy
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1107.069
Carrier	
Carrier Conc (mg/ml)	

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/29/11 00:00	1.0000E+00
02	MBL	BLANK		11/29/11 00:00	1.0000E+00
03	DUP	CORE 1 0-1	89	11/28/11 00:00	1.0003E+00
04	DO	CORE 1 0-1	89	11/28/11 00:00	1.0198E+00
05	TRG	CORE 2 11-12	78	11/28/11 00:00	1.0075E+00
06	TRG	CORE 3 2-3	85	11/28/11 00:00	1.0100E+00
07	TRG	CORE 4 4-5	95	11/28/11 00:00	1.0138E+00
08	TRG	CORE 5 4-5	55	11/28/11 00:00	1.0043E+00
09	TRG	CORE 6 10-11	83	11/28/11 00:00	1.0845E+00
10	TRG	CORE 7 5-6	61	11/28/11 00:00	1.0014E+00
11	TRG	CORE 8 2-3	75	11/28/11 00:00	1.0046E+00
12	TRG	CORE 9 5-6	74	11/28/11 00:00	1.0446E+00
13	TRG	CORE 10 8-9	91	11/28/11 00:00	1.0118E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
Ra226
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9082	1005.4	488.7	107.90		0.0228	0.0311	0.0083		107.90	2.84	1.00
02	MBL	0.9082	1005.4	486.4	107.40		0.0230	0.0313	0.0083		107.40	2.84	1.00
03	DUP	0.9080	1005.2	429.1	94.77		0.0227	0.0295	0.0068		94.77	2.44	1.00
04	DO	0.9072	1004.3	416.7	92.11		0.0225	0.0297	0.0072		92.11	2.55	1.00
05	TRG	0.9074	1004.6	420.5	92.93		0.0229	0.0296	0.0067		92.93	2.40	1.00
06	TRG	0.9067	1003.8	380.2	84.09		0.0227	0.0292	0.0065		84.09	2.34	1.00
07	TRG	0.9065	1003.6	346.5	76.65		0.0226	0.0291	0.0065		76.65	2.34	1.00
08	TRG	0.9065	1003.6	424.2	93.84		0.0227	0.0310	0.0083		93.84	2.84	1.00
09	TRG	0.9062	1003.2	400.3	88.58		0.0229	0.0290	0.0061		88.58	2.20	1.00
10	TRG	0.9068	1003.9	448.6	99.20		0.0229	0.0309	0.0080		99.20	2.77	1.00
11	TRG	0.9063	1003.3	356.7	78.92		0.0231	0.0292	0.0061		78.92	2.20	1.00
12	TRG	0.9060	1003.0	461.8	102.21		0.0233	0.0311	0.0078		102.21	2.72	1.00
13	TRG	0.9044	1001.2	345.8	76.67		0.0233	0.0291	0.0058		76.67	2.08	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
Ra226
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
02	MBL			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
03	DUP			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
04	DO	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
05	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
06	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
07	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
08	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
09	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
10	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
11	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
12	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		
13	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH		

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations

Work Order: 11-11163-Ra226-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-226	LCS	LCS	pCi/g	1.13E+01	1.38E+00	2.44E-01	1.02E+01	110.68	OK		OK	
02	RA-226	MBL	BLANK	pCi/g	7.39E-02	1.13E-01	1.68E-01					OK	OK
03	RA-226	DUP	CORE 1 0-1	pCi/g	9.39E+00	1.18E+00	2.81E-01				INV	OK	
04	RA-226	DO	CORE 1 0-1	pCi/g	1.25E+01	1.41E+00	2.02E-01					OK	
05	RA-226	TRG	CORE 2 11-12	pCi/g	7.53E+00	1.01E+00	1.61E-01					OK	
06	RA-226	TRG	CORE 3 2-3	pCi/g	8.77E+00	1.16E+00	1.57E-01					OK	
07	RA-226	TRG	CORE 4 4-5	pCi/g	7.09E+00	1.10E+00	2.53E-01					OK	
08	RA-226	TRG	CORE 5 4-5	pCi/g	3.69E+00	7.92E-01	2.57E-01					OK	
09	RA-226	TRG	CORE 6 10-11	pCi/g	5.95E+00	9.06E-01	2.05E-01					OK	
10	RA-226	TRG	CORE 7 5-6	pCi/g	4.46E+00	8.72E-01	1.81E-01					OK	
11	RA-226	TRG	CORE 8 2-3	pCi/g	6.43E+00	1.02E+00	2.52E-01					OK	
12	RA-226	TRG	CORE 9 5-6	pCi/g	6.23E+00	9.36E-01	2.38E-01					OK	
13	RA-226	TRG	CORE 10 8-9	pCi/g	8.22E-02	2.10E-02	7.13E-03					OK	

Preliminary Data Report & Analytical Calculations

Work Order: 11-11163-Ra226-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: Ra226
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-226	LCS	11/29/11 00:00	1.00E+00	100.00	0.00	107.90		12/2/2011 12:27	
02	RA-226	MBL	11/29/11 00:00	1.00E+00	100.00	0.00	107.40		12/2/2011 12:27	
03	RA-226	DUP	11/28/11 00:00	1.00E+00	94.77	0.00	94.77		12/2/2011 12:27	
04	RA-226	DO	11/28/11 00:00	1.02E+00	92.11	0.00	92.11		12/2/2011 12:27	
05	RA-226	TRG	11/28/11 00:00	1.01E+00	92.93	0.00	92.93		12/2/2011 12:27	
06	RA-226	TRG	11/28/11 00:00	1.01E+00	84.09	0.00	84.09		12/2/2011 12:27	
07	RA-226	TRG	11/28/11 00:00	1.01E+00	76.65	0.00	76.65		12/2/2011 12:27	
08	RA-226	TRG	11/28/11 00:00	1.00E+00	93.84	0.00	93.84		12/2/2011 12:27	
09	RA-226	TRG	11/28/11 00:00	1.08E+00	88.58	0.00	88.58		12/2/2011 12:27	
10	RA-226	TRG	11/28/11 00:00	1.00E+00	99.20	0.00	99.20		12/2/2011 12:27	
11	RA-226	TRG	11/28/11 00:00	1.00E+00	78.92	0.00	78.92		12/2/2011 12:27	
12	RA-226	TRG	11/28/11 00:00	1.04E+00	100.00	0.00	102.21		12/2/2011 12:27	
13	RA-226	TRG	11/28/11 00:00	1.01E+00	76.67	0.00	76.67		12/2/2011 12:27	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-Ra226-1

Run: 1
Analysis Code: Ra226
Eberline Services Work Order: 11-11163
Client: Foxfire Scientific, Inc.

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-226	LCS	12/04/11 21:07		A_Spec	Alpha_039	170	2.79 E+02	0.00 E+00	18.5
02	RA-226	MBL	12/04/11 21:07		A_Spec	Alpha_040	170	1.83 E+00	1.00 E-03	18.6
03	RA-226	DUP	12/04/11 21:07		A_Spec	Alpha_041	170	2.60 E+02	1.20 E-02	18.9
04	RA-226	DO	12/04/11 21:07		A_Spec	Alpha_042	170	3.23 E+02	3.00 E-03	18.7
05	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_043	170	2.24 E+02	2.00 E-03	20.2
06	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_044	170	2.33 E+02	1.00 E-03	19.4
07	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_045	170	1.68 E+02	0.00 E+00	18.9
08	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_046	170	8.60 E+01	0.00 E+00	18.6
09	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_047	170	1.74 E+02	0.00 E+00	17.7
10	RA-226	TRG	12/04/11 21:07		A_Spec	Alpha_048	170	1.03 E+02	1.00 E-03	17.1
11	RA-226	TRG	12/05/11 10:12		A_Spec	Alpha_003	170.02	1.61 E+02	6.00 E-03	18.4
12	RA-226	TRG	12/05/11 10:12		A_Spec	Alpha_004	170.02	1.80 E+02	8.00 E-03	19.9
13	RA-226	TRG	12/05/11 10:12		A_Spec	Alpha_010	170	6.05 E+01	3.00 E-03	20.1

Count Room Report
Client: Foxfire Scientific, Inc.

11-11163-Ra226-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/29/11 00:00	1.0000	0.9082	1005.4401	488.7000	107.90	2.84	1.00
02	MBL	BLANK	11/29/11 00:00	1.0000	0.9082	1005.4401	486.4000	107.40	2.84	1.00
03	DUP	CORE 1 0-1	11/28/11 00:00	1.0003	0.9080	1005.2187	429.1000	94.77	2.44	1.00
04	DO	CORE 1 0-1	11/28/11 00:00	1.0198	0.9072	1004.3330	416.7000	92.11	2.55	1.00
05	TRG	CORE 2 11-12	11/28/11 00:00	1.0075	0.9074	1004.5544	420.5000	92.93	2.40	1.00
06	TRG	CORE 3 2-3	11/28/11 00:00	1.0100	0.9067	1003.7795	380.2000	84.09	2.34	1.00
07	TRG	CORE 4 4-5	11/28/11 00:00	1.0138	0.9065	1003.5580	346.5000	76.65	2.34	1.00
08	TRG	CORE 5 4-5	11/28/11 00:00	1.0043	0.9065	1003.5580	424.2000	93.84	2.84	1.00
09	TRG	CORE 6 10-11	11/28/11 00:00	1.0845	0.9062	1003.2259	400.3000	88.58	2.20	1.00
10	TRG	CORE 7 5-6	11/28/11 00:00	1.0014	0.9068	1003.8902	448.6000	99.20	2.77	1.00
11	TRG	CORE 8 2-3	11/28/11 00:00	1.0046	0.9063	1003.3366	356.7000	78.92	2.20	1.00
12	TRG	CORE 9 5-6	11/28/11 00:00	1.0446	0.9060	1003.0045	461.8000	102.21	2.72	1.00
13	TRG	CORE 10 8-9	11/28/11 00:00	1.0118	0.9044	1001.2332	345.8000	76.67	2.08	1.00

B-48

3-10

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 11/30/2011 7:05 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11163	1	Ra226	11/30/2011 7:04	JBARNARD	JB	

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-226	Ra-5b	44.098	11/30/2011	0.500	0.5159				10.25	0.471	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1107.069	11/30/2011	0.9082	0.9200
02	Ba-133	Ba-6a	1107.069	11/30/2011	0.9082	0.9200
03	Ba-133	Ba-6a	1107.069	11/30/2011	0.9080	0.9200
04	Ba-133	Ba-6a	1107.069	11/30/2011	0.9072	0.9200
05	Ba-133	Ba-6a	1107.069	11/30/2011	0.9074	0.9200
06	Ba-133	Ba-6a	1107.069	11/30/2011	0.9067	0.9200
07	Ba-133	Ba-6a	1107.069	11/30/2011	0.9065	0.9200
08	Ba-133	Ba-6a	1107.069	11/30/2011	0.9065	0.9200
09	Ba-133	Ba-6a	1107.069	11/30/2011	0.9062	0.9200
10	Ba-133	Ba-6a	1107.069	11/30/2011	0.9068	0.9200
11	Ba-133	Ba-6a	1107.069	11/30/2011	0.9063	0.9200
12	Ba-133	Ba-6a	1107.069	11/30/2011	0.9060	0.9200
13	Ba-133	Ba-6a	1107.069	11/30/2011	0.9044	0.9200

Balance Printer Tapes

Tracer	LCS
0.9082 g	0.5159 g
0.9082 g	0.4094 g
0.9080 g	
0.9072 g	
0.9074 g	
0.9067 g	
0.9065 g	
0.9065 g	
0.9062 g	
0.9068 g	
0.9063 g	
0.9060 g	
0.9044 g	

Matrix Spike

Version 2.0 08/99

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11163	1	Ra226	grams	12/9/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	CORE 1 0-1	DUP					1.0003E+00	1.0003E+00				
04	CORE 1 0-1	DO					1.0198E+00	1.0198E+00				
05	CORE 2 11-12	TRG					1.0075E+00	1.0075E+00				
06	CORE 3 2-3	TRG					1.0100E+00	1.0100E+00				
07	CORE 4 4-5	TRG					1.0138E+00	1.0138E+00				
08	CORE 5 4-5	TRG					1.0043E+00	1.0043E+00				
09	CORE 6 10-11	TRG					1.0845E+00	1.0845E+00				
10	CORE 7 5-6	TRG					1.0014E+00	1.0014E+00				
11	CORE 8 2-3	TRG					1.0046E+00	1.0046E+00				
12	CORE 9 5-6	TRG					1.0446E+00	1.0446E+00			1.0003 g	
13	CORE 10 8-9	TRG					1.0118E+00	1.0118E+00			1.0198 g	
											1.0075 g	
											1.0100 g	
											1.0138 g	
											1.0043 g	
											1.0845 g	
											1.0014 g	
											1.0046 g	
											1.0446 g	
											1.0118 g	

Comments	

Technician: _____ Date: 11/30/11

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11163	1	Ra226			TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data Carrier Added (ml)	Filter Data Filter Tare (g)	Filter Final (g)	Filter Net (g)	Gravimetric % Recovery
01	LCS	LCS		0.0228	0.0311	**0.0083**	
02	BLANK	MBL		0.0230	0.0313	**0.0083**	
03	DUP	DUP		0.0227	0.0295	**0.0068**	
04	CORE 1 0-1	DO		0.0225	0.0297	**0.0072**	
05	CORE 2 11-12	TRG		0.0229	0.0296	**0.0067**	
06	CORE 3 2-3	TRG		0.0227	0.0292	**0.0065**	
07	CORE 4 4-5	TRG		0.0226	0.0291	**0.0065**	
08	CORE 5 4-5	TRG		0.0227	0.0310	**0.0083**	
09	CORE 6 10-11	TRG		0.0229	0.0290	**0.0061**	
10	CORE 7 5-6	TRG		0.0229	0.0309	**0.0080**	
11	CORE 8 2-3	TRG		0.0231	0.0292	**0.0061**	
12	CORE 9 5-6	TRG		0.0233	0.0311	**0.0078**	
13	CORE 10 8-9	TRG		0.0233	0.0291	**0.0058**	

Technician: [illegible] Date: 12/2/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11163	12/9/2011	11/29/2011	11/30/2011	12/1/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	CORE 1 0-1	13.6600	460.7900	329.5100	447.1300	315.8500	29.36%	70.64%	0.0000	0.0000	
05	CORE 2 11-12	13.6700	313.6900	206.0800	300.0200	192.4100	35.87%	64.13%	0.0000	0.0000	
06	CORE 3 2-3	13.6600	304.7900	209.9400	291.1300	196.2800	32.58%	67.42%	0.0000	0.0000	
07	CORE 4 4-5	13.6200	260.5100	177.5100	246.8900	163.8900	33.62%	66.38%	0.0000	0.0000	
08	CORE 5 4-5	13.6100	314.6400	258.2700	301.0300	244.6600	18.73%	81.27%	0.0000	0.0000	
09	CORE 6 10-11	13.6500	234.5200	206.5800	220.8700	192.9300	12.65%	87.35%	0.0000	0.0000	
10	CORE 7 5-6	13.6400	330.9100	243.8100	317.2700	230.1700	27.45%	72.55%	0.0000	0.0000	
11	CORE 8 2-3	13.7100	345.0700	226.6300	331.3600	212.9200	35.74%	64.26%	0.0000	0.0000	
12	CORE 9 5-6	13.6800	493.3800	377.2500	479.7000	363.5700	24.21%	75.79%	0.0000	0.0000	
13	CORE 10 8-9	13.6300	389.0700	275.1300	375.4400	261.5000	30.35%	69.65%	0.0000	0.0000	

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sally

Date: Analysis: Rough Prep Logbook

Analysis: Ra226 Page No. 7866

Apex-Alpha™

Sample Description: SPIKE
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011571.cnf
Batch Identification: 1111163A-RA
Sample Identification: 01
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_039
Chamber Serial Number: 04026479A
Detector Serial Number: 83109
Env. Background: System Bkgd 10877
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.840E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/4/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:18 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1851 +/- 0.0029 on 12/4/2011 8:21:58 AM
Effective Efficiency: 0.1851 +/- 0.0029

Control Certificate Name: Ra226_Ra-5b
Chem. Recov. of Control: 0.0065
Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.808	527.66	8.54	0.34	0.00E+000	3.7
RN-222	5.294	696.49	7.43	0.51	0.00E+000	4.4
RA-226	4.710	279.00	11.76	0.00	0.00E+000	5.8

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.976	6003.00*	2.15E+001 +/- 1.95E+000	1.94E-001 +/- 6.04E-003
RN-222	0.976	5490.00*	2.83E+001 +/- 2.28E+000	2.13E-001 +/- 6.63E-003
RA-226	0.996	4785.00*	1.13E+001 +/- 1.38E+000	2.44E-001 +/- 7.57E-003

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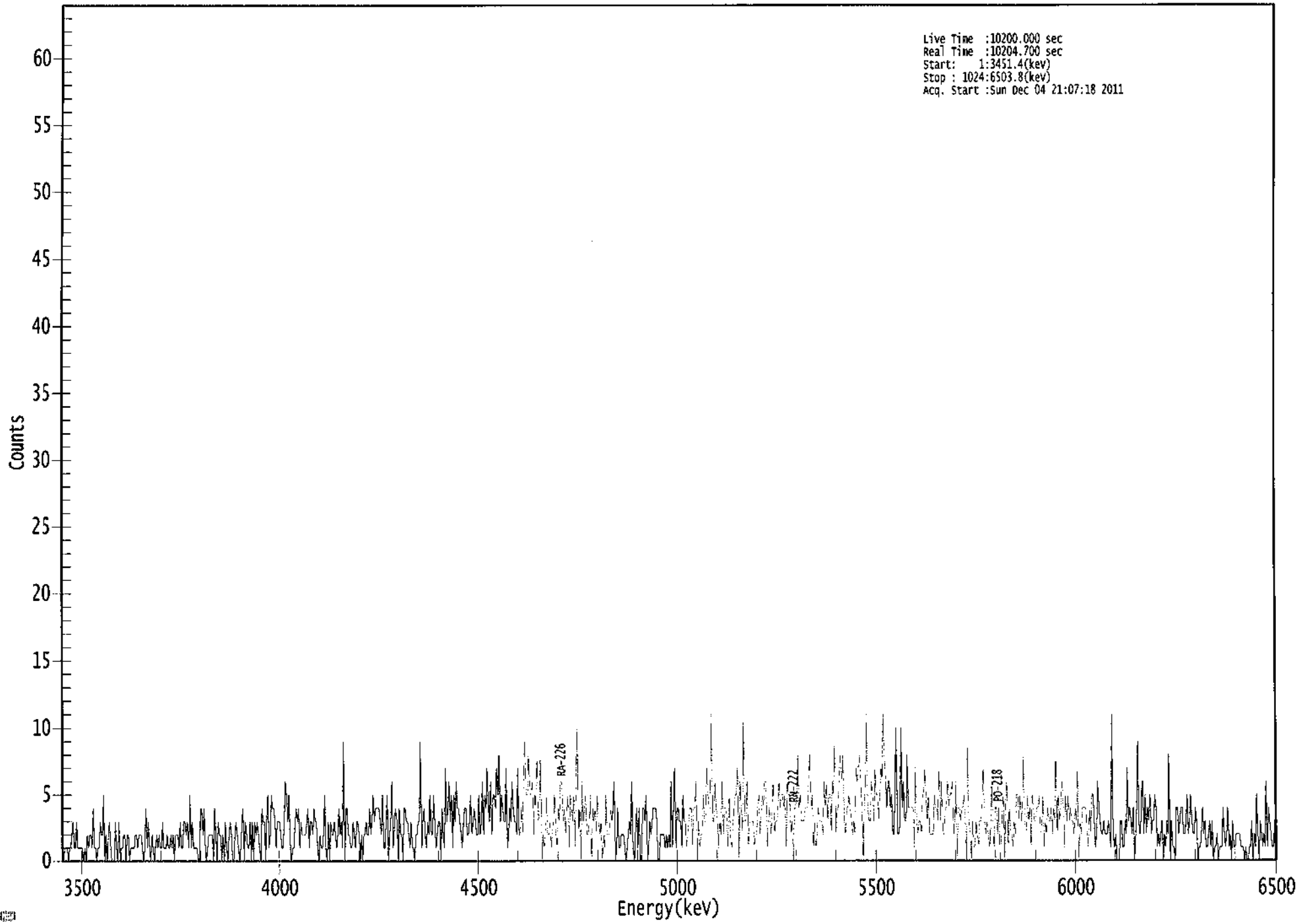
12/6/11

0000011571.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 01

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	1	0	1	1	1	0	1	1
9:	2	3	1	1	3	1	1	1
17:	1	1	0	1	0	2	1	2
25:	2	1	4	1	1	0	1	1
33:	3	2	2	5	0	2	0	2
41:	3	1	0	0	0	3	1	0
49:	3	0	1	1	2	2	0	2
57:	2	0	1	1	1	1	2	2
65:	1	2	2	2	1	0	1	4
73:	1	3	1	0	2	1	0	1
81:	2	1	2	1	1	3	1	1
89:	1	2	1	1	2	1	2	0
97:	2	2	2	1	3	1	1	3
105:	3	2	3	1	5	1	3	1
113:	1	1	1	0	0	4	4	2
121:	4	1	0	1	2	2	2	2
129:	0	4	2	0	3	2	2	0
137:	2	0	3	1	0	2	3	2
145:	0	0	2	3	2	1	0	1
153:	3	4	0	3	2	1	1	3
161:	0	3	0	3	2	3	2	1
169:	0	4	3	3	0	3	5	1
177:	2	5	4	4	3	1	3	3
185:	3	2	1	1	3	6	5	3
193:	5	1	0	1	1	3	4	3
201:	4	1	3	2	2	2	2	3
209:	4	1	3	3	2	4	3	3
217:	1	0	2	1	1	2	5	1
225:	0	3	0	3	2	2	3	2
233:	1	2	4	2	3	1	9	0
241:	4	4	2	2	1	1	3	2
249:	1	3	3	2	0	2	0	2
257:	2	3	2	2	4	2	3	5
265:	3	4	4	4	4	3	2	5
273:	1	1	3	5	0	2	3	6
281:	1	3	4	3	0	4	2	2
289:	0	4	4	3	3	2	1	3
297:	1	1	0	2	2	3	3	9
305:	1	3	4	2	1	3	2	5
313:	2	2	5	3	1	2	3	3
321:	0	4	2	1	7	3	4	6
329:	3	5	1	5	3	6	4	4
337:	3	2	1	3	4	4	2	2
345:	3	5	2	3	4	3	2	2
353:	5	2	3	6	2	5	4	7
361:	4	3	6	2	5	5	4	7

369:	5	8	3	5	4	3	3	7

Sample Title: 01

Channel								
377:	1	2	4	3	6	4	3	3
385:	2	7	2	2	4	2	7	9
393:	5	5	8	5	5	6	2	5
401:	4	8	3	4	8	0	2	1
409:	2	5	2	2	3	1	2	3
417:	5	2	1	4	3	6	6	3
425:	4	2	4	5	1	5	4	3
433:	5	1	7	10	2	4	0	6
441:	3	4	5	2	2	3	5	0
449:	4	3	4	2	5	3	2	3
457:	0	2	1	5	2	2	2	4
465:	3	4	6	0	1	4	1	1
473:	2	2	2	1	0	1	2	3
481:	2	6	1	0	2	4	1	4
489:	0	0	4	4	3	5	0	1
497:	3	2	3	4	4	4	3	0
505:	0	2	2	2	2	1	2	1
513:	2	1	6	1	4	7	1	4
521:	4	3	3	1	5	3	3	1
529:	2	3	4	4	1	4	4	6
537:	0	3	1	2	2	5	3	3
545:	7	5	4	4	11	3	3	6
553:	4	3	1	3	2	6	2	4
561:	4	3	1	5	2	1	3	4
569:	5	5	7	0	6	4	2	11
577:	3	3	6	1	3	3	3	3
585:	1	2	2	4	5	2	4	5
593:	4	6	6	1	3	4	2	3
601:	6	2	3	3	4	6	4	5
609:	5	4	5	1	6	5	5	2
617:	3	0	4	4	5	8	4	5
625:	3	3	3	4	4	4	6	8
633:	4	5	1	3	1	2	4	3
641:	3	3	2	6	4	6	3	5
649:	5	2	6	5	9	2	4	4
657:	7	8	6	8	3	2	4	4
665:	5	4	3	2	3	2	7	6
673:	7	8	6	4	0	5	5	11
681:	4	3	3	6	5	3	7	5
689:	5	3	5	7	6	11	8	6
697:	4	6	6	4	5	2	2	6
705:	10	2	2	3	10	4	6	3
713:	3	8	4	4	4	4	4	1
721:	7	3	2	3	3	2	5	5
729:	7	5	3	5	2	2	2	2
737:	5	4	4	3	7	3	6	2
745:	2	4	4	6	4	5	5	6
753:	2	3	6	0	4	4	3	4
761:	4	5	3	0	9	3	2	0
769:	3	1	1	3	2	1	3	3
777:	4	7	3	2	3	2	1	2
785:	6	2	1	4	4	2	4	0
793:	1	4	5	0	5	6	1	4

801:	2	2	1	3	2	5	5	3

Sample Title: 01

Channel								
809:	5	3	4	8	2	2	5	3
817:	4	1	5	4	3	3	4	4
825:	5	2	2	5	1	3	2	4
833:	3	3	4	2	4	3	8	2
841:	5	3	4	6	5	1	5	3
849:	5	3	4	3	3	2	4	3
857:	7	0	3	2	4	4	4	4
865:	2	1	4	2	5	5	3	1
873:	2	6	4	3	2	2	3	2
881:	2	2	3	2	1	11	2	1
889:	2	0	0	0	3	3	1	1
897:	3	2	7	3	4	3	2	4
905:	0	2	4	9	2	2	5	6
913:	2	5	2	4	3	5	2	3
921:	3	5	4	1	2	1	2	3
929:	0	2	1	3	2	8	0	3
937:	1	1	0	4	4	2	3	4
945:	4	2	2	3	5	2	3	5
953:	3	2	2	4	3	0	1	1
961:	2	4	2	3	1	1	2	3
969:	1	3	0	1	1	2	0	1
977:	1	1	4	2	1	2	4	1
985:	2	0	3	1	1	2	2	2
993:	2	1	1	1	0	1	0	0
1001:	1	1	3	0	2	1	5	2
1009:	0	3	2	1	2	1	6	1
1017:	4	3	2	1	1	3	1	1

1GB 12/5/14

Apex-Alpha™

Sample Description: BLANK
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011522.Cnf
Batch Identification: 1111163A-RA
Sample Identification: 02
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_040
Chamber Serial Number: 04026479B
Detector Serial Number: 91135
Env. Background: System Bkgd 10878
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.840E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 12/4/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:20 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1864 +/- 0.0030 on 12/4/2011 8:21:57 AM
Effective Efficiency: 0.1864 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.811	-0.68	304.44	0.68	0.00E+000	0.0
RN-222	5.315	0.49	416.98	0.51	0.00E+000	3.0
RA-226	4.644	1.83	152.56	0.17	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.977	6003.00*	-2.75E-002 +/- 8.36E-002	2.28E-001 +/- 7.07E-003
RN-222	0.981	5490.00*	1.98E-002 +/- 8.26E-002	2.12E-001 +/- 6.58E-003
RA-226	0.987	4785.00*	7.39E-002 +/- 1.13E-001	1.68E-001 +/- 5.23E-003

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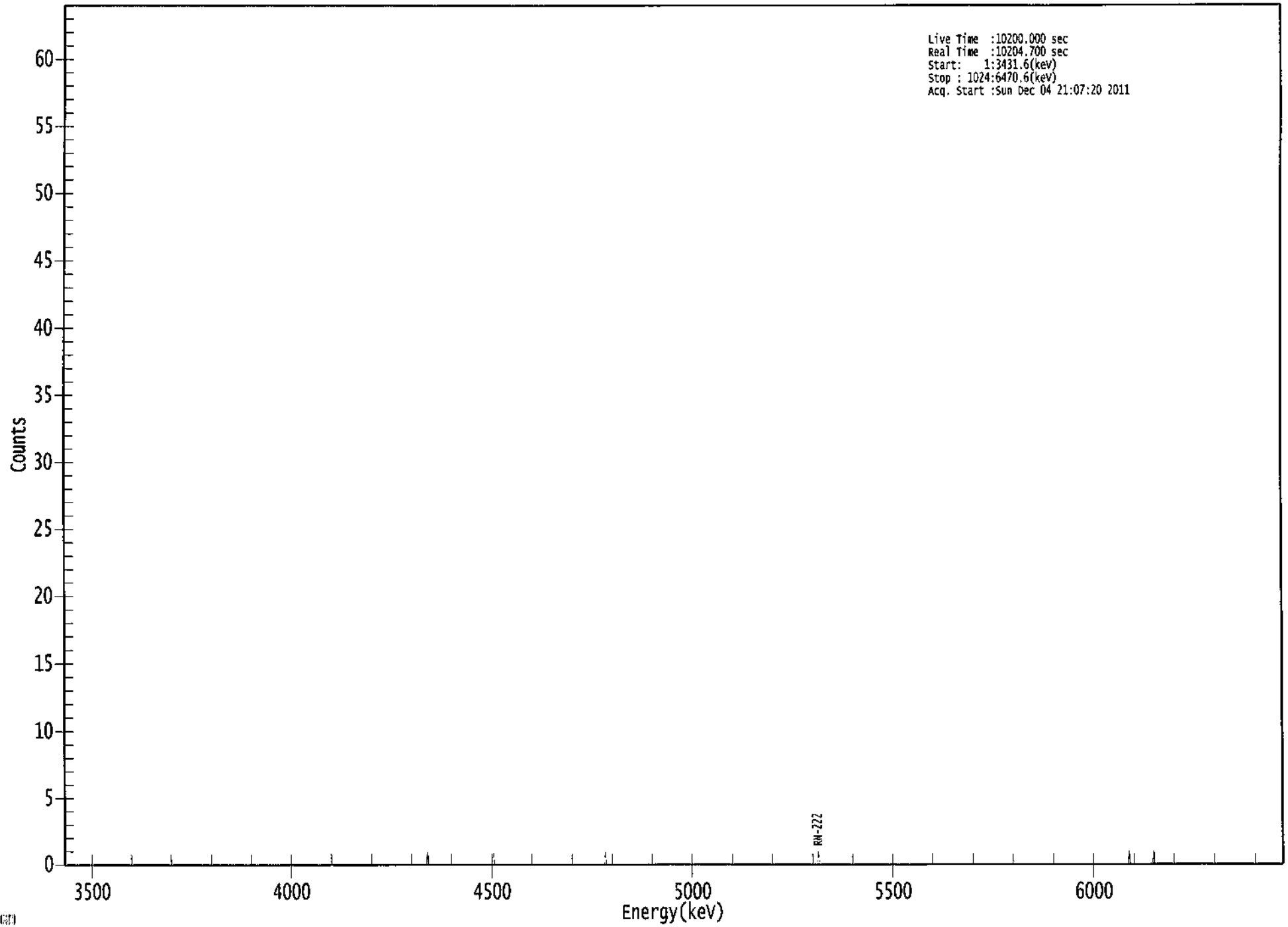
12/6/11

0000011522.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 02

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	0	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	0	0	0	0	0	0
137:	0	0	0	0	0	0	0	0
145:	0	0	0	0	0	0	0	0
153:	0	0	0	0	0	0	0	0
161:	0	0	0	0	0	0	0	0
169:	0	0	0	0	0	0	0	0
177:	0	0	0	0	0	0	0	0
185:	0	0	0	0	0	0	0	0
193:	0	0	0	0	0	0	0	0
201:	0	0	0	0	0	0	0	0
209:	0	0	0	0	0	0	0	0
217:	0	0	0	0	0	0	0	0
225:	0	0	0	0	0	0	0	0
233:	0	0	0	0	0	0	0	0
241:	0	0	0	0	0	0	0	0
249:	0	0	0	0	0	0	0	0
257:	0	0	0	0	0	0	0	0
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	0	0	0	0
281:	0	0	0	0	0	0	0	0
289:	0	0	0	0	0	0	0	0
297:	0	0	0	0	0	0	0	0
305:	0	0	1	0	0	0	0	0
313:	0	0	0	0	0	0	0	0
321:	0	0	0	0	0	0	0	0
329:	0	0	0	0	0	0	0	0
337:	0	0	0	0	0	0	0	0
345:	0	0	0	0	0	0	0	0
353:	0	0	0	0	0	0	0	0
361:	0	1	0	0	0	0	0	0

369:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
377:	0	0	0	0	0	0	0	0
385:	0	0	0	0	0	0	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	0	0	0
409:	0	0	0	0	0	0	0	0
417:	0	0	0	0	0	0	0	0
425:	0	0	0	0	0	0	0	0
433:	0	0	0	0	0	0	0	0
441:	0	0	0	0	0	0	0	0
449:	0	0	0	0	0	0	0	1
457:	0	0	0	0	0	0	0	0
465:	0	0	0	0	0	0	0	0
473:	0	0	0	0	0	0	0	0
481:	0	0	0	0	0	0	0	0
489:	0	0	0	0	0	0	0	0
497:	0	0	0	0	0	0	0	0
505:	0	0	0	0	0	0	0	0
513:	0	0	0	0	0	0	0	0
521:	0	0	0	0	0	0	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	0	0	0	0	0
545:	0	0	0	0	0	0	0	0
553:	0	0	0	0	0	0	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	0	0	0	0	0
577:	0	0	0	0	0	0	0	0
585:	0	0	0	0	0	0	0	0
593:	0	0	0	0	0	0	0	0
601:	0	0	0	0	0	0	0	0
609:	0	0	0	0	0	0	0	0
617:	0	0	0	0	0	0	0	0
625:	0	0	0	0	0	0	0	0
633:	0	0	1	0	0	0	0	0
641:	0	0	0	0	0	0	0	0
649:	0	0	0	0	0	0	0	0
657:	0	0	0	0	0	0	0	0
665:	0	0	0	0	0	0	0	0
673:	0	0	0	0	0	0	0	0
681:	0	0	0	0	0	0	0	0
689:	0	0	0	0	0	0	0	0
697:	0	0	0	0	0	0	0	0
705:	0	0	0	0	0	0	0	0
713:	0	0	0	0	0	0	0	0
721:	0	0	0	0	0	0	0	0
729:	0	0	0	0	0	0	0	0
737:	0	0	0	0	0	0	0	0
745:	0	0	0	0	0	0	0	0
753:	0	0	0	0	0	0	0	0
761:	0	0	0	0	0	0	0	0
769:	0	0	0	0	0	0	0	0
777:	0	0	0	0	0	0	0	0
785:	0	0	0	0	0	0	0	0
793:	0	0	0	0	0	0	0	0

801:	0	0	0	0	0	0	0	0

Sample Title: 02

Channel								
809:	0	0	0	0	0	0	0	0
817:	0	0	0	0	0	0	0	0
825:	0	0	0	0	0	0	0	0
833:	0	0	0	0	0	0	0	0
841:	0	0	0	0	0	0	0	0
849:	0	0	0	0	0	0	0	0
857:	0	0	0	0	0	0	0	0
865:	0	0	0	0	0	0	0	0
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	0	0	0	0	0	0	1	0
897:	0	0	0	0	0	0	0	0
905:	0	0	0	0	0	0	0	0
913:	0	0	0	1	0	0	0	0
921:	0	0	0	0	0	0	0	0
929:	0	0	0	0	0	0	0	0
937:	0	0	0	0	0	0	0	0
945:	0	0	0	0	0	0	0	0
953:	0	0	0	0	0	0	0	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	0	0	0	0	0	0
1001:	0	0	0	0	0	0	0	0
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

KB
12/5/11

Apex-Alpha™

Sample Description: CORE 1 0-1 DUP
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011519.Cnf
Batch Identification: 1111163A-RA
Sample Identification: 03
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_041
Chamber Serial Number: 05026930A
Detector Serial Number: 91087
Env. Background: System Bkgd 10879
Reagent Blank: <not performed>

Sample Size: 1.000E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.440E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:21 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9477 +/- 0.0000
Counting Efficiency: 0.1888 +/- 0.0030 on 12/4/2011 8:21:55 AM
Effective Efficiency: 0.1790 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

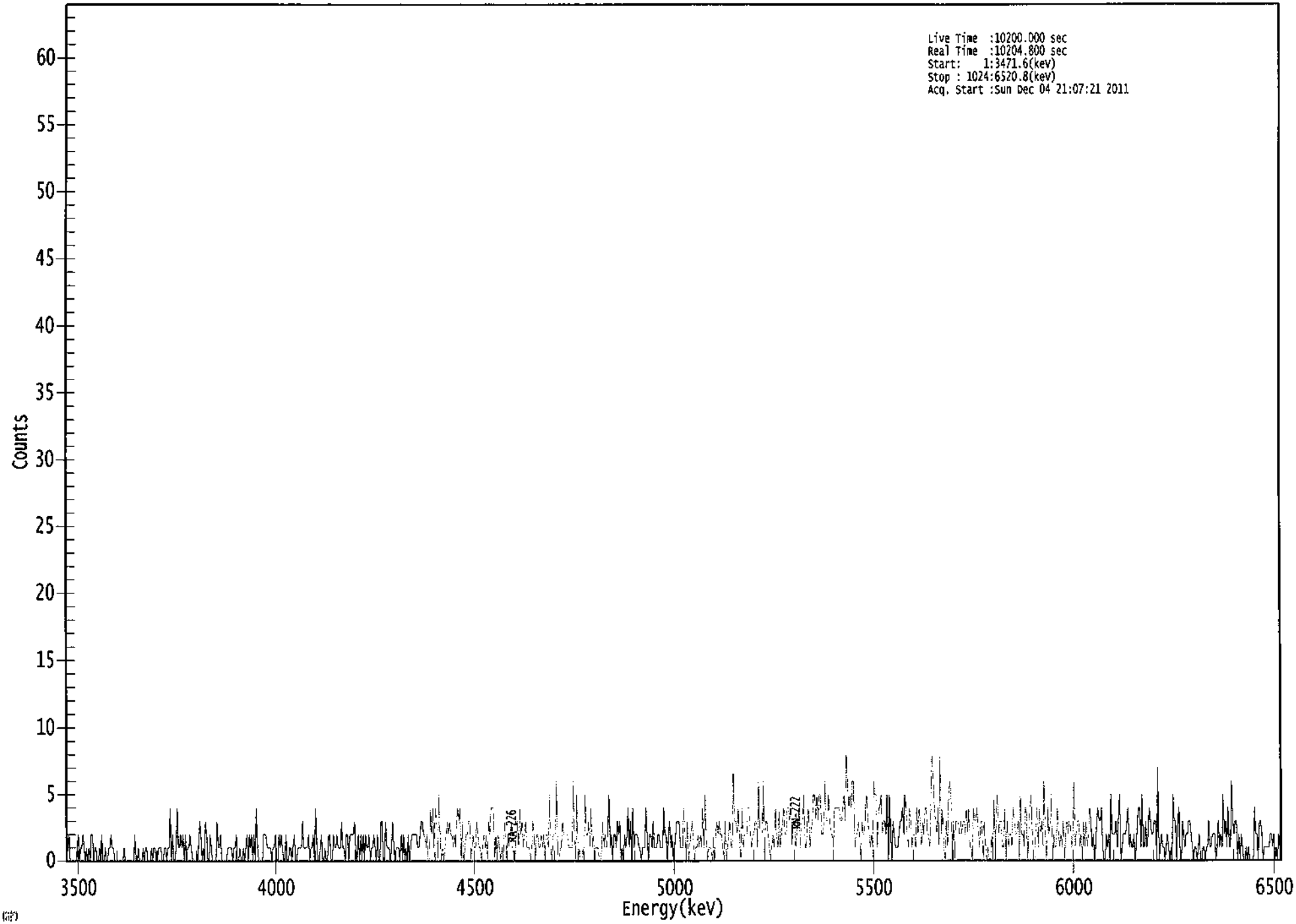
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.798	375.49	10.12	0.51	0.00E+000	8.9
RN-222	5.309	447.49	9.27	0.51	0.00E+000	8.3
RA-226	4.595	259.96	12.21	2.04	0.00E+000	3.7

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.973	6003.00*	1.36E+001 +/- 1.44E+000	1.90E-001 +/- 5.88E-003
RN-222	0.979	5490.00*	1.62E+001 +/- 1.58E+000	1.90E-001 +/- 5.88E-003
RA-226	0.977	4785.00*	9.39E+000 +/- 1.18E+000	2.81E-001 +/- 8.73E-003

AG
12/6/11

0000011519.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 03

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	1	2	0	0	0	0	0
9:	0	1	2	0	1	1	2	1
17:	0	1	0	1	0	2	2	0
25:	1	1	0	0	1	0	2	0
33:	0	1	0	0	1	1	2	1
41:	1	0	0	0	0	0	0	0
49:	0	1	0	0	0	0	0	0
57:	0	0	2	0	0	1	0	0
65:	0	1	0	1	1	0	0	0
73:	1	0	1	1	0	0	1	1
81:	1	0	0	1	1	0	1	1
89:	4	0	2	0	0	1	4	1
97:	1	2	1	2	0	2	0	1
105:	1	2	1	0	0	0	0	0
113:	1	3	2	0	1	0	3	2
121:	0	0	2	1	0	0	0	0
129:	3	1	1	2	0	0	0	0
137:	0	1	1	1	1	0	1	1
145:	2	0	0	1	0	0	1	0
153:	1	2	0	2	1	2	0	2
161:	0	4	1	0	0	0	0	2
169:	2	2	1	1	1	1	0	1
177:	1	2	0	0	2	1	2	1
185:	0	0	2	0	0	1	1	0
193:	1	2	0	0	1	1	1	1
201:	3	1	1	1	1	2	0	1
209:	1	2	0	4	1	0	0	1
217:	2	0	0	1	0	0	2	2
225:	0	0	2	1	1	2	1	1
233:	1	3	1	1	0	2	2	0
241:	2	2	2	2	3	1	0	2
249:	0	2	0	2	0	2	1	1
257:	2	0	1	1	2	1	0	2
265:	0	0	3	3	0	0	3	1
273:	1	1	0	1	3	1	0	1
281:	1	1	0	2	0	2	0	1
289:	0	2	0	1	2	2	2	2
297:	2	1	1	2	3	3	2	2
305:	1	2	0	0	4	2	4	1
313:	4	3	0	5	2	0	1	0
321:	1	2	3	2	3	2	2	1
329:	2	1	3	4	3	4	0	3
337:	0	1	2	2	3	3	0	1
345:	2	1	1	3	2	1	1	0
353:	1	2	1	2	0	3	2	4
361:	4	4	0	2	0	2	1	0

369:	1	0	3	2	0	2	1	2

Sample Title: 03

Channel								
377:	3	1	0	0	2	3	1	4
385:	2	3	1	2	3	1	1	1
393:	0	1	3	2	0	2	2	1
401:	1	2	1	2	0	2	2	1
409:	5	1	0	2	2	2	6	0
417:	0	1	1	3	2	2	2	2
425:	1	1	1	1	6	2	0	5
433:	0	1	0	0	1	0	5	2
441:	2	3	1	4	1	2	0	1
449:	1	1	0	0	1	3	1	2
457:	1	2	5	1	2	0	2	2
465:	1	3	2	3	0	1	0	2
473:	1	2	4	1	3	0	4	1
481:	2	2	2	1	1	0	1	1
489:	1	4	2	0	2	2	1	3
497:	1	1	1	2	2	1	1	1
505:	4	2	2	0	2	3	1	2
513:	0	1	2	3	3	3	1	1
521:	1	4	2	0	3	0	1	2
529:	3	2	0	1	1	2	1	2
537:	1	4	1	5	2	0	1	1
545:	1	0	2	0	2	3	2	3
553:	2	2	1	0	3	0	1	2
561:	3	1	1	7	3	3	2	4
569:	1	0	4	1	2	2	2	4
577:	4	2	1	2	2	3	3	1
585:	6	2	2	2	6	0	3	3
593:	2	1	0	1	2	1	4	2
601:	1	4	1	2	3	4	2	2
609:	4	4	3	4	1	3	3	1
617:	2	3	4	1	3	3	5	1
625:	1	3	4	1	2	3	5	5
633:	3	5	3	5	5	2	2	3
641:	6	3	3	5	3	2	2	1
649:	4	4	4	4	4	3	3	4
657:	5	3	8	6	4	5	4	6
665:	6	1	2	2	3	2	0	3
673:	2	2	4	5	3	2	1	2
681:	1	6	5	5	1	4	4	5
689:	2	3	3	2	5	0	5	2
697:	0	3	2	1	1	1	2	3
705:	3	4	2	5	4	2	1	4
713:	3	1	2	2	1	4	2	4
721:	3	1	3	2	4	4	2	2
729:	1	4	8	7	4	3	2	4
737:	1	8	2	4	1	0	3	1
745:	5	6	5	0	3	0	3	3
753:	3	2	3	2	3	3	2	4
761:	2	4	1	1	0	4	3	3
769:	4	2	1	3	3	0	3	1
777:	0	1	0	0	2	0	5	0
785:	4	5	2	3	3	1	1	4
793:	0	3	1	2	2	1	4	3

801:	2	2	3	0	5	2	2	1

Sample Title: 03

Channel								
809:	4	4	0	2	4	5	2	0
817:	0	3	4	1	4	2	3	1
825:	6	2	0	4	2	3	5	0
833:	2	1	1	4	2	1	2	1
841:	3	0	2	3	2	3	3	1
849:	2	6	1	2	3	3	1	2
857:	0	3	1	3	1	2	4	3
865:	1	2	0	1	3	4	3	3
873:	4	1	0	0	2	1	2	0
881:	5	2	2	2	3	1	3	5
889:	0	1	2	2	2	3	4	1
897:	2	1	1	2	0	1	3	4
905:	4	1	5	1	1	3	1	2
913:	4	3	2	2	3	3	0	7
921:	0	1	2	1	1	0	1	2
929:	1	0	1	0	5	3	3	0
937:	3	4	0	0	3	2	1	2
945:	2	3	3	2	1	0	1	1
953:	0	1	2	0	0	1	1	0
961:	1	1	3	1	1	2	2	2
969:	0	1	3	1	2	1	5	2
977:	3	1	4	1	1	6	3	2
985:	3	3	0	2	0	2	1	0
993:	0	1	0	1	0	0	0	0
1001:	4	2	2	0	3	3	2	0
1009:	1	1	1	1	1	2	2	1
1017:	2	0	1	0	2	1	2	2

Apex-Alpha™

Sample Description: CORE 1 0-1
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011572.cnf
Batch Identification: 1111163A-RA
Sample Identification: 04
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_042
Chamber Serial Number: 05026930B
Detector Serial Number: 84185
Env. Background: System Bkgd 10880
Reagent Blank: <not performed>

Sample Size: 1.020E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.550E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:23 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9211 +/- 0.0000
Counting Efficiency: 0.1868 +/- 0.0030 on 12/4/2011 8:21:53 AM
Effective Efficiency: 0.1721 +/- 0.0027

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

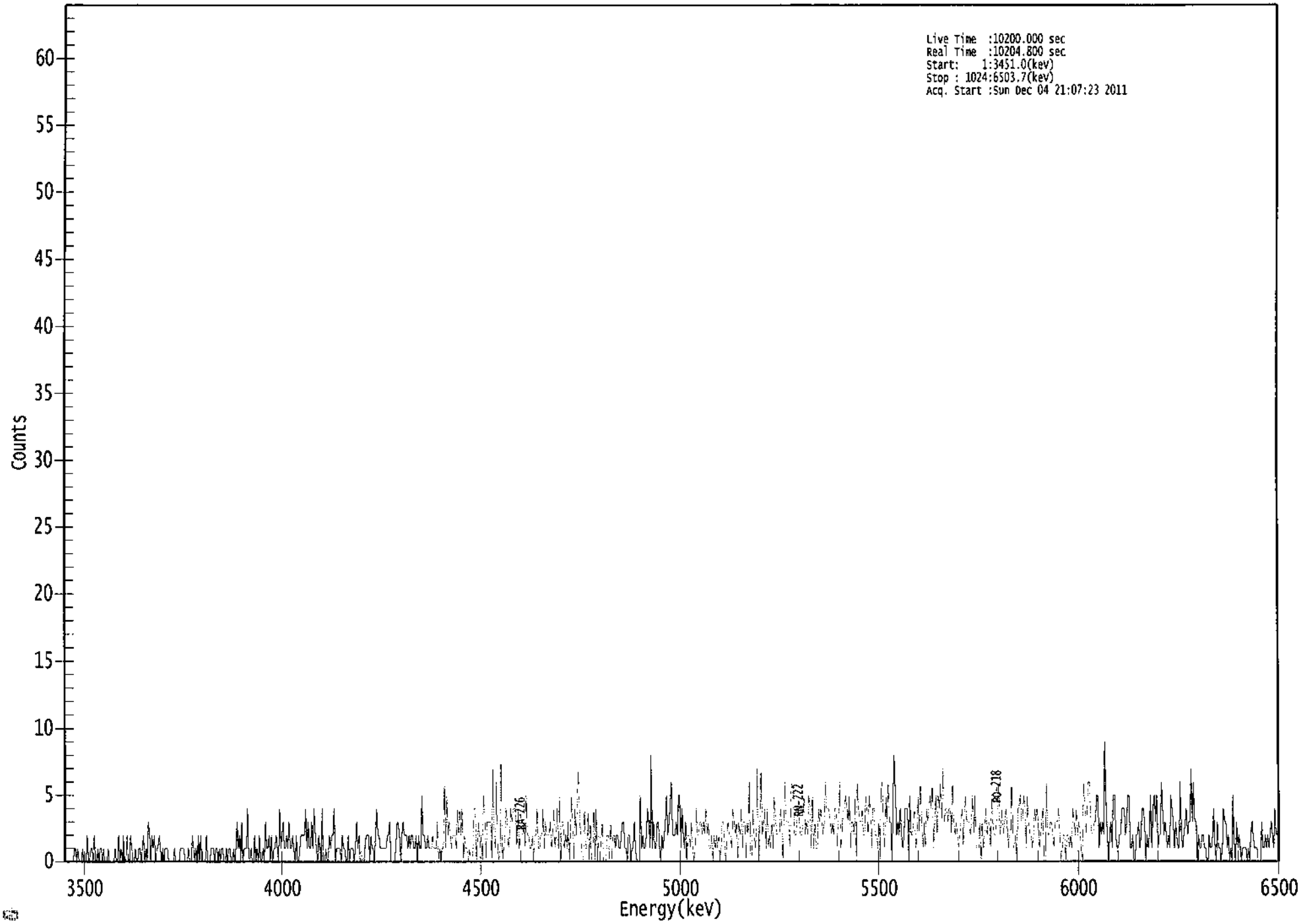
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.800	443.00	9.32	0.00	0.00E+000	5.2
RN-222	5.301	466.49	9.08	0.51	0.00E+000	3.6
RA-226	4.604	323.49	10.91	0.51	0.00E+000	3.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	1.71E+001 +/- 1.68E+000	2.31E-001 +/- 7.17E-003
RN-222	0.977	5490.00*	1.80E+001 +/- 1.73E+000	2.02E-001 +/- 6.28E-003
RA-226	0.979	4785.00*	1.25E+001 +/- 1.41E+000	2.02E-001 +/- 6.27E-003

AG
12/6/11

0000011572.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 04

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	0	0	0	0	0
9:	1	1	0	1	0	0	0	1
17:	0	0	0	2	0	0	1	1
25:	0	2	0	0	1	0	1	1
33:	0	1	0	0	0	1	0	0
41:	0	0	0	1	0	0	2	0
49:	1	0	2	0	0	2	0	0
57:	2	1	0	0	1	0	0	1
65:	1	0	1	2	0	1	0	3
73:	2	0	2	1	2	0	1	1
81:	2	1	0	1	0	1	1	1
89:	0	0	0	0	0	1	0	0
97:	0	0	1	1	1	1	0	0
105:	0	1	0	0	2	1	0	1
113:	0	2	0	2	0	0	0	0
121:	2	0	0	0	1	1	1	0
129:	1	1	0	1	0	1	1	0
137:	0	1	0	1	1	0	0	1
145:	0	1	3	1	2	0	3	0
153:	1	1	1	4	0	0	1	0
161:	0	2	0	1	0	2	0	0
169:	1	0	3	1	1	2	0	2
177:	0	1	1	2	1	0	4	1
185:	2	3	1	1	2	1	3	1
193:	1	2	1	0	2	0	0	1
201:	2	2	2	2	4	1	3	1
209:	1	3	1	4	2	1	0	2
217:	1	0	4	0	0	1	0	0
225:	2	1	2	2	4	0	1	1
233:	1	1	0	2	1	1	0	0
241:	2	0	1	1	1	0	1	3
249:	1	2	0	0	0	0	1	2
257:	2	2	0	2	1	1	0	2
265:	4	2	2	1	1	1	1	1
273:	1	2	2	3	0	0	0	0
281:	1	3	3	2	0	2	3	2
289:	2	2	1	2	1	2	2	1
297:	1	2	0	2	1	1	5	2
305:	2	1	1	2	1	1	1	2
313:	1	1	1	3	0	1	0	1
321:	1	6	1	5	2	3	2	1
329:	2	2	2	1	4	2	4	2
337:	4	0	2	1	1	0	1	0
345:	0	1	4	4	0	2	3	1
353:	2	0	5	4	0	3	3	3
361:	3	0	7	2	1	6	1	0

369:	1	8	0	1	2	4	3	1

Sample Title: 04

Channel								
377:	2	4	3	4	4	4	1	4
385:	1	2	2	2	3	1	5	2
393:	2	1	1	2	0	2	2	4
401:	1	1	2	2	4	1	3	2
409:	2	2	3	1	2	4	1	2
417:	4	1	5	0	3	3	1	2
425:	1	3	0	2	5	3	0	4
433:	2	5	7	3	2	0	0	4
441:	1	1	4	0	3	0	1	4
449:	0	4	0	2	2	1	3	0
457:	0	0	2	2	0	3	0	2
465:	2	1	2	2	1	1	2	3
473:	3	1	1	0	2	2	0	1
481:	1	3	1	0	0	0	5	1
489:	2	1	1	2	4	3	1	8
497:	1	3	1	1	3	3	1	0
505:	2	1	2	3	5	2	3	4
513:	6	2	2	2	3	2	5	5
521:	1	4	2	1	3	0	2	2
529:	1	3	1	0	1	4	2	2
537:	3	3	2	3	2	4	2	3
545:	1	1	2	0	2	1	2	1
553:	2	0	1	3	3	1	0	2
561:	3	2	2	1	4	3	2	3
569:	0	3	2	4	1	3	3	0
577:	3	2	6	0	0	4	2	1
585:	2	7	0	3	7	2	3	4
593:	1	4	1	2	1	3	1	5
601:	3	2	2	2	4	3	0	3
609:	6	3	3	3	1	5	6	5
617:	2	2	3	4	3	2	2	3
625:	5	2	3	2	5	4	1	5
633:	1	3	1	1	4	3	4	3
641:	2	3	6	4	4	4	3	2
649:	3	2	4	4	1	3	6	1
657:	2	4	4	5	4	3	5	1
665:	3	3	2	5	0	6	4	3
673:	3	4	2	2	5	4	2	5
681:	4	1	4	4	2	2	1	3
689:	0	6	6	2	1	5	3	6
697:	3	3	0	5	8	5	2	3
705:	2	4	2	1	2	4	4	4
713:	0	5	2	2	3	4	1	2
721:	5	2	6	3	1	3	1	4
729:	3	4	5	4	6	1	3	5
737:	2	5	4	6	3	7	3	4
745:	4	3	4	4	2	6	3	2
753:	3	2	1	2	3	4	1	4
761:	5	3	3	3	2	3	5	2
769:	5	1	1	1	3	0	3	1
777:	2	4	2	3	3	1	5	3
785:	2	2	3	4	6	2	3	4
793:	2	3	4	3	1	2	2	6

801:	1	1	2	0	4	4	5	3

Sample Title: 04

Channel								
809:	3	5	4	1	5	3	2	2
817:	1	2	4	3	4	3	1	2
825:	3	4	0	0	6	2	2	3
833:	3	2	1	3	3	3	4	2
841:	0	1	2	2	0	2	2	1
849:	2	1	4	3	2	4	2	3
857:	2	1	0	6	4	2	4	6
865:	6	3	2	2	3	3	5	5
873:	1	3	2	3	2	9	4	2
881:	0	2	3	1	5	5	2	1
889:	1	2	2	4	4	4	2	3
897:	5	5	1	1	2	0	0	2
905:	2	3	1	2	4	4	3	0
913:	2	1	2	5	1	4	5	3
921:	5	1	2	2	6	4	2	3
929:	2	1	2	1	5	4	3	1
937:	3	2	1	1	6	2	1	2
945:	3	4	2	3	3	7	3	6
953:	3	3	0	2	1	1	2	2
961:	1	1	0	0	2	1	1	2
969:	4	1	0	3	1	1	0	1
977:	4	3	3	1	2	0	1	0
985:	5	1	0	3	1	2	1	0
993:	1	1	1	1	0	1	0	2
1001:	3	2	1	1	1	0	0	0
1009:	3	1	1	2	1	2	1	2
1017:	3	2	1	4	2	2	3	1

Apex-Alpha™

Sample Description: CORE 2 11-12
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011573.cnf
Batch Identification: 1111163A-RA
Sample Identification: 05
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_043
Chamber Serial Number: 04026481A
Detector Serial Number: 91088
Env. Background: System Bkgd 10881
Reagent Blank: <not performed>

Sample Size: 1.008E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.400E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:24 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.9293 +/- 0.0000
Counting Efficiency: 0.2019 +/- 0.0032 on 12/4/2011 8:21:52 AM
Effective Efficiency: 0.1876 +/- 0.0030

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.798	241.49	12.63	0.51	0.00E+000	6.9
RN-222	5.301	297.00	11.39	0.00	0.00E+000	10.0
RA-226	4.612	223.66	13.12	0.34	0.00E+000	5.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	8.13E+000 +/- 1.06E+000	1.77E-001 +/- 5.47E-003
RN-222	0.977	5490.00*	1.00E+001 +/- 1.18E+000	2.02E-001 +/- 6.25E-003
RA-226	0.981	4785.00*	7.53E+000 +/- 1.01E+000	1.61E-001 +/- 4.98E-003

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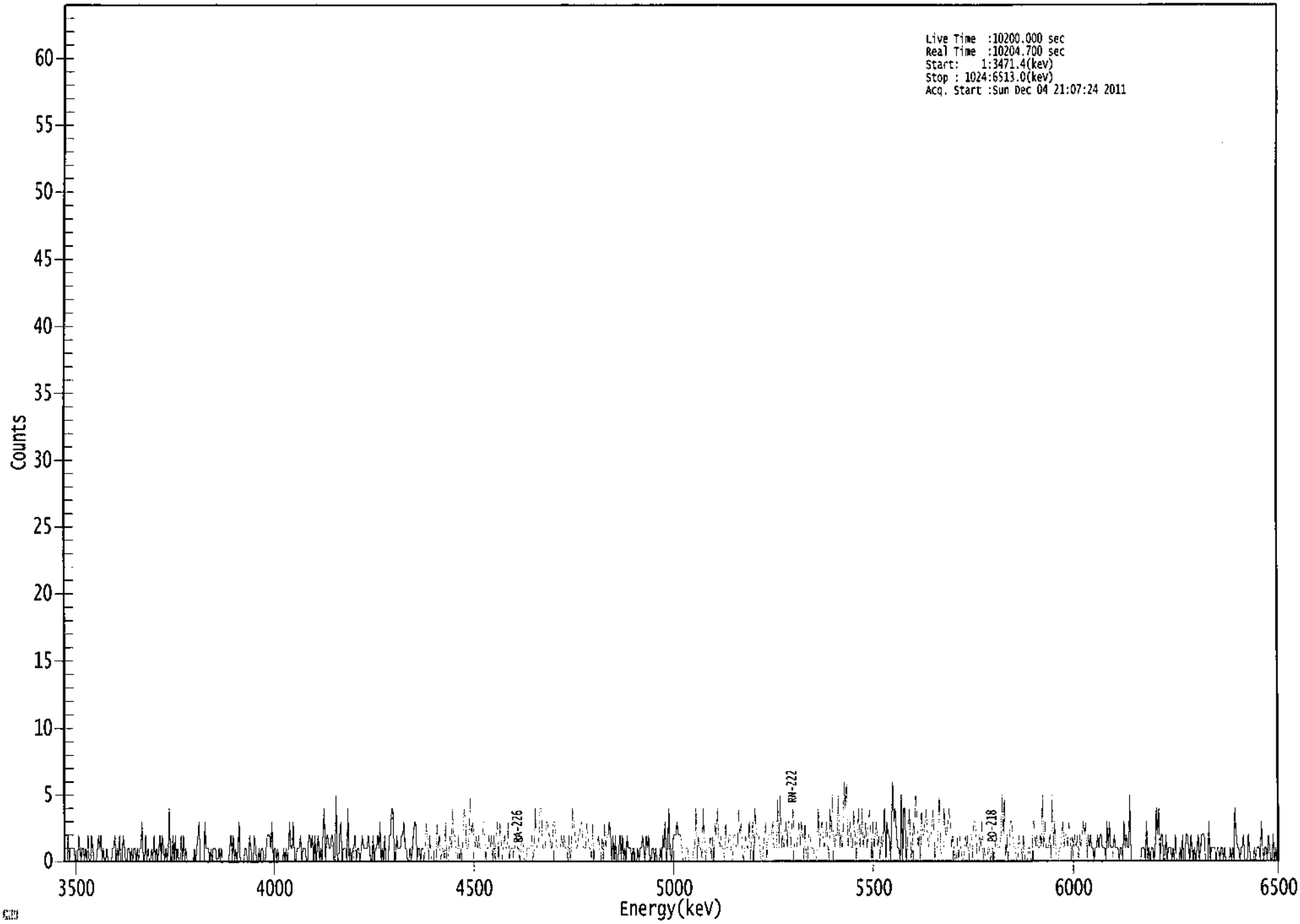
12/6/11

0000011573.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 05

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	0	0	0	2	0	1	1	1
9:	1	0	0	0	2	1	0	1
17:	1	0	1	0	2	0	0	2
25:	1	0	0	0	1	2	1	2
33:	0	1	0	0	1	0	0	0
41:	0	1	1	2	0	1	0	2
49:	0	0	2	1	0	0	1	1
57:	0	1	0	1	1	0	1	0
65:	1	1	3	0	0	2	0	1
73:	0	0	1	0	2	0	1	0
81:	1	2	0	2	1	0	1	0
89:	1	4	0	0	2	0	2	0
97:	1	0	0	2	0	2	0	1
105:	0	0	0	0	0	0	1	0
113:	1	2	3	0	0	0	0	3
121:	1	1	1	0	1	0	1	1
129:	1	0	0	1	0	1	0	0
137:	0	0	0	0	1	2	0	2
145:	0	1	0	1	3	0	0	0
153:	0	1	1	0	0	2	1	0
161:	0	2	1	0	0	1	0	1
169:	1	0	0	1	2	2	2	1
177:	3	0	1	1	0	1	0	0
185:	0	0	1	0	1	0	1	3
193:	1	1	3	0	0	1	1	1
201:	2	0	1	1	1	0	0	2
209:	2	1	2	0	2	0	1	2
217:	0	1	0	2	4	0	2	2
225:	1	1	2	2	0	0	5	0
233:	0	2	3	0	1	1	1	0
241:	4	0	1	0	1	1	2	0
249:	1	1	0	1	2	1	1	1
257:	1	2	1	0	0	2	0	1
265:	1	2	1	3	0	1	0	2
273:	0	0	0	2	2	4	4	1
281:	0	2	1	1	1	2	2	3
289:	1	1	0	0	1	0	1	2
297:	3	3	0	1	1	0	1	1
305:	0	1	3	2	0	2	0	0
313:	0	0	0	3	1	2	0	1
321:	1	0	3	0	0	1	2	1
329:	4	2	2	0	0	2	0	1
337:	0	3	4	3	1	1	2	5
345:	2	3	2	1	2	1	2	1
353:	1	1	3	3	0	1	1	2
361:	1	2	0	2	0	2	3	0

369:	3	2	0	1	2	1	1	3

Sample Title: 05

Channel								
377:	0	1	1	1	1	1	2	1
385:	1	0	1	2	1	0	0	1
393:	1	1	1	2	0	1	4	1
401:	1	2	4	4	1	1	1	3
409:	3	2	2	1	1	3	3	2
417:	1	1	1	1	2	1	2	1
425:	1	0	2	0	1	4	3	2
433:	1	1	2	2	3	3	1	1
441:	1	3	2	1	1	0	3	0
449:	1	1	1	2	1	0	2	0
457:	3	1	2	2	3	2	0	2
465:	0	2	0	0	1	2	0	2
473:	0	1	0	2	1	1	1	0
481:	1	1	0	0	1	0	1	1
489:	2	1	0	2	1	2	0	0
497:	1	1	0	1	0	0	0	1
505:	0	2	1	3	0	1	4	1
513:	0	1	2	2	2	3	2	2
521:	2	1	0	0	0	1	1	0
529:	0	0	0	1	1	4	0	2
537:	1	1	0	4	2	0	1	1
545:	1	2	0	2	0	3	2	4
553:	2	1	2	1	1	0	3	1
561:	1	2	2	0	0	2	2	1
569:	1	4	2	3	1	0	1	2
577:	1	1	3	0	2	3	0	4
585:	2	2	2	1	0	0	1	2
593:	3	0	2	2	2	2	3	1
601:	1	1	5	1	5	1	2	1
609:	2	3	1	3	3	1	3	4
617:	1	1	1	2	3	1	3	2
625:	0	3	0	0	2	2	1	1
633:	1	0	0	1	4	1	2	3
641:	2	1	2	3	1	0	4	2
649:	5	2	1	2	2	5	1	2
657:	1	2	6	4	6	1	2	3
665:	1	1	4	2	0	2	4	1
673:	2	4	1	2	3	1	2	4
681:	3	0	3	1	2	3	1	2
689:	0	2	1	2	4	0	3	2
697:	2	0	3	6	3	4	2	1
705:	1	0	5	0	4	4	0	1
713:	3	4	0	1	3	2	5	4
721:	1	2	0	4	2	2	3	4
729:	2	1	2	2	3	4	0	1
737:	1	2	5	1	0	0	4	2
745:	2	3	4	3	1	2	1	0
753:	0	2	0	2	1	0	0	1
761:	2	1	2	0	2	2	0	3
769:	3	2	0	0	2	1	3	0
777:	1	0	0	1	1	0	1	1
785:	0	1	2	1	1	1	2	5
793:	2	5	0	2	0	1	3	3

801:	2	1	1	0	0	2	1	1

Sample Title: 05

Channel								
809:	0	2	0	0	0	1	1	0
817:	0	3	3	1	2	1	1	2
825:	1	5	1	3	1	1	1	2
833:	0	5	1	3	1	0	0	1
841:	1	2	3	1	2	2	1	3
849:	2	0	2	1	2	1	2	0
857:	2	1	2	3	2	3	0	2
865:	1	2	1	1	0	1	1	2
873:	1	2	2	1	1	1	0	3
881:	1	3	1	1	1	2	1	1
889:	1	0	1	1	0	3	1	2
897:	1	1	5	0	0	0	0	0
905:	0	0	0	0	1	1	1	0
913:	3	0	1	0	1	1	0	1
921:	4	2	4	0	2	2	0	0
929:	2	0	1	1	1	0	1	0
937:	2	0	0	0	1	0	2	0
945:	0	2	2	1	0	2	1	0
953:	1	0	1	2	0	1	2	2
961:	2	0	0	0	3	0	1	1
969:	1	1	0	1	1	0	1	1
977:	0	1	0	0	0	0	1	0
985:	1	0	4	2	1	1	0	1
993:	1	2	0	0	0	2	1	0
1001:	0	0	1	0	1	1	1	0
1009:	3	1	0	1	1	0	2	1
1017:	0	0	2	0	1	0	2	2

Apex-Alpha™

Sample Description: CORE 3 2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011574.cnf
Batch Identification: 1111163A-RA
Sample Identification: 06
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_044
Chamber Serial Number: 04026481B
Detector Serial Number: 84168
Env. Background: System Bkgd 10882
Reagent Blank: <not performed>

Sample Size: 1.010E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:26 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.1 minutes

Chem. Recovery Factor: 0.8409 +/- 0.0000
Counting Efficiency: 0.1938 +/- 0.0031 on 12/4/2011 8:21:50 AM
Effective Efficiency: 0.1630 +/- 0.0026

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.796	454.32	9.20	0.68	0.00E+000	5.1
RN-222	5.277	469.83	9.04	0.17	0.00E+000	4.1
RA-226	4.605	232.83	12.85	0.17	0.00E+000	7.2

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.973	6003.00*	1.71E+001 +/- 1.66E+000	2.13E-001 +/- 6.60E-003
RN-222	0.971	5490.00*	1.77E+001 +/- 1.69E+000	1.57E-001 +/- 4.88E-003
RA-226	0.980	4785.00*	8.77E+000 +/- 1.16E+000	1.57E-001 +/- 4.88E-003

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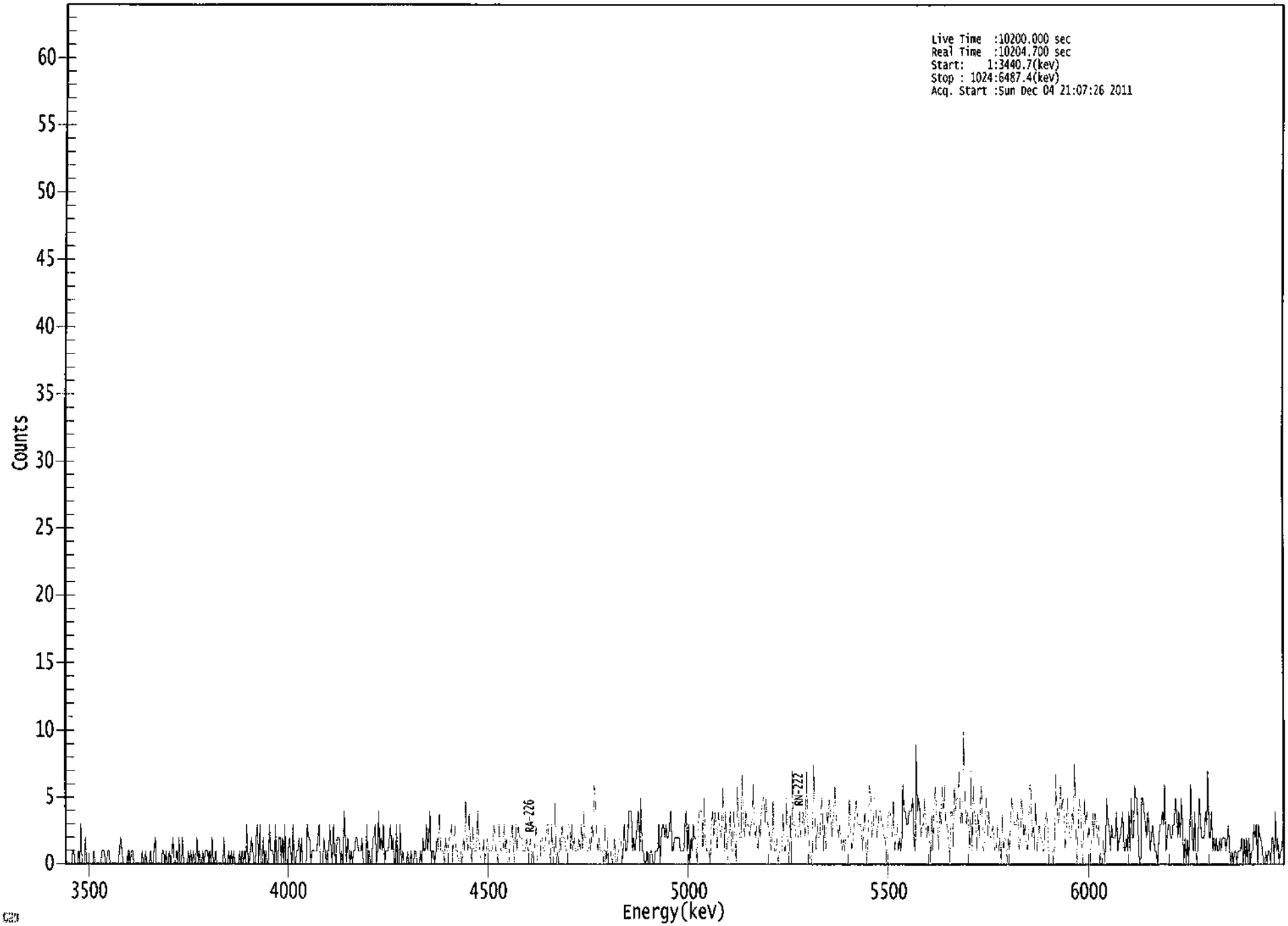
12/6/11

0000011574.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 06

Elapsed Live time: 10200
Elapsed Real Time: 10205

Channel								
1:	1	0	0	0	0	0	1	1
9:	0	0	0	1	0	3	0	0
17:	0	2	0	0	0	0	0	0
25:	1	0	0	0	0	0	0	1
33:	1	1	0	0	1	1	0	0
41:	0	0	0	0	0	0	1	2
49:	1	0	0	0	0	1	1	0
57:	1	1	0	0	0	0	0	0
65:	0	1	0	0	1	0	0	0
73:	1	0	0	1	2	0	0	0
81:	0	0	1	1	0	1	0	0
89:	1	0	1	2	0	0	1	0
97:	2	0	0	2	0	0	0	0
105:	1	0	1	0	1	0	0	2
113:	0	1	0	0	1	0	1	1
121:	1	0	1	0	2	0	0	1
129:	0	0	0	0	0	0	2	0
137:	0	0	1	0	1	0	1	0
145:	0	0	0	1	0	1	0	1
153:	0	3	0	0	1	2	1	0
161:	0	2	3	0	3	0	0	2
169:	0	1	0	0	3	1	1	1
177:	0	3	0	0	2	2	0	2
185:	0	3	0	0	1	2	1	0
193:	3	0	0	1	1	2	0	2
201:	0	0	0	0	3	2	2	0
209:	1	1	1	1	1	2	3	0
217:	0	0	2	1	0	1	1	3
225:	1	0	3	1	0	2	2	2
233:	0	1	0	4	2	0	2	1
241:	0	1	0	1	1	2	2	1
249:	1	1	2	0	0	0	3	0
257:	1	0	0	2	2	3	0	1
265:	4	1	2	1	3	0	1	1
273:	1	2	3	1	2	0	0	3
281:	0	0	3	0	1	0	0	0
289:	1	0	0	1	0	0	1	1
297:	0	0	0	1	0	2	1	1
305:	3	1	2	4	0	1	1	0
313:	1	2	1	4	1	1	1	0
321:	2	1	1	2	2	3	0	2
329:	3	1	1	0	0	1	0	2
337:	1	5	2	1	4	1	0	3
345:	1	1	1	4	2	1	0	0
353:	2	0	1	2	1	1	1	1
361:	2	3	1	1	0	3	1	1

369:	1	3	1	2	0	0	2	2

Sample Title: 06

Channel								
377:	3	1	0	3	1	3	2	2
385:	2	1	1	1	2	1	1	2
393:	0	1	0	2	3	0	0	0
401:	2	2	1	1	2	3	3	1
409:	0	3	0	1	5	0	1	0
417:	2	1	3	2	2	1	1	3
425:	3	1	3	1	2	1	1	1
433:	2	1	3	1	4	2	2	1
441:	1	2	1	3	2	6	5	2
449:	1	2	1	1	1	0	3	0
457:	2	0	0	1	0	1	2	0
465:	0	1	2	2	0	1	3	1
473:	1	2	4	4	4	1	2	1
481:	2	3	4	1	5	1	1	0
489:	0	1	0	0	1	1	0	0
497:	1	1	1	3	0	2	3	3
505:	2	3	2	2	3	4	1	1
513:	2	2	2	2	2	1	1	1
521:	1	3	4	1	3	0	2	1
529:	3	2	2	0	3	4	4	4
537:	1	5	2	1	1	1	0	3
545:	4	2	4	3	1	4	3	2
553:	3	6	1	4	1	2	2	4
561:	1	1	4	2	0	6	3	2
569:	2	7	3	2	4	3	3	2
577:	3	3	6	3	2	3	1	3
585:	2	4	5	5	3	5	3	3
593:	2	1	2	5	1	1	2	0
601:	1	1	1	4	1	1	5	1
609:	0	4	0	7	3	3	2	2
617:	2	4	2	3	4	3	2	7
625:	3	2	0	0	1	8	3	1
633:	3	2	2	4	5	1	3	1
641:	4	3	5	4	2	3	4	6
649:	3	3	2	3	2	1	2	1
657:	2	2	2	5	3	1	2	3
665:	4	5	3	3	3	3	1	3
673:	4	0	1	3	6	5	2	3
681:	5	5	2	3	4	4	3	3
689:	2	2	0	3	4	4	3	2
697:	5	1	2	3	1	2	1	2
705:	6	4	4	3	3	4	4	4
713:	5	2	1	9	4	5	4	2
721:	3	3	5	3	2	3	2	0
729:	4	1	4	6	4	3	1	4
737:	3	6	4	6	3	3	2	0
745:	4	4	1	6	4	5	5	7
753:	3	4	3	10	5	3	4	3
761:	1	7	1	6	4	3	1	4
769:	2	5	6	1	1	4	5	2
777:	4	2	2	3	2	1	1	3
785:	1	2	0	4	1	2	2	0
793:	2	1	3	5	4	3	3	3

801:	4	1	2	5	4	2	3	2

Sample Title: 06

Channel								
809:	1	2	6	6	2	3	1	5
817:	1	2	3	2	2	1	1	3
825:	4	3	1	1	1	1	0	2
833:	7	4	3	4	6	4	5	4
841:	1	3	5	3	2	2	4	3
849:	8	2	0	3	5	4	1	0
857:	5	3	4	2	3	0	2	4
865:	2	4	3	2	3	0	1	0
873:	2	0	2	5	3	3	1	3
881:	2	2	2	4	1	2	2	3
889:	4	1	1	2	1	4	1	5
897:	2	2	6	5	5	2	0	0
905:	5	5	4	3	2	4	3	1
913:	2	3	2	1	1	0	2	3
921:	3	4	3	6	1	2	3	3
929:	2	2	3	3	5	4	2	4
937:	2	5	3	0	2	0	2	0
945:	3	6	2	1	4	1	0	2
953:	5	3	2	2	2	4	3	7
961:	2	2	4	1	2	1	2	1
969:	1	2	1	2	2	2	1	2
977:	3	1	0	1	0	1	1	0
985:	1	1	1	2	0	2	0	2
993:	0	2	0	1	1	3	2	3
1001:	0	3	2	2	1	0	0	1
1009:	0	1	1	0	2	2	0	4
1017:	1	2	0	1	1	2	4	1

Apex-Alpha™

Sample Description: CORE 4 4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011575.cnf
Batch Identification: 1111163A-RA
Sample Identification: 07
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_045
Chamber Serial Number: 04026482A
Detector Serial Number: 91131
Env. Background: System Bkgd 10883
Reagent Blank: <not performed>

Sample Size: 1.014E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.340E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:28 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7665 +/- 0.0000
Counting Efficiency: 0.1892 +/- 0.0030 on 12/4/2011 8:21:49 AM
Effective Efficiency: 0.1450 +/- 0.0023

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

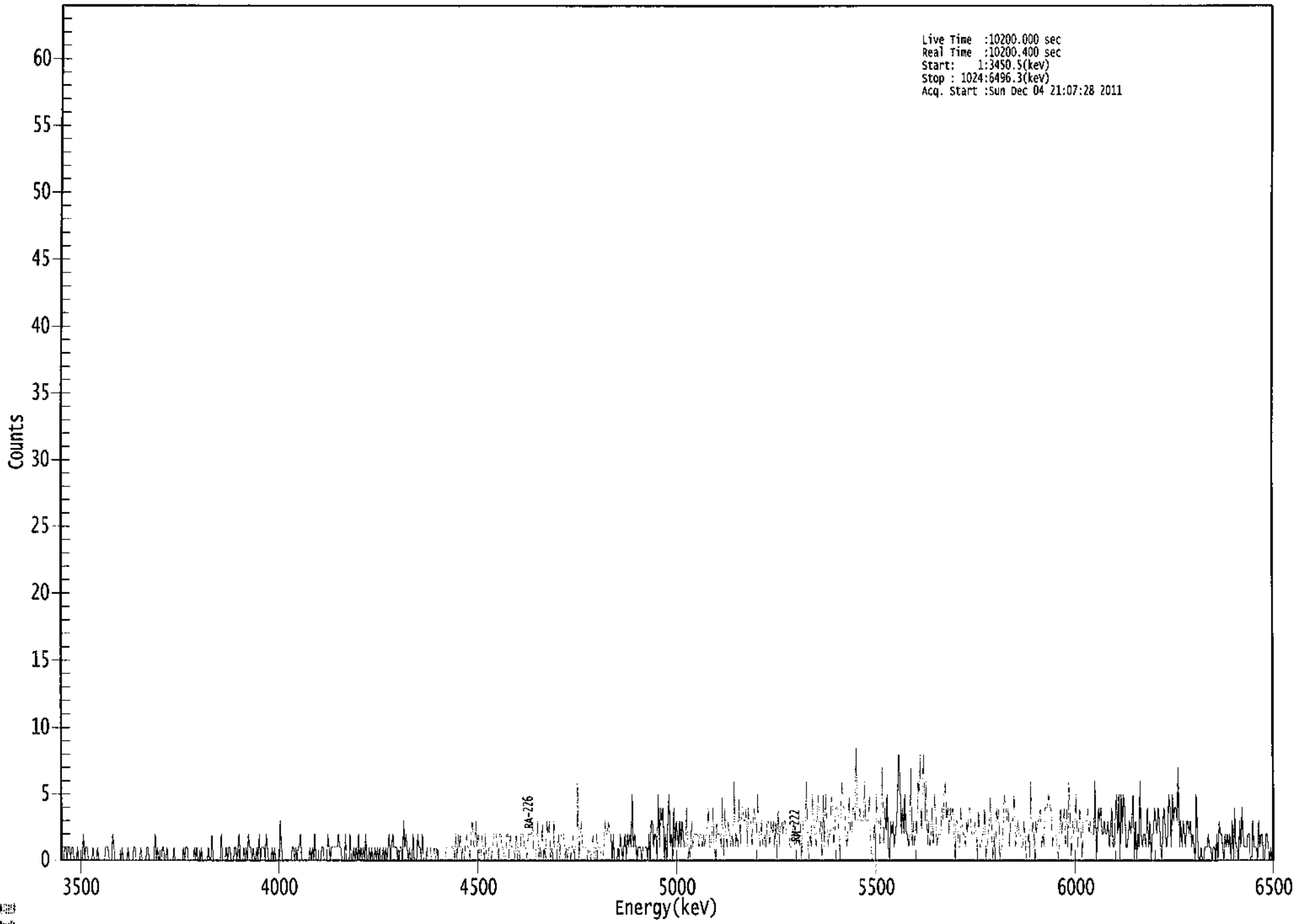
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.800	412.49	9.66	0.51	0.00E+000	9.4
RN-222	5.298	424.00	9.53	0.00	0.00E+000	4.5
RA-226	4.630	168.00	15.17	0.00	0.00E+000	3.3

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	1.74E+001 +/- 1.77E+000	2.21E-001 +/- 6.87E-003
RN-222	0.977	5490.00*	1.79E+001 +/- 1.79E+000	2.53E-001 +/- 7.86E-003
RA-226	0.985	4785.00*	7.09E+000 +/- 1.10E+000	2.53E-001 +/- 7.85E-003

AG
12/6/11

0000011575.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 07

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	1	0	0	1	1	0	1	1
9:	0	1	1	0	0	0	1	0
17:	0	0	0	2	0	1	1	0
25:	0	0	0	1	0	0	0	1
33:	0	0	0	0	0	0	1	1
41:	1	0	0	0	2	1	0	0
49:	0	0	0	0	1	0	0	0
57:	0	1	0	0	0	0	1	1
65:	0	0	0	0	1	0	0	0
73:	0	1	1	0	0	0	0	0
81:	2	0	1	0	0	0	1	1
89:	0	0	1	0	0	0	0	0
97:	1	0	0	0	0	0	0	0
105:	1	0	1	1	0	0	0	0
113:	0	1	0	1	0	0	0	1
121:	0	0	0	0	0	1	0	0
129:	2	0	0	0	0	0	0	0
137:	2	0	0	0	1	0	1	1
145:	0	0	0	1	1	0	1	2
153:	0	0	0	1	0	1	0	2
161:	1	1	0	1	0	0	1	0
169:	2	0	1	1	1	0	2	1
177:	0	0	0	1	0	1	0	0
185:	0	0	3	1	0	0	0	0
193:	0	0	0	0	1	1	0	1
201:	0	1	1	2	0	0	0	0
209:	0	0	0	1	0	1	0	2
217:	0	0	0	0	0	1	1	0
225:	0	0	2	1	0	1	1	1
233:	1	1	1	2	1	1	0	0
241:	0	2	0	0	0	2	0	0
249:	1	0	1	0	2	0	1	0
257:	1	0	2	0	0	1	0	1
265:	0	0	1	0	1	0	1	0
273:	0	1	0	1	0	1	2	0
281:	1	2	1	1	1	0	0	1
289:	1	0	3	1	2	1	0	1
297:	0	0	2	0	0	0	2	1
305:	1	0	2	0	0	0	1	0
313:	0	1	0	0	1	0	1	0
321:	0	0	0	0	0	0	1	1
329:	1	1	1	1	1	0	2	0
337:	2	1	2	0	1	0	1	2
345:	1	1	0	2	3	1	1	3
353:	1	2	0	0	2	1	0	2
361:	0	0	1	1	0	1	2	2

369:	2	1	0	2	2	1	1	0

Sample Title: 07

Channel								
377:	0	2	2	0	2	1	1	1
385:	0	2	1	1	0	2	2	2
393:	1	1	0	2	2	2	2	3
401:	0	0	1	3	0	1	0	3
409:	0	1	0	3	2	3	0	1
417:	0	3	0	0	1	2	0	2
425:	2	2	0	1	0	1	1	0
433:	1	2	0	1	1	6	0	2
441:	3	1	1	1	1	0	1	1
449:	0	1	2	0	0	2	1	1
457:	1	0	0	1	3	2	2	3
465:	2	2	0	2	0	0	0	1
473:	0	2	1	0	1	2	0	2
481:	1	2	1	5	1	2	1	0
489:	1	1	1	0	1	1	1	1
497:	0	2	0	3	3	1	2	2
505:	0	5	1	4	3	4	0	2
513:	0	3	5	1	2	0	4	1
521:	3	2	1	3	1	3	2	1
529:	1	4	0	1	0	3	1	2
537:	2	2	2	1	2	2	1	2
545:	1	2	2	4	1	1	2	4
553:	1	0	3	2	2	2	1	5
561:	0	4	2	1	3	2	1	2
569:	1	6	1	2	1	5	1	4
577:	4	3	3	4	1	4	3	3
585:	1	3	4	3	2	5	2	1
593:	3	1	1	2	1	3	3	1
601:	3	2	3	1	3	0	4	1
609:	3	3	2	3	3	2	2	2
617:	1	1	2	3	1	1	2	2
625:	1	3	0	3	3	3	6	1
633:	0	2	1	5	3	2	1	4
641:	5	2	3	0	5	1	5	3
649:	1	2	2	5	4	1	3	4
657:	4	3	0	4	6	4	4	2
665:	1	2	5	2	2	4	4	3
673:	9	3	3	4	3	3	3	6
681:	3	3	3	5	2	0	0	3
689:	0	5	3	3	1	4	7	1
697:	4	2	5	1	0	3	2	3
705:	1	2	3	5	8	6	2	4
713:	2	5	2	2	1	2	7	1
721:	3	1	3	2	6	5	8	2
729:	6	8	3	6	1	3	1	2
737:	4	1	5	4	1	2	2	2
745:	4	3	5	6	3	4	2	4
753:	3	4	3	0	3	3	1	1
761:	4	3	2	2	1	3	2	4
769:	4	2	2	2	3	2	0	4
777:	1	1	2	2	4	0	1	2
785:	3	5	2	0	2	0	4	3
793:	4	0	1	1	3	5	4	3

801:	4	1	3	3	3	5	1	2

Sample Title: 07

Channel								
809:	3	2	2	1	1	3	2	0
817:	1	2	0	6	2	3	0	3
825:	2	3	3	4	1	2	1	4
833:	4	4	5	4	4	1	2	2
841:	2	1	0	2	4	2	3	4
849:	1	4	1	6	4	0	3	2
857:	3	5	1	2	4	3	0	3
865:	3	3	3	4	2	3	2	2
873:	2	6	0	2	4	3	4	2
881:	2	3	2	2	3	1	2	4
889:	1	1	3	5	2	5	0	5
897:	2	5	4	1	1	2	3	2
905:	3	5	0	3	0	2	1	6
913:	2	1	2	2	1	4	1	3
921:	0	2	2	4	3	2	4	3
929:	1	0	3	4	2	1	2	5
937:	4	1	5	3	4	4	3	7
945:	1	3	1	3	2	1	3	3
953:	2	3	1	2	1	0	5	2
961:	0	0	1	0	0	1	1	1
969:	2	1	1	0	1	1	0	2
977:	0	3	2	2	1	0	2	1
985:	2	1	2	0	3	0	4	1
993:	1	0	3	1	4	2	1	1
1001:	1	2	2	0	0	3	1	1
1009:	1	0	3	1	2	2	0	0
1017:	2	2	1	0	1	0	0	0

Apex-Alpha™

Sample Description: CORE 5 4-5
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011576.cnf
Batch Identification: 1111163A-RA
Sample Identification: 08
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_046
Chamber Serial Number: 04026482B
Detector Serial Number: 58762
Env. Background: System Bkgd 10884
Reagent Blank: <not performed>

Sample Size: 1.004E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.840E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:29 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9384 +/- 0.0000
Counting Efficiency: 0.1863 +/- 0.0030 on 12/4/2011 8:22:12 AM
Effective Efficiency: 0.1748 +/- 0.0028

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.778	66.98	24.16	1.02	0.00E+000	6.0
RN-222	5.304	69.83	23.49	0.17	0.00E+000	3.0
RA-226	4.618	86.00	21.26	0.00	0.00E+000	3.0

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.968	6003.00*	2.87E+000 +/- 7.00E-001	2.70E-001 +/- 8.40E-003
RN-222	0.978	5490.00*	3.00E+000 +/- 7.10E-001	1.79E-001 +/- 5.57E-003
RA-226	0.982	4785.00*	3.69E+000 +/- 7.92E-001	2.57E-001 +/- 7.99E-003

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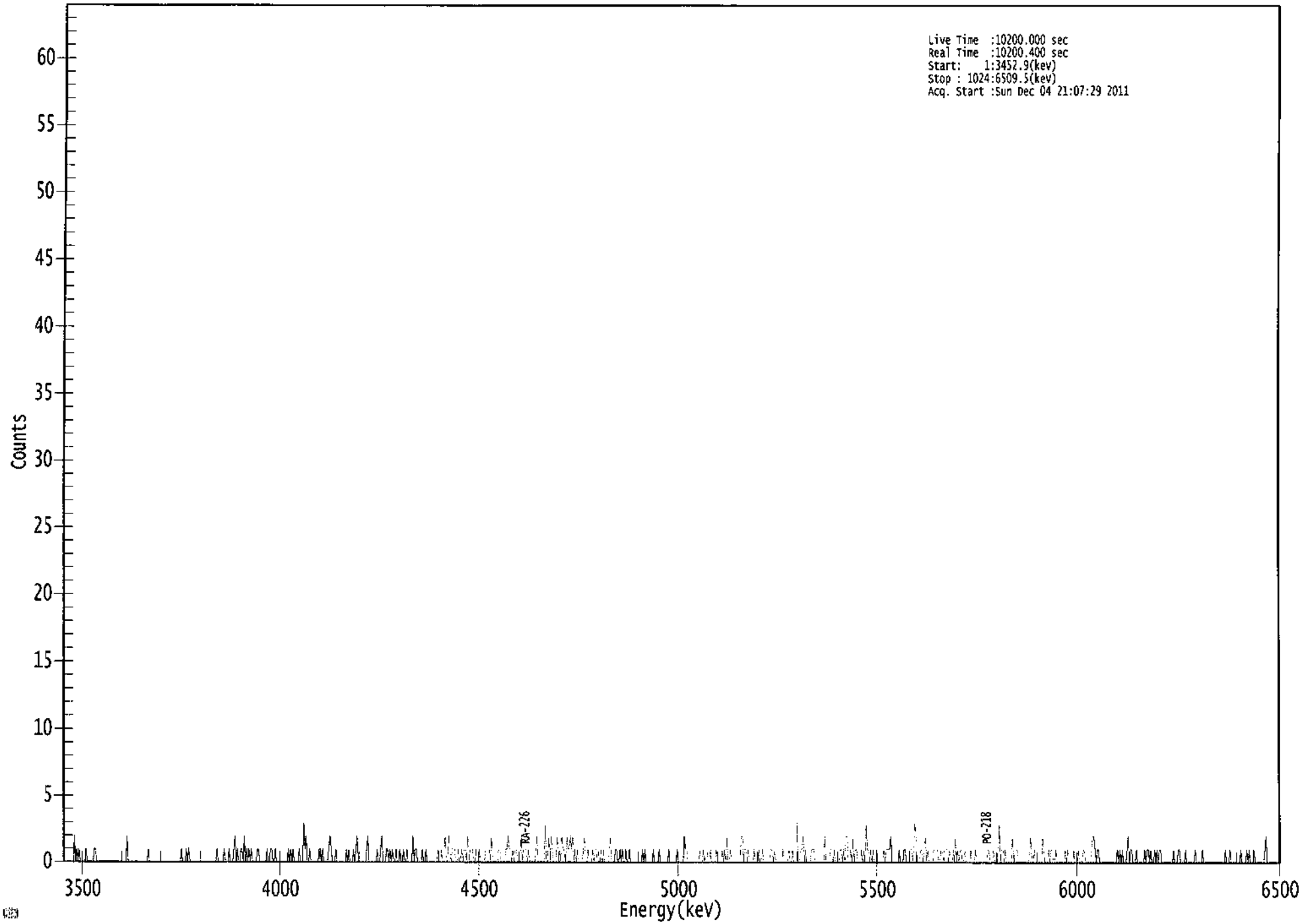
12/6/11

0000011576.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 08

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	2	0	1	0	1	0	0
17:	0	0	0	1	0	0	0	0
25:	0	0	1	1	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	2	0
57:	0	0	0	0	0	0	0	0
65:	0	0	0	0	0	0	0	0
73:	1	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	0	0
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	1	0	0	0
105:	1	0	1	0	0	0	0	0
113:	0	0	0	0	0	0	0	0
121:	0	0	0	0	0	0	0	0
129:	0	0	1	0	0	0	0	0
137:	1	0	0	0	1	0	0	0
145:	1	2	0	1	0	0	1	1
153:	0	2	0	1	0	1	0	1
161:	0	0	0	0	1	1	0	0
169:	0	0	0	0	1	0	0	1
177:	1	0	0	1	0	0	0	0
185:	0	0	0	0	0	0	1	0
193:	1	0	1	0	0	0	0	1
201:	0	0	0	3	1	2	0	0
209:	1	0	0	0	0	0	0	0
217:	1	1	0	1	0	0	0	0
225:	1	2	1	0	0	0	1	0
233:	0	0	0	0	0	0	0	1
241:	0	1	0	0	0	1	0	1
249:	2	0	0	0	0	0	0	0
257:	1	2	0	0	0	0	0	0
265:	0	1	0	0	1	2	0	0
273:	0	1	1	0	1	0	1	0
281:	0	1	0	0	1	0	0	1
289:	0	0	1	0	0	0	0	2
297:	0	1	1	0	0	0	0	1
305:	0	0	1	0	0	0	0	0
313:	0	0	0	0	1	0	0	1
321:	0	0	2	0	0	2	1	0
329:	1	1	1	0	0	1	0	0
337:	1	0	1	1	0	2	0	1
345:	1	1	0	0	1	0	0	1
353:	0	0	0	0	1	1	1	1
361:	0	2	0	0	0	0	0	1

369:	1	0	0	0	0	1	1	2

Sample Title: 08

Channel								
377:	1	1	0	1	0	1	1	0
385:	0	0	2	0	1	1	1	0
393:	1	0	0	0	0	0	1	2
401:	0	0	0	0	0	0	3	0
409:	0	2	0	2	1	0	0	0
417:	2	1	1	0	2	1	1	0
425:	2	1	1	2	1	2	0	1
433:	0	1	0	0	0	0	1	2
441:	0	0	1	0	0	0	1	0
449:	1	1	0	0	0	1	0	1
457:	0	0	0	0	1	2	0	0
465:	0	1	1	0	0	1	0	1
473:	0	0	1	0	0	1	0	0
481:	0	0	0	0	0	0	0	0
489:	1	0	1	0	0	0	0	0
497:	0	1	0	0	0	0	1	0
505:	0	0	0	0	0	0	1	0
513:	0	0	0	0	0	1	0	0
521:	0	0	0	2	1	1	0	0
529:	0	0	0	0	0	0	0	0
537:	1	0	0	1	0	1	1	0
545:	0	1	0	0	0	0	1	0
553:	0	0	0	1	0	1	0	2
561:	0	0	1	0	0	0	0	0
569:	0	0	0	2	2	0	1	1
577:	0	1	0	0	0	0	1	0
585:	0	0	1	0	0	1	0	0
593:	0	0	0	0	1	1	0	1
601:	0	0	0	0	0	0	1	0
609:	0	0	0	1	0	0	1	0
617:	0	0	3	0	0	1	1	2
625:	0	1	0	0	0	0	1	1
633:	1	0	0	0	0	0	0	0
641:	0	2	0	0	0	0	1	1
649:	0	1	0	0	0	0	1	1
657:	0	1	0	2	2	0	0	1
665:	0	2	0	1	1	0	0	0
673:	1	0	1	0	3	1	1	0
681:	1	0	1	0	0	1	0	0
689:	0	0	0	1	0	1	1	1
697:	1	2	0	0	0	0	0	0
705:	1	0	0	0	1	1	0	0
713:	0	1	1	0	1	3	2	0
721:	0	0	1	1	0	1	2	0
729:	1	0	0	0	0	1	1	1
737:	1	0	0	1	1	0	1	1
745:	1	0	1	0	0	1	0	2
753:	0	1	0	1	1	0	0	1
761:	0	0	0	0	1	0	0	0
769:	1	0	0	0	0	0	0	0
777:	0	0	1	1	0	0	0	1
785:	0	0	0	1	3	0	1	1
793:	0	1	0	0	0	0	0	2

801:	0	1	1	1	0	0	0	0

Sample Title: 08

Channel								
809:	0	0	0	0	0	1	2	0
817:	0	1	0	0	0	0	0	0
825:	2	1	0	0	0	1	0	1
833:	1	0	0	1	0	0	0	0
841:	0	0	0	1	0	1	0	0
849:	0	0	1	0	0	0	1	0
857:	0	0	1	1	0	0	0	0
865:	0	1	2	2	1	0	1	1
873:	0	0	0	0	0	0	0	0
881:	0	0	0	0	0	0	0	1
889:	0	1	0	1	0	0	0	1
897:	2	0	1	1	0	0	0	1
905:	0	0	0	0	0	0	1	0
913:	1	1	0	1	0	0	1	0
921:	1	0	1	1	0	0	0	0
929:	0	0	0	0	0	0	1	0
937:	0	0	1	1	0	0	0	0
945:	1	0	0	0	0	0	0	0
953:	1	0	0	0	0	0	1	0
961:	0	0	0	0	0	0	0	0
969:	0	0	0	0	0	0	0	0
977:	0	1	0	0	0	1	0	0
985:	0	0	0	0	0	0	1	0
993:	0	0	0	1	0	1	0	0
1001:	0	1	0	0	0	0	0	0
1009:	0	0	1	2	0	0	0	0
1017:	0	0	0	0	0	0	0	0

Apex-Alpha™

Sample Description: CORE 6 10-11
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011524.Cnf
Batch Identification: 1111163A-RA
Sample Identification: 09
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_047
Chamber Serial Number: 02030596A
Detector Serial Number: 91086
Env. Background: System Bkgd 10885
Reagent Blank: <not performed>

Sample Size: 1.084E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.200E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:31 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.8858 +/- 0.0000
Counting Efficiency: 0.1773 +/- 0.0028 on 12/4/2011 8:22:11 AM
Effective Efficiency: 0.1571 +/- 0.0025

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

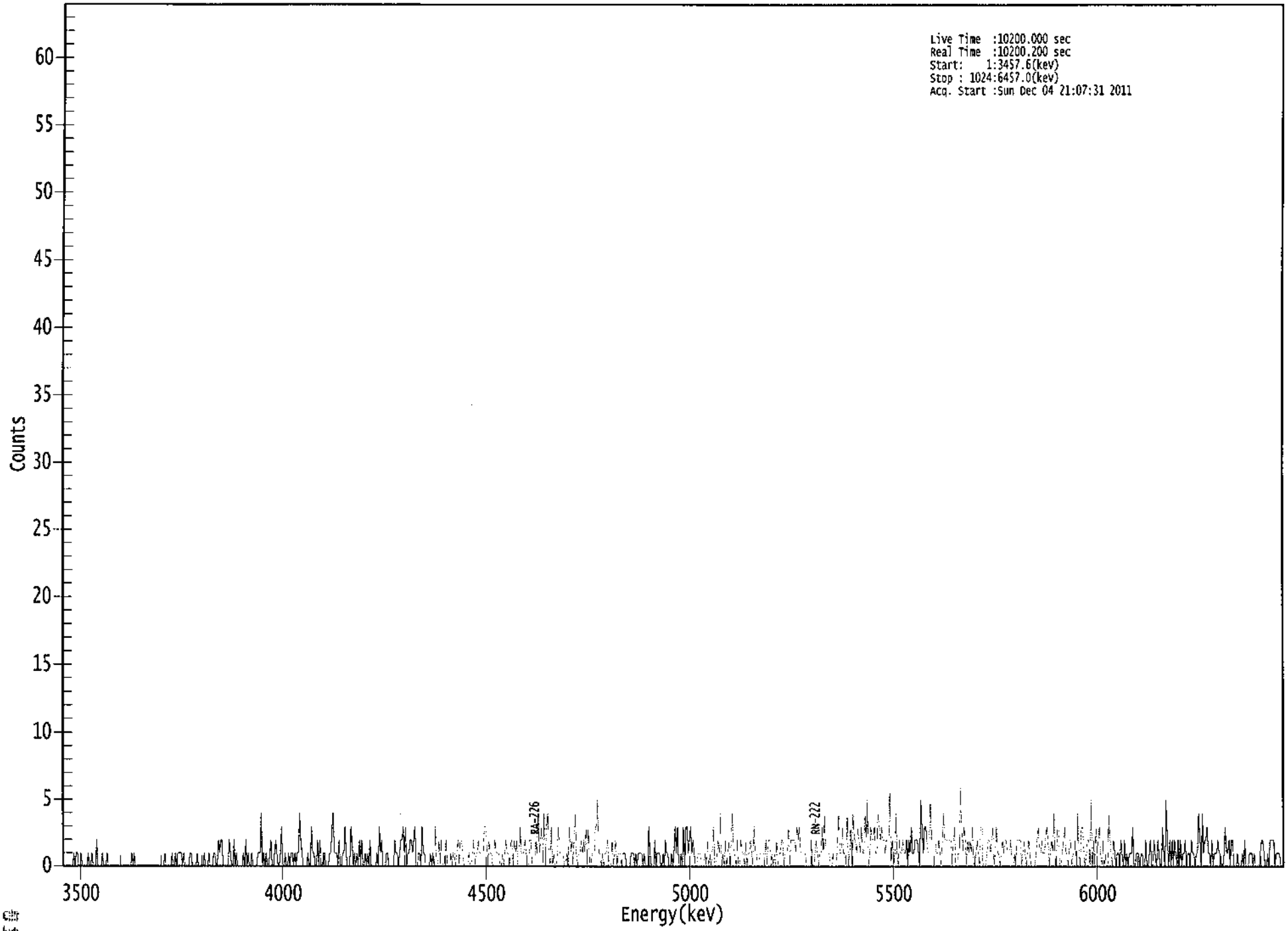
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.801	223.83	13.11	0.17	0.00E+000	4.7
RN-222	5.312	229.83	12.93	0.17	0.00E+000	3.7
RA-226	4.621	174.00	14.90	0.00	0.00E+000	8.4

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.974	6003.00*	7.66E+000 +/- 1.03E+000	1.43E-001 +/- 4.45E-003
RN-222	0.980	5490.00*	7.87E+000 +/- 1.05E+000	1.43E-001 +/- 4.45E-003
RA-226	0.983	4785.00*	5.95E+000 +/- 9.06E-001	2.05E-001 +/- 6.39E-003

AG
12/6/11

0000011524.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 09

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	0	0	0	0	0	0	0	0
9:	0	1	0	1	1	0	0	1
17:	0	0	0	0	0	1	0	0
25:	1	0	0	0	2	0	0	0
33:	0	1	0	0	0	1	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	0	0	0	0	0
57:	0	0	1	0	1	0	0	0
65:	0	0	0	0	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	0	0	0	1	0
89:	0	0	0	0	1	0	0	1
97:	0	1	1	1	1	0	1	0
105:	0	0	0	1	1	0	0	0
113:	0	1	0	0	0	0	0	1
121:	0	0	0	1	0	0	0	1
129:	1	0	0	2	1	2	2	0
137:	0	0	0	0	2	1	0	0
145:	2	0	1	0	0	0	0	0
153:	1	0	2	0	1	0	0	1
161:	0	0	0	0	1	1	1	4
169:	0	1	0	1	0	0	1	2
177:	0	0	1	2	1	0	0	1
185:	3	0	0	1	0	0	1	0
193:	1	1	0	1	0	1	1	4
201:	2	1	0	0	0	0	1	0
209:	0	3	1	1	0	0	2	0
217:	2	0	0	1	1	0	0	0
225:	1	1	3	4	1	1	1	0
233:	2	0	0	1	1	3	1	0
241:	0	0	3	2	0	1	0	1
249:	0	2	0	2	0	0	1	0
257:	1	0	2	0	0	0	0	0
265:	1	0	3	1	2	0	0	0
273:	1	1	0	0	0	0	0	2
281:	1	1	0	1	2	2	3	1
289:	3	0	1	1	2	2	1	2
297:	3	0	0	1	1	0	3	1
305:	1	0	0	0	0	1	0	1
313:	0	3	0	0	2	0	2	0
321:	0	1	2	0	0	0	1	0
329:	1	1	0	1	2	0	2	2
337:	1	0	0	0	0	1	0	0
345:	1	2	0	1	1	2	1	1
353:	1	1	3	3	2	0	2	1
361:	1	0	0	2	1	1	1	0

369:	0	1	0	1	2	1	1	0

Sample Title: 09

Channel								
377:	2	2	0	2	1	2	0	0
385:	3	1	1	1	2	1	0	0
393:	2	2	0	0	0	2	1	4
401:	1	2	3	0	4	0	3	4
409:	1	0	3	0	1	0	0	1
417:	3	1	1	1	1	0	0	1
425:	0	3	1	2	0	2	4	1
433:	0	1	1	2	1	2	1	3
441:	0	3	0	0	1	1	1	3
449:	3	5	1	1	0	1	0	1
457:	1	2	1	0	0	2	0	1
465:	2	0	1	1	1	0	1	1
473:	1	0	0	0	0	1	1	1
481:	0	1	0	1	1	1	1	0
489:	1	0	0	0	3	1	0	0
497:	0	2	0	1	1	1	0	0
505:	1	0	2	1	1	0	0	1
513:	0	1	3	1	3	0	0	1
521:	0	3	0	3	3	1	2	3
529:	1	2	1	0	0	1	1	1
537:	0	0	0	1	0	2	0	1
545:	0	1	3	0	0	1	2	1
553:	4	0	1	0	2	0	1	2
561:	0	2	4	1	1	0	2	0
569:	0	2	1	1	0	2	0	1
577:	1	2	1	0	3	1	1	0
585:	0	1	1	1	1	0	2	0
593:	2	2	1	1	0	1	0	2
601:	0	1	1	2	2	0	1	1
609:	1	3	0	2	2	2	2	1
617:	3	2	3	1	1	1	1	1
625:	0	0	0	0	2	0	0	1
633:	2	1	0	1	1	3	1	4
641:	1	1	1	1	0	0	1	0
649:	0	0	2	4	1	1	3	1
657:	1	0	4	0	1	3	0	4
665:	2	2	1	3	2	1	3	1
673:	1	4	2	5	0	1	3	2
681:	2	3	1	1	4	3	2	3
689:	2	2	1	2	2	2	6	0
697:	2	1	0	4	1	0	2	1
705:	1	2	1	1	2	0	2	1
713:	3	1	1	2	2	2	1	0
721:	5	3	1	3	3	2	1	1
729:	5	2	2	2	2	1	1	2
737:	1	0	2	4	2	2	2	2
745:	2	2	0	2	3	0	0	1
753:	1	6	3	1	3	2	0	2
761:	1	2	1	3	0	0	1	2
769:	1	0	3	3	0	0	0	1
777:	2	2	1	2	3	0	1	3
785:	1	1	0	1	2	1	2	2
793:	1	1	1	2	0	0	1	0

801:	2	2	2	2	0	1	2	1

Sample Title: 09

Channel								
809:	0	1	2	1	0	0	0	0
817:	1	2	3	1	1	2	1	1
825:	2	3	2	0	1	2	1	4
833:	0	1	3	3	0	0	1	2
841:	3	1	1	0	2	2	0	1
849:	1	2	0	4	1	0	3	3
857:	1	0	1	2	2	0	5	0
865:	2	0	3	1	2	3	1	0
873:	2	0	1	0	0	4	2	1
881:	0	2	1	0	1	1	0	2
889:	1	0	2	0	1	0	1	1
897:	1	3	0	0	1	1	1	0
905:	1	1	0	0	2	0	0	1
913:	2	0	0	2	1	0	2	1
921:	0	0	3	1	0	5	2	0
929:	2	0	2	0	2	1	0	2
937:	0	2	0	1	1	2	0	1
945:	1	0	2	1	1	0	1	1
953:	4	2	0	4	1	2	2	3
961:	1	1	0	2	0	1	1	1
969:	2	1	1	0	0	1	3	1
977:	1	2	0	2	2	0	0	0
985:	1	0	0	0	1	0	2	0
993:	0	0	1	1	1	0	1	0
1001:	0	0	0	1	2	2	1	0
1009:	0	1	0	2	2	2	2	0
1017:	1	1	1	1	0	0	0	1

Apex-Alpha™

Sample Description: CORE 7 5-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011577.cnf
Batch Identification: 1111163A-RA
Sample Identification: 10
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_048
Chamber Serial Number: 02030596B
Detector Serial Number: 83111
Env. Background: System Bkgd 10886
Reagent Blank: <not performed>

Sample Size: 1.001E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.770E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/4/2011 9:07:33 PM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.9920 +/- 0.0000
Counting Efficiency: 0.1707 +/- 0.0027 on 12/4/2011 8:22:09 AM
Effective Efficiency: 0.1693 +/- 0.0027

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

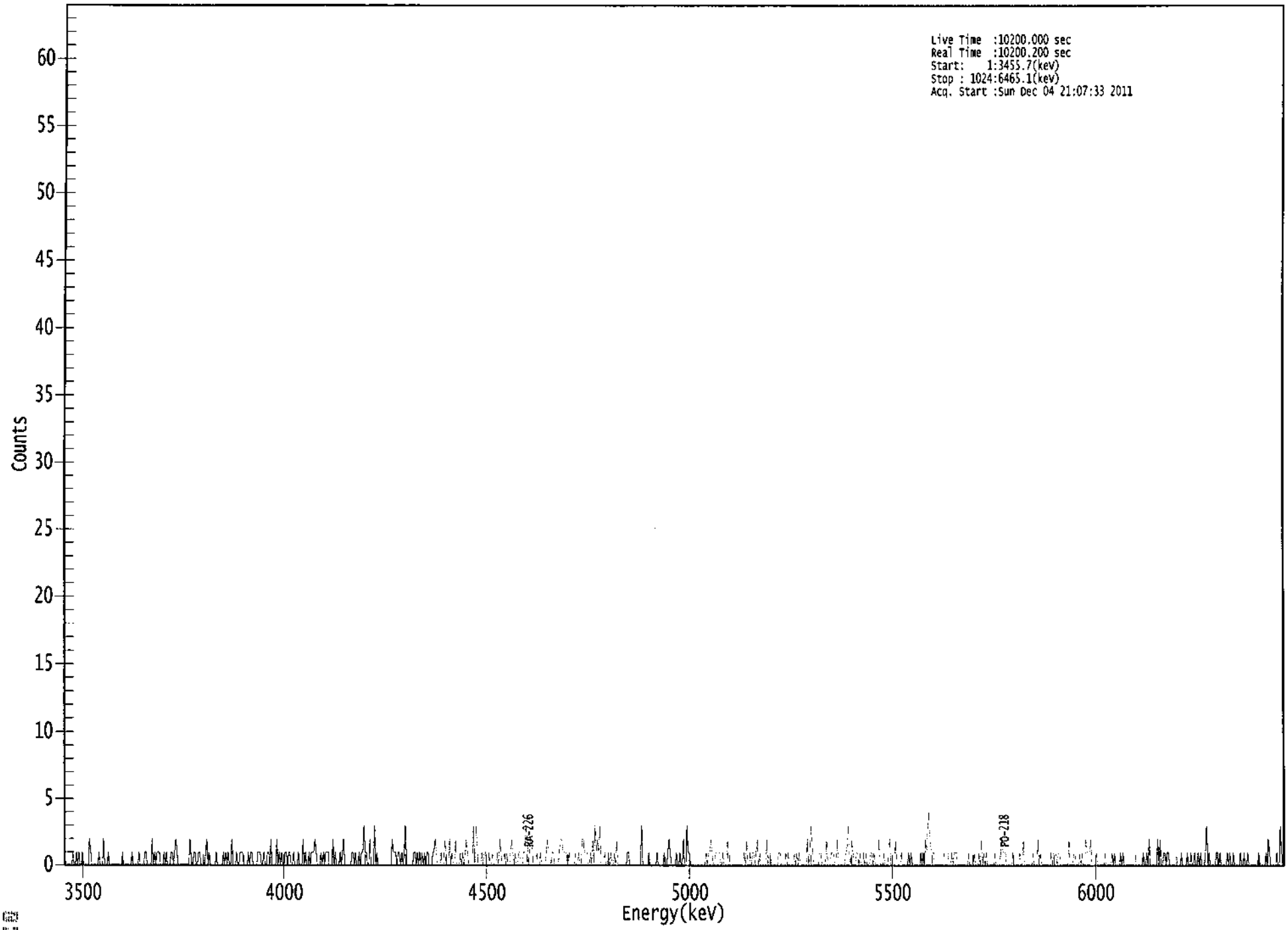
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.779	67.00	24.12	0.00	0.00E+000	7.4
RN-222	5.284	75.64	22.77	1.36	0.00E+000	5.9
RA-226	4.606	102.83	19.35	0.17	0.00E+000	2.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.968	6003.00*	2.90E+000 +/- 7.06E-001	2.60E-001 +/- 8.10E-003
RN-222	0.973	5490.00*	3.28E+000 +/- 7.53E-001	2.97E-001 +/- 9.26E-003
RA-226	0.980	4785.00*	4.45E+000 +/- 8.72E-001	1.81E-001 +/- 5.64E-003

AG
12/6/11

0000011577.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 10

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	1	0	0	0	0	0	0	1
9:	0	0	1	0	1	0	0	1
17:	0	0	0	0	0	2	1	0
25:	0	0	0	0	0	1	0	0
33:	0	2	0	0	0	1	0	0
41:	0	0	0	0	0	0	0	0
49:	0	1	0	0	0	0	0	0
57:	0	1	0	0	0	0	0	1
65:	0	0	0	0	1	1	0	0
73:	0	0	2	0	1	0	1	1
81:	1	0	0	0	1	0	1	0
89:	0	0	1	1	0	1	2	1
97:	0	0	0	0	0	0	0	0
105:	0	0	2	0	0	1	1	0
113:	0	1	1	0	0	0	0	1
121:	2	0	1	0	0	0	0	0
129:	1	0	0	0	0	0	1	0
137:	1	0	1	0	0	2	0	0
145:	0	1	0	0	1	1	1	0
153:	0	0	0	1	0	1	1	0
161:	0	0	0	1	1	1	0	0
169:	1	0	0	1	1	0	2	0
177:	0	0	0	2	0	1	0	1
185:	0	0	1	1	0	1	1	0
193:	0	1	0	0	0	1	0	0
201:	0	2	0	1	0	0	1	0
209:	1	1	1	2	1	0	0	0
217:	1	0	1	0	1	1	1	0
225:	0	0	2	0	1	0	0	0
233:	1	0	1	2	0	0	0	0
241:	0	0	1	1	0	1	0	0
249:	1	0	1	1	3	1	1	0
257:	0	2	0	0	0	3	0	1
265:	0	0	0	0	0	0	0	0
273:	0	0	0	0	2	1	1	1
281:	0	1	1	0	1	0	1	3
289:	0	0	0	0	0	0	1	1
297:	0	1	0	1	0	1	0	1
305:	0	1	1	0	0	0	1	1
313:	2	1	0	0	0	1	0	0
321:	2	1	0	0	2	0	1	0
329:	0	2	0	0	0	1	0	1
337:	0	1	2	1	0	0	0	0
345:	3	0	3	2	0	0	0	1
353:	0	1	1	0	0	1	0	0
361:	1	0	0	0	1	0	2	1

369:	0	0	1	0	1	0	0	1

Sample Title: 10

Channel								
377:	2	1	0	1	0	0	1	1
385:	0	0	1	1	3	2	0	1
393:	2	2	0	0	0	1	0	0
401:	1	0	0	0	0	1	2	1
409:	1	0	1	1	0	0	0	0
417:	1	2	2	1	1	1	1	0
425:	1	0	0	0	0	1	0	0
433:	1	0	0	2	2	1	1	1
441:	0	0	1	0	2	0	3	1
449:	2	1	3	0	0	0	1	0
457:	0	1	0	1	0	0	1	0
465:	2	0	0	0	0	0	0	0
473:	0	1	1	0	0	0	0	0
481:	0	0	0	0	0	3	0	0
489:	0	0	0	1	0	0	0	0
497:	0	0	1	0	0	0	0	0
505:	1	0	0	1	2	1	0	0
513:	0	0	1	0	0	1	0	0
521:	2	0	0	3	1	1	0	0
529:	0	0	0	0	0	0	0	0
537:	0	0	0	1	0	1	1	2
545:	1	0	0	1	1	1	1	0
553:	0	1	0	0	0	2	0	0
561:	0	0	0	0	0	0	0	0
569:	0	0	0	1	0	2	0	0
577:	1	0	1	1	0	1	2	0
585:	1	0	0	0	0	0	2	0
593:	1	1	0	0	0	0	0	0
601:	1	1	0	0	0	0	1	0
609:	1	0	0	0	0	1	0	1
617:	0	1	0	0	0	0	0	0
625:	2	0	1	3	2	0	0	0
633:	0	0	1	1	0	0	0	0
641:	2	0	0	0	1	1	1	0
649:	0	2	0	0	0	0	0	0
657:	1	1	3	1	0	2	1	0
665:	0	1	1	0	1	0	0	1
673:	0	1	0	0	0	1	1	0
681:	1	0	0	0	2	0	0	0
689:	1	0	0	0	1	2	0	0
697:	0	0	2	0	0	0	0	1
705:	0	0	0	0	0	1	0	1
713:	0	0	0	0	0	0	0	1
721:	0	1	0	2	1	3	4	2
729:	1	1	1	0	0	0	0	0
737:	0	0	0	1	1	1	1	0
745:	0	1	0	1	1	1	0	0
753:	0	0	0	0	0	0	0	1
761:	0	0	0	0	1	0	0	0
769:	1	0	2	0	1	0	1	0
777:	0	0	0	0	0	1	0	0
785:	0	0	1	2	1	1	1	0
793:	0	0	0	0	1	0	0	0

801:	0	0	1	0	0	2	0	0

Sample Title: 10

Channel								
809:	0	0	0	0	0	1	0	0
817:	0	2	0	1	0	0	0	0
825:	0	0	0	0	1	0	1	1
833:	1	0	1	1	0	0	0	0
841:	0	0	0	2	0	0	0	1
849:	1	0	0	0	1	0	1	0
857:	0	2	1	1	1	2	0	0
865:	0	0	1	0	0	0	0	0
873:	0	1	0	0	0	0	0	1
881:	0	1	0	0	0	0	1	0
889:	1	0	0	0	0	0	0	0
897:	0	0	0	0	0	0	0	0
905:	0	1	0	0	1	0	2	0
913:	0	0	0	0	0	2	0	2
921:	0	0	1	1	0	1	1	0
929:	0	0	0	0	0	0	0	0
937:	0	1	0	0	0	0	1	0
945:	0	1	0	0	1	0	0	1
953:	0	1	0	0	0	1	3	0
961:	1	0	0	0	0	0	1	1
969:	0	1	0	0	0	0	0	1
977:	0	1	0	0	1	0	0	0
985:	0	0	1	0	0	1	0	0
993:	1	0	0	0	0	0	0	0
1001:	0	1	0	0	0	0	0	1
1009:	0	2	1	0	0	0	0	0
1017:	1	0	0	3	1	0	0	0

Apex-Alpha™

Sample Description: CORE 8 2-3
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011578.cnf
Batch Identification: 1111163A-RA
Sample Identification: 11
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_003
Chamber Serial Number:
Detector Serial Number: 3
Env. Background: System Bkgd 10972
Reagent Blank: <not performed>

Sample Size: 1.005E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.200E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/5/2011 10:12:11 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7892 +/- 0.0000
Counting Efficiency: 0.1841 +/- 0.0029 on 12/2/2011 5:34:12 PM
Effective Efficiency: 0.1453 +/- 0.0023

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.792	200.05	14.10	5.95	0.00E+000	8.9
RN-222	5.285	237.11	12.82	2.89	0.00E+000	3.7
RA-226	4.609	160.98	15.51	1.02	0.00E+000	3.6

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.972	6003.00*	7.99E+000 +/- 1.15E+000	4.55E-001 +/- 1.41E-002
RN-222	0.974	5490.00*	9.48E+000 +/- 1.25E+000	3.50E-001 +/- 1.09E-002
RA-226	0.980	4785.00*	6.43E+000 +/- 1.02E+000	2.52E-001 +/- 7.82E-003

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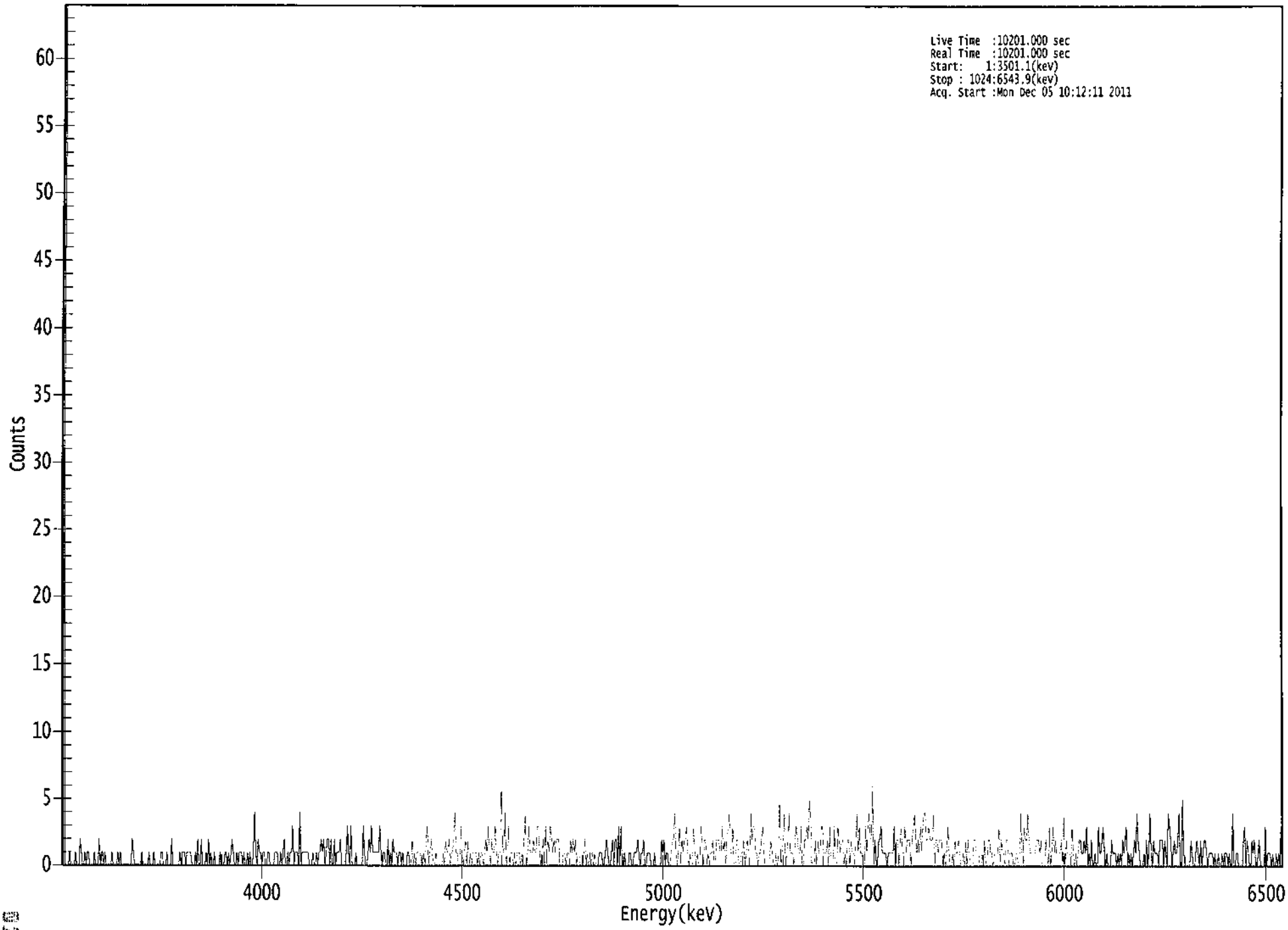
12/6/11

0000011578.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 11

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	0	0	0	0	1	0
9:	0	0	0	1	0	0	0	2
17:	1	0	0	1	0	1	1	0
25:	0	0	0	1	0	0	0	2
33:	0	1	1	0	1	0	0	0
41:	0	0	1	0	0	0	0	1
49:	0	1	0	0	0	0	0	0
57:	0	0	0	2	1	0	0	0
65:	0	0	0	1	0	0	0	0
73:	0	1	0	0	0	1	0	0
81:	0	0	0	1	1	0	0	0
89:	1	0	0	0	2	0	0	0
97:	0	0	0	1	0	1	1	1
105:	0	1	1	1	1	0	0	0
113:	1	0	2	0	0	2	0	0
121:	0	1	0	2	0	1	0	0
129:	1	0	0	0	0	1	0	0
137:	0	1	1	0	1	0	1	2
145:	1	0	0	1	0	1	1	1
153:	0	1	0	0	1	0	1	0
161:	0	1	4	1	0	2	1	1
169:	0	1	1	0	0	1	1	0
177:	0	0	0	1	1	1	0	0
185:	1	0	1	2	0	0	1	0
193:	1	1	3	0	1	1	1	0
201:	4	0	1	1	1	1	1	1
209:	0	0	0	1	0	0	1	0
217:	1	1	2	1	2	0	1	2
225:	2	0	2	0	0	2	0	1
233:	1	1	2	0	0	0	0	1
241:	3	1	0	3	0	0	0	1
249:	0	0	0	0	0	3	1	0
257:	0	1	2	1	3	1	1	1
265:	1	1	1	3	1	0	1	1
273:	0	0	2	0	1	0	2	1
281:	1	1	0	1	1	0	1	0
289:	0	0	1	1	0	0	2	0
297:	1	0	1	1	1	1	0	0
305:	1	0	2	3	0	1	2	1
313:	0	0	1	0	0	0	0	0
321:	1	0	2	1	1	2	0	1
329:	1	2	4	1	1	0	0	3
337:	1	0	1	2	0	2	0	1
345:	0	1	1	1	1	0	1	0
353:	1	1	0	1	2	1	3	1
361:	0	2	1	1	3	1	0	1

369:	1	6	1	1	4	0	1	3

Sample Title: 11

Channel								
377:	0	1	1	0	1	0	1	1
385:	1	0	1	0	2	4	0	1
393:	3	1	1	1	2	1	1	3
401:	3	1	0	1	2	0	3	0
409:	2	1	3	2	1	2	1	2
417:	2	2	0	0	0	1	1	0
425:	1	1	0	2	1	2	1	2
433:	0	1	1	0	0	0	1	2
441:	0	1	0	1	0	1	0	1
449:	0	0	0	1	1	1	0	0
457:	1	2	1	0	0	1	2	0
465:	2	2	0	3	0	3	0	0
473:	1	0	0	0	1	1	0	0
481:	1	1	1	2	1	0	1	1
489:	2	0	0	1	1	1	0	0
497:	0	1	0	0	0	0	0	2
505:	1	2	0	1	1	0	0	1
513:	2	2	4	1	0	1	3	0
521:	2	1	2	2	3	1	0	1
529:	0	0	3	1	0	1	0	0
537:	3	2	0	2	2	0	1	0
545:	1	1	2	0	0	2	2	2
553:	1	1	3	1	2	0	2	3
561:	4	1	1	3	0	0	2	2
569:	0	0	1	1	2	0	1	2
577:	1	0	4	2	3	3	1	1
585:	0	1	1	2	3	1	0	0
593:	0	0	1	2	1	0	0	1
601:	0	1	5	0	1	2	4	0
609:	1	2	4	1	1	1	0	2
617:	3	2	1	1	3	0	0	2
625:	2	3	2	5	4	0	0	0
633:	2	0	2	1	1	3	3	1
641:	1	1	2	0	3	0	0	0
649:	3	0	0	3	2	1	2	2
657:	0	1	0	2	2	0	2	1
665:	1	0	2	4	1	3	1	1
673:	0	0	3	1	3	4	2	2
681:	6	0	2	0	0	2	2	3
689:	1	1	1	1	0	1	1	1
697:	1	1	3	0	2	2	0	2
705:	3	1	1	3	1	2	2	2
713:	0	2	3	4	2	1	2	1
721:	3	1	3	4	4	2	2	3
729:	2	2	2	4	0	2	2	1
737:	2	2	2	0	1	0	1	3
745:	1	0	0	1	0	2	1	1
753:	2	1	0	0	1	0	2	0
761:	2	1	0	0	0	2	2	1
769:	1	1	0	0	1	0	2	0
777:	0	2	2	1	1	0	1	1
785:	1	1	3	0	2	1	1	0
793:	2	2	0	1	1	1	0	0

801:	1	1	0	0	4	1	1	3

Sample Title: 11

Channel								
809:	2	2	4	2	1	1	1	1
817:	1	2	2	2	1	2	0	0
825:	0	2	1	0	3	0	1	3
833:	1	2	1	1	1	1	2	0
841:	4	0	2	1	1	1	0	3
849:	1	0	1	0	1	2	2	1
857:	1	2	1	3	0	1	0	2
865:	0	0	1	0	0	3	1	1
873:	2	3	1	0	1	0	0	0
881:	2	1	1	1	0	1	0	1
889:	0	2	1	2	3	0	1	0
897:	1	0	1	2	1	4	2	1
905:	0	0	0	1	0	2	0	1
913:	4	1	0	2	1	1	1	0
921:	2	2	2	0	2	1	0	4
929:	3	2	0	1	2	1	1	2
937:	4	0	0	5	1	0	0	0
945:	0	0	2	1	0	0	1	2
953:	1	0	2	0	1	2	2	1
961:	0	1	1	1	1	0	1	0
969:	0	1	0	0	1	0	1	1
977:	1	0	1	0	0	4	0	0
985:	1	1	0	0	0	0	2	3
993:	0	2	1	0	0	2	1	2
1001:	0	0	1	2	0	0	0	0
1009:	3	0	1	1	1	0	1	0
1017:	0	1	0	1	0	3	1	0

Apex-Alpha™

Sample Description: CORE 9 5-6
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011579.cnf
Batch Identification: 1111163A-RA
Sample Identification: 12
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_004
Chamber Serial Number:
Detector Serial Number: 4
Env. Background: System Bkgd 10973
Reagent Blank: <not performed>

Sample Size: 1.045E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 2.720E+000 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/5/2011 10:12:13 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 1.0000 +/- 0.0000
Counting Efficiency: 0.1988 +/- 0.0031 on 12/2/2011 5:34:05 PM
Effective Efficiency: 0.1988 +/- 0.0031

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

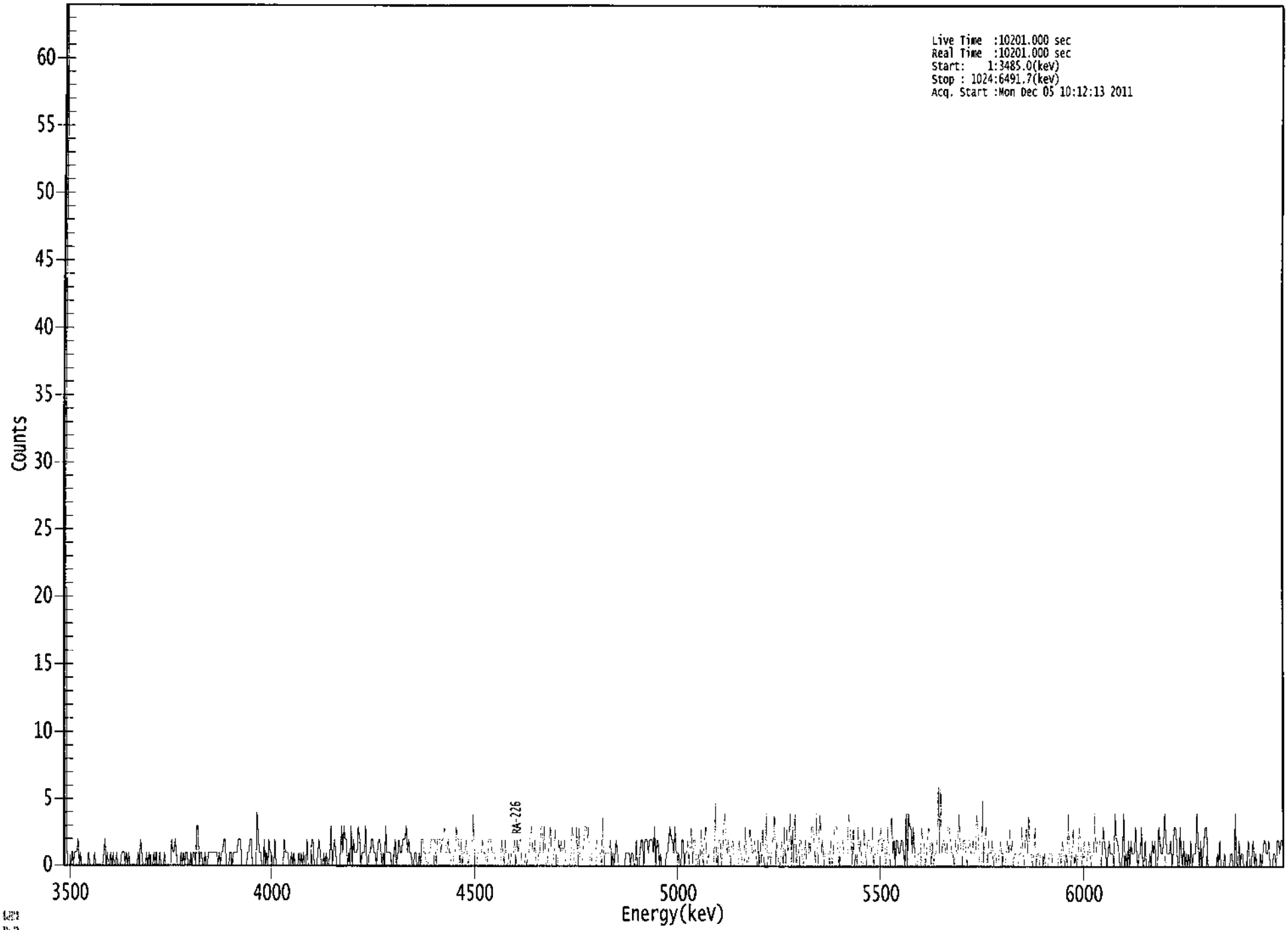
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.789	195.47	14.08	1.53	0.00E+000	4.0
RN-222	5.288	231.79	12.95	2.21	0.00E+000	3.3
RA-226	4.603	179.64	14.69	1.36	0.00E+000	3.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.971	6003.00*	6.79E+000 +/- 9.79E-001	2.47E-001 +/- 7.65E-003
RN-222	0.974	5490.00*	8.05E+000 +/- 1.07E+000	2.78E-001 +/- 8.61E-003
RA-226	0.979	4785.00*	6.23E+000 +/- 9.36E-001	2.38E-001 +/- 7.38E-003

AG
12/6/11

0000011579.CNF



ROI Type: 1

****
***** S P E C T R A L D A T A R E P O R T *****
****

Sample Title: 12

Elapsed Live time: 10201
Elapsed Real Time: 10201

Channel								
1:	10201	10201	3	0	0	0	0	1
9:	0	1	1	1	2	0	1	0
17:	0	0	0	0	0	1	0	0
25:	0	0	1	0	0	0	0	0
33:	0	0	1	2	0	1	0	0
41:	1	0	1	0	0	1	0	0
49:	0	1	1	1	0	1	0	1
57:	0	0	0	0	0	0	0	1
65:	0	2	1	0	0	0	1	0
73:	1	0	0	0	1	0	1	0
81:	0	1	0	0	0	1	0	0
89:	0	0	0	2	1	1	2	1
97:	0	0	0	1	0	1	0	1
105:	1	0	0	1	0	1	1	0
113:	3	3	0	1	1	0	0	1
121:	0	0	1	1	1	1	1	1
129:	1	1	0	1	0	1	1	2
137:	2	0	0	0	1	1	0	1
145:	1	1	1	2	2	2	0	0
153:	0	0	0	1	1	2	2	0
161:	0	0	0	4	2	1	1	0
169:	0	2	0	1	0	2	1	1
177:	0	0	2	0	0	0	0	0
185:	0	0	2	1	1	1	0	0
193:	1	0	1	0	0	0	1	0
201:	1	0	1	0	0	2	0	0
209:	0	2	2	0	0	0	1	2
217:	1	0	0	1	0	1	0	0
225:	1	3	0	1	2	1	0	0
233:	0	1	3	1	3	2	2	0
241:	1	0	3	0	2	1	1	1
249:	3	2	0	1	1	1	3	0
257:	0	1	1	2	2	1	1	0
265:	1	2	2	1	0	1	0	3
273:	1	1	1	1	0	0	1	2
281:	0	1	2	1	1	2	2	2
289:	3	1	2	1	1	0	0	1
297:	1	0	0	1	0	2	2	1
305:	1	0	0	1	1	2	2	2
313:	2	0	2	2	2	1	2	2
321:	3	1	1	2	1	1	0	0
329:	1	1	3	2	2	0	2	0
337:	1	1	2	1	0	1	1	1
345:	4	1	0	0	1	1	1	1
353:	2	1	1	0	0	2	2	2
361:	1	1	1	0	0	0	0	0

369:	2	1	0	2	0	0	1	0

Sample Title: 12

Channel								
377:	1	1	1	2	0	2	1	2
385:	2	0	0	0	1	0	1	1
393:	2	3	1	1	2	0	0	1
401:	1	3	3	1	3	0	0	1
409:	2	3	0	0	1	3	0	0
417:	2	1	2	1	1	2	0	0
425:	0	0	1	3	2	0	0	3
433:	0	3	0	0	1	2	3	3
441:	2	3	0	0	1	1	1	1
449:	2	1	1	1	0	4	0	1
457:	1	1	1	2	0	1	0	1
465:	2	1	0	0	0	0	0	0
473:	1	1	1	1	0	1	1	0
481:	0	2	0	0	1	2	2	0
489:	2	2	2	1	2	2	2	1
497:	3	0	2	2	0	1	0	0
505:	0	0	1	1	2	3	2	2
513:	1	3	1	1	1	0	0	2
521:	2	0	1	1	2	0	2	3
529:	0	2	2	0	0	1	0	3
537:	1	0	2	3	0	1	0	0
545:	0	0	1	5	0	1	2	2
553:	0	1	3	4	2	1	2	1
561:	0	2	2	0	0	0	0	2
569:	1	1	0	0	3	1	0	0
577:	3	2	1	1	2	1	0	2
585:	0	2	0	3	0	0	4	0
593:	1	1	0	2	2	4	0	2
601:	0	0	1	2	0	3	0	3
609:	1	2	4	0	3	0	4	0
617:	1	1	2	2	1	0	1	2
625:	0	0	2	1	3	3	2	0
633:	4	0	2	4	1	2	0	1
641:	1	1	1	0	2	0	1	3
649:	3	3	1	0	2	2	2	1
657:	1	1	1	4	3	2	0	3
665:	0	1	0	3	1	2	0	0
673:	3	1	0	2	2	1	1	3
681:	0	1	1	1	2	2	3	1
689:	2	2	0	1	3	1	0	4
697:	1	2	0	2	2	1	1	2
705:	2	1	0	4	0	4	3	3
713:	1	3	1	0	0	1	1	1
721:	3	2	2	0	1	2	3	2
729:	0	2	0	1	1	2	6	1
737:	6	1	2	2	1	1	3	3
745:	2	1	1	0	2	1	1	4
753:	2	1	1	2	2	1	0	2
761:	2	1	1	2	1	1	4	3
769:	1	0	0	5	0	2	3	0
777:	2	1	1	2	0	1	1	0
785:	0	1	2	1	1	0	0	1
793:	2	1	3	1	2	0	1	1

801:	0	0	1	1	3	1	0	2

Sample Title: 12

Channel								
809:	3	1	4	1	1	0	1	3
817:	0	1	1	0	1	1	0	1
825:	0	0	0	1	1	1	0	0
833:	0	0	0	1	1	0	2	1
841:	0	1	0	4	1	0	1	3
849:	0	1	0	1	3	2	0	1
857:	2	0	0	1	2	1	0	1
865:	1	4	1	2	2	2	0	1
873:	3	2	1	0	1	2	1	1
881:	1	0	4	2	2	1	0	0
889:	1	4	0	1	0	2	0	2
897:	1	1	1	3	1	0	1	1
905:	3	0	0	2	0	0	0	1
913:	0	2	1	2	0	0	3	2
921:	1	1	2	4	2	1	1	1
929:	2	0	1	3	3	2	0	0
937:	3	1	0	2	0	1	0	1
945:	0	2	0	1	1	1	4	2
953:	0	2	0	1	2	3	3	0
961:	0	0	0	0	0	0	0	1
969:	0	2	0	0	0	1	0	0
977:	0	0	1	1	0	0	4	0
985:	0	2	0	1	1	0	0	0
993:	1	2	0	0	1	2	0	1
1001:	0	0	0	1	0	1	2	2
1009:	1	1	2	0	0	0	1	1
1017:	0	2	2	1	2	2	1	2

Apex-Alpha™

Sample Description: CORE 10 8-9
Spectrum File: \\OR-ALPHA1\AlphaRoot\Data\0000011580.cnf
Batch Identification: 1111163A-RA
Sample Identification: 13
Sample Geometry: Shelf 2
Procedure Description: Ra

Detector Name: Alpha_010
Chamber Serial Number:
Detector Serial Number: 10
Env. Background: System Bkgd 10975
Reagent Blank: <not performed>

Sample Size: 1.012E+000 +/- 0.000E+000 gram
Generic Mult. Factor: 8.000E-002 Generic Div. Factor: 1.000E+000
Sample Date/Time: 11/28/2011 8:53:36 PM
Acquisition Date/Time: 12/5/2011 10:12:10 AM
Acquisition Live Time: 170.0 minutes
Acquisition Real Time: 170.0 minutes

Chem. Recovery Factor: 0.7667 +/- 0.0000
Counting Efficiency: 0.2010 +/- 0.0032 on 12/2/2011 5:34:30 PM
Effective Efficiency: 0.1541 +/- 0.0024

Peak Match Tolerance: 0.500 MeV

PEAK AREA REPORT

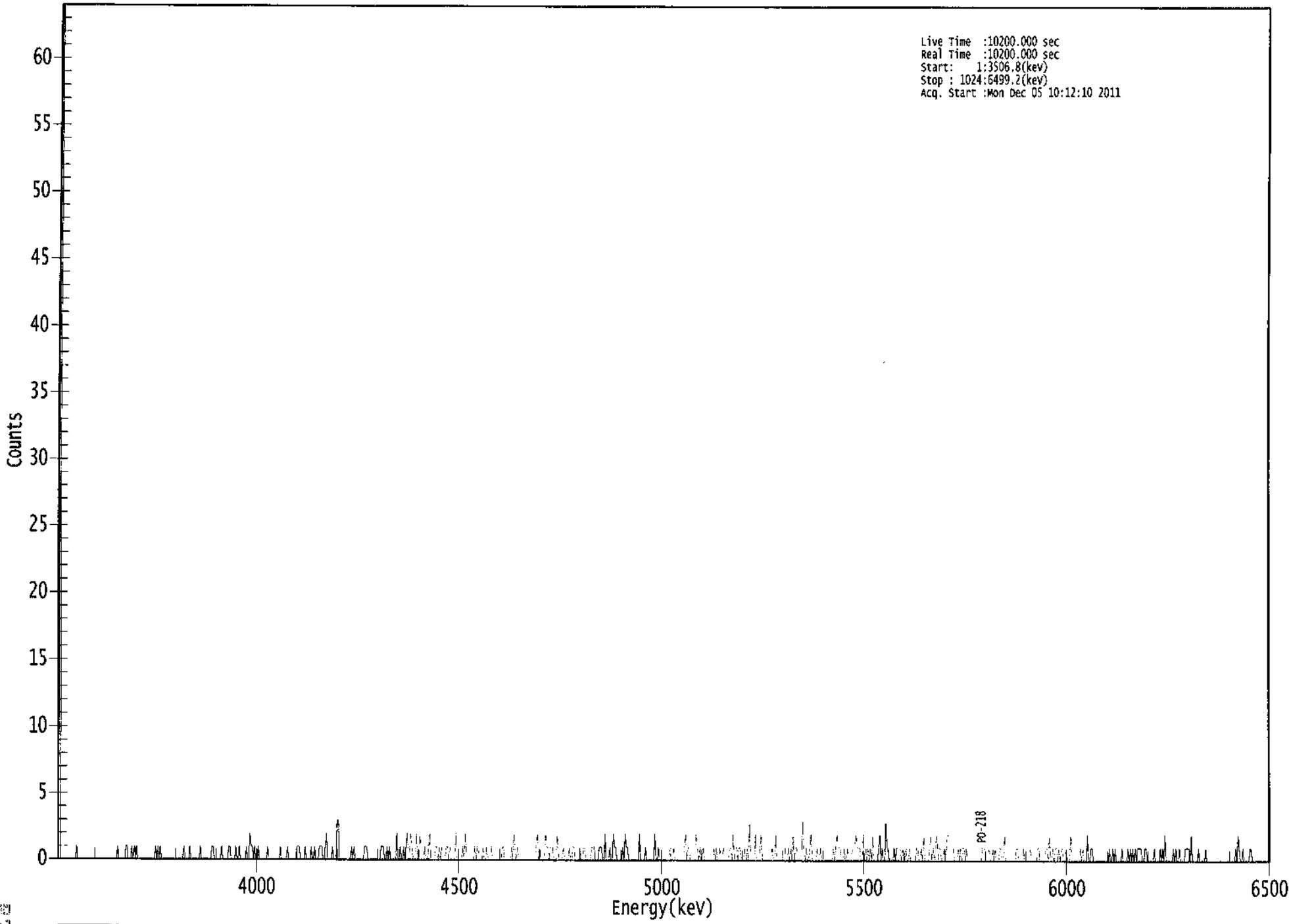
Nuclide	Energy (MeV)	Net Pk Area	Pk Area Error %	Ambient Backgnd	Reagent Backgnd	FWHM (keV)
PO-218	5.793	59.94	26.06	3.06	0.00E+000	2.9
RN-222	5.298	76.30	22.73	1.70	0.00E+000	2.9
RA-226	4.590	60.49	25.32	0.51	0.00E+000	2.9

NUCLIDE ANALYSIS RESULTS

Nuclide	Id Conf.	Energy (keV)	Activity (pCi/gram)	MDA (pCi/gram)
PO-218	0.972	6003.00*	8.15E-002 +/- 2.14E-002	1.21E-002 +/- 3.76E-004
RN-222	0.977	5490.00*	1.04E-001 +/- 2.38E-002	1.00E-002 +/- 3.09E-004
RA-226	0.976	4785.00*	8.22E-002 +/- 2.10E-002	7.13E-003 +/- 2.21E-004

AG
12/6/11

0000011580.CNF



ROI Type: 1

```
*****************************************************
*****   S P E C T R A L   D A T A   R E P O R T   *****
*****************************************************
```

Sample Title: 13

Elapsed Live time: 10200
Elapsed Real Time: 10200

Channel								
1:	10200	10200	0	0	0	0	0	0
9:	0	0	0	0	0	0	0	0
17:	1	0	0	0	0	0	0	0
25:	0	0	0	0	0	0	0	0
33:	0	0	0	0	0	0	0	0
41:	0	0	0	0	0	0	0	0
49:	0	0	0	1	0	0	0	0
57:	0	0	1	1	0	0	0	1
65:	0	1	0	1	0	0	0	0
73:	0	0	0	0	0	0	0	0
81:	0	0	0	1	0	1	0	1
89:	0	0	0	0	0	0	0	0
97:	0	0	0	0	0	0	0	0
105:	0	0	0	1	0	0	0	0
113:	1	0	0	0	0	0	0	0
121:	0	1	0	0	0	0	0	0
129:	0	0	0	1	1	0	0	0
137:	0	0	0	1	0	0	0	0
145:	0	1	1	0	0	0	0	1
153:	0	0	1	0	0	0	0	0
161:	1	0	0	2	1	1	0	1
169:	0	0	1	0	0	0	0	0
177:	0	0	1	0	0	0	0	0
185:	0	0	0	0	0	1	0	0
193:	0	0	0	1	0	0	0	0
201:	0	0	0	1	1	1	0	0
209:	0	0	1	0	0	0	0	1
217:	0	0	1	0	0	0	1	1
225:	1	0	0	1	2	0	0	0
233:	0	1	0	0	0	3	3	0
241:	0	0	0	0	0	0	0	0
249:	0	1	0	1	0	0	0	0
257:	0	0	0	0	1	1	1	0
265:	0	0	0	0	0	0	0	0
273:	0	0	1	1	1	0	0	1
281:	0	1	0	0	0	0	0	2
289:	0	0	1	0	0	1	0	1
297:	2	0	0	2	1	0	0	0
305:	2	0	0	2	0	0	0	1
313:	0	0	1	2	0	0	0	0
321:	1	1	0	1	0	1	0	0
329:	0	1	1	0	1	0	0	0
337:	0	2	0	0	0	0	0	1
345:	0	2	0	0	0	0	0	0
353:	0	1	0	1	1	0	0	0
361:	1	0	0	1	0	0	0	1

369:	0	0	0	0	0	0	0	0

Sample Title: 13

Channel								
377:	1	1	0	0	0	0	0	0
385:	1	0	2	1	0	1	0	0
393:	0	0	0	0	0	0	0	0
401:	0	0	0	0	0	1	2	0
409:	1	0	0	0	0	2	1	1
417:	0	1	1	1	0	0	0	2
425:	0	0	0	0	1	0	0	0
433:	0	1	0	0	1	1	0	0
441:	0	0	1	0	0	1	1	0
449:	0	0	0	0	1	1	1	0
457:	0	0	1	1	1	0	0	2
465:	0	0	0	1	0	0	2	1
473:	1	0	0	0	0	0	1	0
481:	2	1	1	0	0	0	0	0
489:	0	0	0	0	2	0	0	0
497:	0	1	0	0	0	0	0	0
505:	0	2	0	0	1	0	0	0
513:	0	0	0	0	0	0	1	0
521:	0	1	0	0	0	0	0	0
529:	0	0	1	2	0	1	1	0
537:	0	0	0	0	2	1	0	1
545:	0	0	1	0	0	0	0	0
553:	0	0	0	1	0	1	0	0
561:	1	0	0	1	0	0	0	0
569:	1	1	0	2	0	1	1	0
577:	1	1	0	0	0	1	0	1
585:	0	3	0	0	0	0	2	0
593:	0	0	1	2	0	0	0	0
601:	0	0	0	0	1	0	0	2
609:	0	0	0	0	0	0	0	1
617:	0	0	1	0	1	0	2	0
625:	1	1	0	0	0	0	3	1
633:	0	1	0	0	1	2	0	0
641:	0	0	1	0	0	1	0	0
649:	0	0	0	0	0	0	0	0
657:	1	0	1	2	1	1	1	0
665:	0	1	0	0	1	0	0	0
673:	1	1	1	2	1	1	1	0
681:	0	2	0	1	0	1	0	1
689:	0	2	0	0	0	0	1	2
697:	0	1	0	0	3	1	1	0
705:	0	0	0	1	0	1	1	1
713:	1	0	1	0	0	1	0	0
721:	1	0	0	0	0	0	1	1
729:	0	0	1	0	2	0	0	0
737:	0	1	2	0	1	0	1	2
745:	0	1	1	0	0	1	0	1
753:	2	2	0	0	0	1	0	0
761:	0	1	0	1	0	1	1	0
769:	1	0	0	0	0	0	0	0
777:	0	0	0	0	0	1	1	1
785:	0	0	0	1	0	0	1	0
793:	1	0	0	0	1	1	0	0

801:	2	0	0	0	0	0	0	0

Sample Title: 13

Channel								
809:	0	0	1	1	0	0	0	0
817:	1	0	0	0	0	0	1	0
825:	0	0	0	0	1	1	0	0
833:	0	0	0	1	1	0	2	0
841:	0	1	0	1	1	0	1	0
849:	1	1	0	0	1	0	0	0
857:	2	0	0	0	0	0	0	0
865:	1	0	1	0	0	0	2	0
873:	0	1	1	0	0	0	0	0
881:	0	0	0	0	0	0	0	0
889:	1	0	0	1	0	1	0	0
897:	0	0	0	1	0	0	0	0
905:	1	0	1	0	1	0	1	0
913:	1	1	1	1	0	0	1	1
921:	0	0	0	0	0	0	1	0
929:	0	0	0	1	0	1	0	2
937:	0	0	0	0	0	0	1	0
945:	1	0	0	1	0	0	0	0
953:	1	1	1	1	0	2	0	0
961:	0	0	0	1	0	0	0	0
969:	0	1	0	0	0	0	0	0
977:	0	0	0	0	0	0	0	0
985:	0	0	0	0	0	0	0	0
993:	0	0	1	0	2	1	0	0
1001:	1	0	0	0	0	0	1	1
1009:	0	0	0	0	0	0	0	0
1017:	0	0	0	0	0	0	0	0

12/5/2011 8:49:26 AM

Apex-Alpha™

QA SUMMARY REPORT
Review Of QA Results - Pulser Check

Date : 12/5/2011
Time : 8:49:26 AM

CHAMBER	DEVICE	PARAMETER	FLAG	DATE
Alpha_010	AIM21F	ALL	Passed	12/5/2011 8:34:47 AM
Alpha_011	AIM21F	ALL	Passed	12/5/2011 8:34:48 AM
Alpha_012	AIM21F	ALL	Passed	12/5/2011 8:34:49 AM
Alpha_013	AIM21F	ALL	Passed	12/5/2011 8:34:50 AM
Alpha_014	AIM21F	ALL	Passed	12/5/2011 8:34:51 AM
Alpha_015	AIM21F	ALL	Passed	12/5/2011 8:34:52 AM
Alpha_017	AIM730	ALL	Passed	12/5/2011 8:34:53 AM
Alpha_018	AIM730	ALL	Passed	12/5/2011 8:34:54 AM
Alpha_021	AIM730	ALL	Passed	12/5/2011 8:34:55 AM
Alpha_024	AIM730	ALL	Passed	12/5/2011 8:34:56 AM
Alpha_026	AIM730	ALL	Passed	12/5/2011 8:34:57 AM
Alpha_027	AIM730	ALL	Passed	12/5/2011 8:34:58 AM
Alpha_028	AIM730	ALL	Passed	12/5/2011 8:34:59 AM
Alpha_029	AIM730	ALL	Passed	12/5/2011 8:35:00 AM
Alpha_030	AIM730	ALL	Passed	12/5/2011 8:35:00 AM
Alpha_031	AIM730	ALL	Passed	12/5/2011 8:35:01 AM
Alpha_033	Alpha Analyst100DC	ALL	Not Done	
Alpha_034	Alpha Analyst100DC	Peak CPS	Action	12/5/2011 8:35:04 AM
Alpha_035	Alpha Analyst100DC	Peak FWHM	Action	12/4/2011 9:18:31 AM
Alpha_036	Alpha Analyst100DC	ALL	Not Done	
Alpha_037	Alpha Analyst100DC	Peak CPS	Action	12/5/2011 8:35:09 AM
Alpha_038	Alpha Analyst100DC	ALL	Not Done	
Alpha_039	Alpha Analyst100DC	ALL	Passed	12/4/2011 8:19:13 PM
Alpha_040	Alpha Analyst100DC	Peak CPS	Action	12/5/2011 8:35:14 AM
Alpha_041	Alpha Analyst100DC	ALL	Not Done	
Alpha_042	Alpha Analyst100DC	Peak CPS	Action	12/5/2011 8:35:17 AM
Alpha_043	Alpha Analyst100DC	ALL	Not Done	
Alpha_044	Alpha Analyst100DC	Peak CPS	Action	12/5/2011 8:35:21 AM
Alpha_045	Alpha Analyst100DC	ALL	Passed	12/5/2011 8:35:22 AM
Alpha_046	Alpha Analyst100DC	ALL	Passed	12/5/2011 8:35:24 AM
Alpha_047	Alpha Analyst100DC	ALL	Passed	12/5/2011 8:35:26 AM
Alpha_048	Alpha Analyst100DC	ALL	Passed	12/5/2011 8:35:28 AM

APPROVED BY: AG

APPROVAL DATE: 12/5/11

SECTION X

ANALYTICAL DATA (RADIUM-228)

11-11163
Ra228
Run 1

Work Order	11-11163
Analysis Code	Ra228
Run	1
Date Received	11/29/2011
Lab Deadline	12/9/2011
Client	Foxfire Scientific, Inc.
Project	ALCOA - TT ESL
Report Level	4
Activity Units	pCi
Aliquot Units	g
Matrix	SO
Method	EPA 904.0 Modified
Instrument Type	Alpha/Beta GPC
Radiometric Tracer	Ba-133
Radiometric Sol#	Ba-6a
Tracer Act (dpm/g)	1107.069
Carrier	Yttirum
Carrier Conc (mg/ml)	30

Internal Fraction	Sample Desc	Client ID	Login CPM	Sample Date	Sample Aliquot
01	LCS	LCS		11/29/11 00:00	1.0000E+00
02	MBL	BLANK		11/29/11 00:00	1.0000E+00
03	DUP	CORE 1 0-1	89	11/28/11 00:00	1.0003E+00
04	DO	CORE 1 0-1	89	11/28/11 00:00	1.0198E+00
05	TRG	CORE 2 11-12	78	11/28/11 00:00	1.0075E+00
06	TRG	CORE 3 2-3	85	11/28/11 00:00	1.0100E+00
07	TRG	CORE 4 4-5	95	11/28/11 00:00	1.0138E+00
08	TRG	CORE 5 4-5	55	11/28/11 00:00	1.0043E+00
09	TRG	CORE 6 10-11	83	11/28/11 00:00	1.0845E+00
10	TRG	CORE 7 5-6	61	11/28/11 00:00	1.0014E+00
11	TRG	CORE 8 2-3	75	11/28/11 00:00	1.0046E+00
12	TRG	CORE 9 5-6	74	11/28/11 00:00	1.0446E+00
13	TRG	CORE 10 8-9	91	11/28/11 00:00	1.0118E+00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
Ra228
Run 1

Internal Fraction	Sample Desc	Tracer Aliquot (g)	Tracer Total ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	Grav Carrier Added (ml)	Grav Filter Tare (g)	Grav Filter Final (g)	Grav Filter Net (g)	Grav % Rec	Mean % Rec	SAF 1*	SAF 2*
01	LCS	0.9082	1005.4	488.7	107.90	2.000	0.0954	0.1497	0.0543	90.50	97.65	1.00	1.00
02	MBL	0.9082	1005.4	486.4	107.40	2.000	0.0961	0.1523	0.0562	93.67	100.59	1.00	1.00
03	DUP	0.9080	1005.2	429.1	94.77	2.000	0.0956	0.1504	0.0548	91.33	86.55	1.00	1.00
04	DO	0.9072	1004.3	416.7	92.11	2.000	0.0956	0.1501	0.0545	90.83	83.67	1.00	1.00
05	TRG	0.9074	1004.6	420.5	92.93	2.000	0.0960	0.1508	0.0548	91.33	84.87	1.00	1.00
06	TRG	0.9067	1003.8	380.2	84.09	2.000	0.0958	0.1519	0.0561	93.50	78.62	1.00	1.00
07	TRG	0.9065	1003.6	346.5	76.65	2.000	0.0957	0.1505	0.0548	91.33	70.01	1.00	1.00
08	TRG	0.9065	1003.6	424.2	93.84	2.000	0.0959	0.1508	0.0549	91.50	85.86	1.00	1.00
09	TRG	0.9062	1003.2	400.3	88.58	2.000	0.0961	0.1502	0.0541	90.17	79.87	1.00	1.00
10	TRG	0.9068	1003.9	448.6	99.20	2.000	0.0954	0.1506	0.0552	92.00	91.27	1.00	1.00
11	TRG	0.9063	1003.3	356.7	78.92	2.000	0.0960	0.1507	0.0547	91.17	71.95	1.00	1.00
12	TRG	0.9060	1003.0	461.8	102.21	2.000	0.0959	0.1513	0.0554	92.33	94.38	1.00	1.00
13	TRG	0.9044	1001.2	345.8	76.67	2.000	0.0960	0.1511	0.0551	91.83	70.41	1.00	1.00

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

11-11163
Ra228
Run 1

Internal Fraction	Sample Desc	Rough Prep Date	Rough Prep By	Prep Date	Prep By	Sep t0 Date/Time	Sep t0 By	Sep t1 Date/Time	Sep t1 By
01	LCS			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
02	MBL			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
03	DUP			11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
04	DO	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
05	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
06	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
07	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
08	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
09	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
10	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
11	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
12	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH
13	TRG	11/30/11 07:26	KSALLINGS	11/30/11 07:05	JBARNARD	12/02/11 12:27	TSMITH	12/13/11 06:19	TSMITH

* SAF1 is used for Gross Alpha and all other radionuclides. SAF2 is used for Gross Beta only. ** Actual mass exceeded the calibration curve range. Results should be qualified as appropriate.

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Client Identification	Activity Units	Results	Error Estimate	MDA	LCS Known	LCS %R	LCS Flag	RPD Flag	MDA Flag	Blank Flag
01	RA-228	LCS	LCS	pCi/g	3.66E+01	1.46E+00	9.66E-01	3.60E+01	101.59	OK		OK	
02	RA-228	MBL	BLANK	pCi/g	5.75E-01	4.60E-01	9.16E-01					OK	OK
03	RA-228	DUP	CORE 1 0-1	pCi/g	9.77E+00	9.61E-01	1.23E+00				OK	OK	
04	RA-228	DO	CORE 1 0-1	pCi/g	1.10E+01	9.59E-01	1.09E+00					OK	
05	RA-228	TRG	CORE 2 11-12	pCi/g	7.52E+00	8.54E-01	1.11E+00					OK	
06	RA-228	TRG	CORE 3 2-3	pCi/g	1.04E+01	1.07E+00	1.45E+00					OK	
07	RA-228	TRG	CORE 4 4-5	pCi/g	1.31E+01	1.22E+00	1.53E+00					OK	
08	RA-228	TRG	CORE 5 4-5	pCi/g	1.78E+00	6.72E-01	1.25E+00					OK	
09	RA-228	TRG	CORE 6 10-11	pCi/g	3.83E+00	7.97E-01	1.31E+00					OK	
10	RA-228	TRG	CORE 7 5-6	pCi/g	1.07E+00	5.84E-01	1.12E+00					OK	
11	RA-228	TRG	CORE 8 2-3	pCi/g	7.14E+00	1.00E+00	1.41E+00					OK	
12	RA-228	TRG	CORE 9 5-6	pCi/g	1.45E+00	5.99E-01	1.12E+00					OK	
13	RA-228	TRG	CORE 10 8-9	pCi/g	7.81E+00	1.02E+00	1.38E+00					OK	

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Sample Date	Sample Aliquot	Radiometric % Rec	Grav % Rec	Mean % Rec	SAF	Sep t0 Date/Time	Sep t1 Date/Time
01	RA-228	LCS	11/29/11 00:00	1.00E+00	107.90	90.50	97.65	1.00	12/2/2011 12:27	12/13/2011 6:19
02	RA-228	MBL	11/29/11 00:00	1.00E+00	107.40	93.67	100.59	1.00	12/2/2011 12:27	12/13/2011 6:19
03	RA-228	DUP	11/28/11 00:00	1.00E+00	94.77	91.33	86.55	1.00	12/2/2011 12:27	12/13/2011 6:19
04	RA-228	DO	11/28/11 00:00	1.02E+00	92.11	90.83	83.67	1.00	12/2/2011 12:27	12/13/2011 6:19
05	RA-228	TRG	11/28/11 00:00	1.01E+00	92.93	91.33	84.87	1.00	12/2/2011 12:27	12/13/2011 6:19
06	RA-228	TRG	11/28/11 00:00	1.01E+00	84.09	93.50	78.62	1.00	12/2/2011 12:27	12/13/2011 6:19
07	RA-228	TRG	11/28/11 00:00	1.01E+00	76.65	91.33	70.01	1.00	12/2/2011 12:27	12/13/2011 6:19
08	RA-228	TRG	11/28/11 00:00	1.00E+00	93.84	91.50	85.86	1.00	12/2/2011 12:27	12/13/2011 6:19
09	RA-228	TRG	11/28/11 00:00	1.08E+00	88.58	90.17	79.87	1.00	12/2/2011 12:27	12/13/2011 6:19
10	RA-228	TRG	11/28/11 00:00	1.00E+00	99.20	92.00	91.27	1.00	12/2/2011 12:27	12/13/2011 6:19
11	RA-228	TRG	11/28/11 00:00	1.00E+00	78.92	91.17	71.95	1.00	12/2/2011 12:27	12/13/2011 6:19
12	RA-228	TRG	11/28/11 00:00	1.04E+00	102.21	92.33	94.38	1.00	12/2/2011 12:27	12/13/2011 6:19
13	RA-228	TRG	11/28/11 00:00	1.01E+00	76.67	91.83	70.41	1.00	12/2/2011 12:27	12/13/2011 6:19

Preliminary Data Report & Analytical Calculations
Work Order: 11-11163-Ra228-1

Client: Foxfire Scientific, Inc.
Eberline Services Work Order: 11-11163
Analysis Code: Ra228
Run: 1

Lab Fraction	Nuclide	Sample Desc	Counting Date/Time	Halflife (days)	Detect	Carrier	Count Time	Counts	Bkg CPM	Eff
01	RA-228	LCS	12/13/11 10:01		LB4110R	B1	120	2787	1.15	0.4754
02	RA-228	MBL	12/13/11 10:01		LB4110R	B2	120	168	1.05	0.4658
03	RA-228	DUP	12/13/11 10:01		LB4110R	B3	120	798	1.466666667	0.4713
04	RA-228	DO	12/13/11 10:01		LB4110R	B4	120	832	1.116666667	0.4773
05	RA-228	TRG	12/13/11 10:01		LB4110R	C1	120	610	1.15	0.4705
06	RA-228	TRG	12/13/11 10:01		LB4110R	C2	120	802	1.683333333	0.4676
07	RA-228	TRG	12/13/11 10:01		LB4110R	C3	120	844	1.45	0.4614
08	RA-228	TRG	12/13/11 10:01		LB4110R	C4	120	293	1.5	0.4714
09	RA-228	TRG	12/13/11 10:56		LB4110A	C1	120	376	1.316666667	0.4667
10	RA-228	TRG	12/13/11 10:56		LB4110A	C2	120	185	1.016666667	0.4578
11	RA-228	TRG	12/13/11 10:56		LB4110A	C3	120	469	1.066666667	0.4699
12	RA-228	TRG	12/13/11 10:56		LB4110A	D2	120	244	1.25	0.4682
13	RA-228	TRG	12/13/11 10:56		LB4110A	D4	120	491	1	0.4741

Count Room Report
Client: Foxfire Scientific, Inc.

11-11163-Ra228-1 (pCi/g) in SO
Tracer ID: Ba-6a

Internal Fraction	Sample Desc	Client ID	Sample Date	Sample Aliquot	Tracer Aliquot (g)	Tracer ACT (dpm)	Radiometric Tracer (pCi)	Radiometric % Rec	SAF 1*	SAF 2*
01	LCS	LCS	11/29/11 00:00	1.0000	0.9082	1005.4401	488.7000	107.90	1.00	1.00
02	MBL	BLANK	11/29/11 00:00	1.0000	0.9082	1005.4401	486.4000	107.40	1.00	1.00
03	DUP	CORE 1 0-1	11/28/11 00:00	1.0003	0.9080	1005.2187	429.1000	94.77	1.00	1.00
04	DO	CORE 1 0-1	11/28/11 00:00	1.0198	0.9072	1004.3330	416.7000	92.11	1.00	1.00
05	TRG	CORE 2 11-12	11/28/11 00:00	1.0075	0.9074	1004.5544	420.5000	92.93	1.00	1.00
06	TRG	CORE 3 2-3	11/28/11 00:00	1.0100	0.9067	1003.7795	380.2000	84.09	1.00	1.00
07	TRG	CORE 4 4-5	11/28/11 00:00	1.0138	0.9065	1003.5580	346.5000	76.65	1.00	1.00
08	TRG	CORE 5 4-5	11/28/11 00:00	1.0043	0.9065	1003.5580	424.2000	93.84	1.00	1.00
09	TRG	CORE 6 10-11	11/28/11 00:00	1.0845	0.9062	1003.2259	400.3000	88.58	1.00	1.00
10	TRG	CORE 7 5-6	11/28/11 00:00	1.0014	0.9068	1003.8902	448.6000	99.20	1.00	1.00
11	TRG	CORE 8 2-3	11/28/11 00:00	1.0046	0.9063	1003.3366	356.7000	78.92	1.00	1.00
12	TRG	CORE 9 5-6	11/28/11 00:00	1.0446	0.9060	1003.0045	461.8000	102.21	1.00	1.00
13	TRG	CORE 10 8-9	11/28/11 00:00	1.0118	0.9044	1001.2332	345.8000	76.67	1.00	1.00

Eberline Services
Oak Ridge Laboratory

Spike and Tracer Worksheet

Printed: 12/14/2011 9:59 AM

Internal Work Order	Run	Analysis Code	Date	Technician	Technician Initials	Witness Initials
11-11163	1	Ra228	12/14/2011 9:58	MMCDOUGALL		

LCS & Matrix Spikes					LCS	MS	LCSD	MSD	LCS		MS		LCSD		MSD	
Isotope	Sol #	Activity dpm/g	Solution Date	Approx Addition	Volume Used (g)	Volume Used (g)	Volume Used (g)	Volume Used (g)	Known pCi	Error Estimate	Added pCi	Error Estimate	Known pCi	Error Estimate	Added pCi	Error Estimate
Ra-228	Ra-11	45.899	12/14/2011	0.440	1.7412				36.00	1.836	0.00	0.000	0.00	0.000	0.00	0.000

Tracers

fraction	Isotope	Sol #	Activity dpm/g	Solution Date	Volume Used (g)	Approx Addition
01	Ba-133	Ba-6a	1104.266	12/14/2011	0.9082	0.9200
02	Ba-133	Ba-6a	1104.266	12/14/2011	0.9082	0.9200
03	Ba-133	Ba-6a	1104.266	12/14/2011	0.9080	0.9200
04	Ba-133	Ba-6a	1104.266	12/14/2011	0.9072	0.9200
05	Ba-133	Ba-6a	1104.266	12/14/2011	0.9074	0.9200
06	Ba-133	Ba-6a	1104.266	12/14/2011	0.9067	0.9200
07	Ba-133	Ba-6a	1104.266	12/14/2011	0.9065	0.9200
08	Ba-133	Ba-6a	1104.266	12/14/2011	0.9065	0.9200
09	Ba-133	Ba-6a	1104.266	12/14/2011	0.9062	0.9200
10	Ba-133	Ba-6a	1104.266	12/14/2011	0.9068	0.9200
11	Ba-133	Ba-6a	1104.266	12/14/2011	0.9063	0.9200
12	Ba-133	Ba-6a	1104.266	12/14/2011	0.9060	0.9200
13	Ba-133	Ba-6a	1104.266	12/14/2011	0.9044	0.9200

Balance Printer Tapes

Tracer	LCS
	Corrected LCS Addition [illegible] 12/14/11

Matrix Spike

Eberline Analytical
Oak Ridge Laboratory

Aliquot Worksheet

Work Order	Run	Analysis Code	Rpt Units	Lab Deadline	Technician
11-11163	1	Ra228	grams	12/9/2011	JBARNARD

Lab Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Muffle Data Ratio Post/Pre	Dilution Data No of Dils	Dil Factor	Ratio	Aliquot Data Aliquot	Net Equiv	MS Aliquot Data Aliquot	Net Equiv	H-3 Solids Only Water Added (ml)	H3 Dist Aliq
01	LCS	LCS					1.0000E+00	1.0000E+00				
02	BLANK	MBL					1.0000E+00	1.0000E+00				
03	CORE 1 0-1	DUP					1.0003E+00	1.0003E+00				
04	CORE 1 0-1	DO					1.0198E+00	1.0198E+00				
05	CORE 2 11-12	TRG					1.0075E+00	1.0075E+00				
06	CORE 3 2-3	TRG					1.0100E+00	1.0100E+00				
07	CORE 4 4-5	TRG					1.0138E+00	1.0138E+00				
08	CORE 5 4-5	TRG					1.0043E+00	1.0043E+00				
09	CORE 6 10-11	TRG					1.0845E+00	1.0845E+00				
10	CORE 7 5-6	TRG					1.0014E+00	1.0014E+00				
11	CORE 8 2-3	TRG					1.0046E+00	1.0046E+00				
12	CORE 9 5-6	TRG					1.0446E+00	1.0446E+00				
13	CORE 10 8-9	TRG					1.0118E+00	1.0118E+00				

Comments	

Technician: JB Date: 11/30/11

Eberline Services - Oak Ridge
Version 1.0 9/1999

Gravimetric Worksheet

Work Order	Run	Analysis Code	Gravimetric Carrier	Carrier Conc (mg/ml)	Technician
11-11163	1	Ra228	Yttirum	30.0000	TSMITH

TRetec Fraction	Foxfire Scientific, Inc. Client ID	Sample Type	Carrier Data: Carrier Added (ml)	Filter Data: Filter Tare (g)	Filter Data: Filter Final (g)	Filter Data: Filter Net (g)	Gravimetric: % Recovery
01	LCS	LCS	2.0000	0.0954	0.1497	0.0543	90.50
02	BLANK	MBL	2.0000	0.0961	0.1523	0.0562	93.67
03	DUP	DUP	2.0000	0.0956	0.1504	0.0548	91.33
04	CORE 1 0-1	DO	2.0000	0.0956	0.1501	0.0545	90.83
05	CORE 2 11-12	TRG	2.0000	0.0960	0.1508	0.0548	91.33
06	CORE 3 2-3	TRG	2.0000	0.0958	0.1519	0.0561	93.50
07	CORE 4 4-5	TRG	2.0000	0.0957	0.1505	0.0548	91.33
08	CORE 5 4-5	TRG	2.0000	0.0959	0.1508	0.0549	91.50
09	CORE 6 10-11	TRG	2.0000	0.0961	0.1502	0.0541	90.17
10	CORE 7 5-6	TRG	2.0000	0.0954	0.1506	0.0552	92.00
11	CORE 8 2-3	TRG	2.0000	0.0960	0.1507	0.0547	91.17
12	CORE 9 5-6	TRG	2.0000	0.0959	0.1513	0.0554	92.33
13	CORE 10 8-9	TRG	2.0000	0.0960	0.1511	0.0551	91.83

Technician: [illegible] Date: 12/13/11

Eberline Services - Oak Ridge
Prep Logbook
Version 2.0 8/1999

Rough Sample Preparation Log Book

Work Order	Lab Deadline	Date Received in Prep	Date Sealed	Date Returned	Technician
11-11163	12/9/2011	11/29/2011	11/30/2011	12/1/2011	KSALLINGS

Eberline Fraction	Foxfire Scientific, Inc. Client ID	Tare (g) Pan Wt	Gross (g) Wet Wt.	Gross (g) Dry Wt.	Net (g) Wet Wt.	Net (g) Dry Wt.	Percent Liquid	Percent Solid	Gamma Dry Wt.	Gamma LEPS Wt.	Special Info
04	CORE 1 0-1	13.6600	460.7900	329.5100	447.1300	315.8500	29.36%	70.64%	0.0000	0.0000	
05	CORE 2 11-12	13.6700	313.6900	206.0800	300.0200	192.4100	35.87%	64.13%	0.0000	0.0000	
06	CORE 3 2-3	13.6600	304.7900	209.9400	291.1300	196.2800	32.58%	67.42%	0.0000	0.0000	
07	CORE 4 4-5	13.6200	260.5100	177.5100	246.8900	163.8900	33.62%	66.38%	0.0000	0.0000	
08	CORE 5 4-5	13.6100	314.6400	258.2700	301.0300	244.6600	18.73%	81.27%	0.0000	0.0000	
09	CORE 6 10-11	13.6500	234.5200	206.5800	220.8700	192.9300	12.65%	87.35%	0.0000	0.0000	
10	CORE 7 5-6	13.6400	330.9100	243.8100	317.2700	230.1700	27.45%	72.55%	0.0000	0.0000	
11	CORE 8 2-3	13.7100	345.0700	226.6300	331.3600	212.9200	35.74%	64.26%	0.0000	0.0000	
12	CORE 9 5-6	13.6800	493.3800	377.2500	479.7000	363.5700	24.21%	75.79%	0.0000	0.0000	
13	CORE 10 8-9	13.6300	389.0700	275.1300	375.4400	261.5000	30.35%	69.65%	0.0000	0.0000	

Comments	
Special Codes	H: Hot, O: Organic Hazard, P: PCB Hazard, R: Rush, T: Other (see comments)

Technician: Kenny Sal

Date: Analysis: Rough Prep Logbook

Analysis: Ra228 Page No. 7866

12/13/11

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
B1	1111163-01	358	2787	120	1400	12/13/11 12:01
B2	1111163-02	11	168	120	1400	12/13/11 12:01
B3	1111163-03	16	798	120	1400	12/13/11 12:01
B4	1111163-04	14	832	120	1400	12/13/11 12:01
C1	1111163-05	11	610	120	1400	12/13/11 12:01
C2	1111163-06	9	802	120	1400	12/13/11 12:01
C3	1111163-07	15	844	120	1400	12/13/11 12:01
C4	1111163-08	12	293	120	1400	12/13/11 12:01

A
12/13/11
RB

Detector ID	Sample ID	Alpha	Beta	Count Time	Voltage	TOD
C1	1111163-09	16	376	120	1400	12/13/11 12:56
C2	1111163-10	15	185	120	1400	12/13/11 12:56
C3	1111163-11	18	469	120	1400	12/13/11 12:56
D2	1111163-12	12	244	120	1400	12/13/11 12:56
D4	1111163-13	12	491	120	1400	12/13/11 12:56

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

12/13/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/13/2011	0.00E+00	P	-2.53E+01	3.61E-01	2.60E+01
LB4110A - A2	Alpha	11/18/2007	12/13/2011	0.00E+00	P	-2.15E+01	3.43E-01	2.21E+01
LB4110A - A3	Alpha	11/18/2007	12/13/2011	0.00E+00	P	-2.09E+01	2.97E-01	2.15E+01
LB4110A - A4	Alpha	11/18/2007	12/13/2011	0.00E+00	P	-2.22E+01	3.22E-01	2.28E+01
LB4110A - B1	Alpha	11/18/2007	12/13/2011	3.33E-02	P	-1.16E-01	7.46E-02	2.65E-01
LB4110A - B2	Alpha	11/18/2007	12/13/2011	6.67E-02	P	-6.66E-02	7.18E-02	2.10E-01
LB4110A - B3	Alpha	11/18/2007	12/13/2011	8.33E-02	P	-5.90E-02	4.81E-02	1.55E-01
LB4110A - B4	Alpha	11/18/2007	12/13/2011	5.00E-02	P	-4.95E-02	5.97E-02	1.69E-01
LB4110A - C1	Alpha	11/18/2007	12/13/2011	3.33E-02	P	-6.40E-02	7.59E-02	2.16E-01
LB4110A - C2	Alpha	11/18/2007	12/13/2011	8.33E-02	P	-1.83E-01	9.76E-02	3.78E-01
LB4110A - C3	Alpha	11/18/2007	12/13/2011	1.17E-01	P	-2.06E-01	1.05E-01	4.15E-01
LB4110A - C4	Alpha	11/18/2007	12/13/2011	3.33E-02	P	-6.84E-02	7.25E-02	2.13E-01
LB4110A - D1	Alpha	11/18/2007	12/13/2011	8.33E-02	P	-5.93E-02	8.31E-02	2.25E-01
LB4110A - D2	Alpha	11/18/2007	12/13/2011	6.67E-02	P	-6.99E-02	6.10E-02	1.92E-01
LB4110A - D3	Alpha	11/18/2007	12/13/2011	1.00E-01	P	-4.80E-02	6.88E-02	1.86E-01
LB4110A - D4	Alpha	11/18/2007	12/13/2011	5.00E-02	P	-5.76E-02	7.34E-02	2.05E-01
LB4110R - A1	Alpha	11/24/2006	12/13/2011	2.83E-01	W	-1.13E-01	9.03E-02	2.94E-01
LB4110R - A2	Alpha	11/24/2006	12/13/2011	6.67E-02	P	-9.48E-02	8.48E-02	2.64E-01
LB4110R - A3	Alpha	11/24/2006	12/13/2011	1.67E-02	P	-8.11E-02	7.30E-02	2.27E-01
LB4110R - A4	Alpha	11/24/2006	12/13/2011	1.67E-02	P	-5.24E-02	7.77E-02	2.08E-01
LB4110R - B1	Alpha	11/24/2006	12/13/2011	1.67E-02	P	-1.07E-01	6.38E-02	2.34E-01
LB4110R - B2	Alpha	11/24/2006	12/13/2011	5.00E-02	P	-7.41E-02	6.91E-02	2.12E-01
LB4110R - B3	Alpha	11/24/2006	12/13/2011	1.17E-01	P	-6.84E-02	6.80E-02	2.04E-01
LB4110R - B4	Alpha	11/24/2006	12/13/2011	6.67E-02	P	-6.66E-02	7.57E-02	2.18E-01
LB4110R - C1	Alpha	11/24/2006	12/13/2011	5.00E-02	P	-8.40E-02	7.89E-02	2.42E-01
LB4110R - C2	Alpha	11/24/2006	12/13/2011	3.33E-02	P	-7.99E-02	7.74E-02	2.35E-01
LB4110R - C3	Alpha	11/24/2006	12/13/2011	5.00E-02	P	-9.71E-02	8.52E-02	2.67E-01
LB4110R - C4	Alpha	11/24/2006	12/13/2011	3.33E-02	P	-6.70E-02	8.66E-02	2.40E-01
LB4110R - D1	Alpha	11/24/2006	12/13/2011	6.67E-02	P	-8.27E-02	8.22E-02	2.47E-01
LB4110R - D2	Alpha	11/24/2006	12/13/2011	5.00E-02	P	-6.10E-02	8.19E-02	2.25E-01
LB4110R - D3	Alpha	11/24/2006	12/13/2011	3.33E-02	P	-5.72E-02	7.43E-02	2.06E-01
LB4110R - D4	Alpha	11/24/2006	12/13/2011	8.33E-02	P	-5.57E-02	8.81E-02	2.32E-01
LB5100 - 1	Alpha	7/10/2006	10/26/2007	5.00E-02	P	-1.56E-02	9.58E-02	2.07E-01

Eberline Analytical
Oak Ridge Laboratory

GPC Detector Report
(ALL Backgrounds)

12/13/11

Detector	Alpha/Beta	Calibration Date	Count Date	Bkg CPM	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/13/2011	8.67E-01	P	-4.12E+01	2.71E+00	4.66E+01
LB4110A - A2	Beta	11/18/2007	12/13/2011	9.00E-01	P	-3.50E+01	1.89E+00	3.88E+01
LB4110A - A3	Beta	11/18/2007	12/13/2011	1.05E+00	P	-3.59E+01	1.68E+00	3.93E+01
LB4110A - A4	Beta	11/18/2007	12/13/2011	1.15E+00	P	-3.73E+01	2.21E+00	4.17E+01
LB4110A - B1	Beta	11/18/2007	12/13/2011	1.45E+00	P	-7.44E+00	3.00E+00	1.34E+01
LB4110A - B2	Beta	11/18/2007	12/13/2011	1.03E+00	P	1.98E-01	1.40E+00	2.60E+00
LB4110A - B3	Beta	11/18/2007	12/13/2011	1.42E+00	P	2.65E-01	1.41E+00	2.56E+00
LB4110A - B4	Beta	11/18/2007	12/13/2011	1.28E+00	P	1.27E-01	1.38E+00	2.63E+00
LB4110A - C1	Beta	11/18/2007	12/13/2011	1.32E+00	P	-6.32E+00	2.44E+00	1.12E+01
LB4110A - C2	Beta	11/18/2007	12/13/2011	1.02E+00	P	3.33E-01	1.32E+00	2.30E+00
LB4110A - C3	Beta	11/18/2007	12/13/2011	1.07E+00	P	4.78E-01	1.53E+00	2.58E+00
LB4110A - C4	Beta	11/18/2007	12/13/2011	8.37E+00	F	-1.76E+00	2.31E+00	6.38E+00
LB4110A - D1	Beta	11/18/2007	12/13/2011	2.07E+00	P	-3.00E+00	2.68E+00	8.37E+00
LB4110A - D2	Beta	11/18/2007	12/13/2011	1.25E+00	P	-9.00E-01	1.62E+00	4.14E+00
LB4110A - D3	Beta	11/18/2007	12/13/2011	4.88E+00	P	7.25E-01	4.36E+00	8.00E+00
LB4110A - D4	Beta	11/18/2007	12/13/2011	1.00E+00	P	-6.13E-01	1.43E+00	3.47E+00
LB4110R - A1	Beta	11/24/2006	12/13/2011	9.30E+00	P	-7.00E+01	4.41E+00	7.88E+01
LB4110R - A2	Beta	11/24/2006	12/13/2011	9.00E-01	P	-5.58E+01	2.37E+00	6.05E+01
LB4110R - A3	Beta	11/24/2006	12/13/2011	1.27E+00	P	-5.15E+01	3.26E+00	5.80E+01
LB4110R - A4	Beta	11/24/2006	12/13/2011	1.13E+00	P	-5.16E+01	2.26E+00	5.61E+01
LB4110R - B1	Beta	11/24/2006	12/13/2011	1.15E+00	P	-5.42E+01	2.26E+00	5.88E+01
LB4110R - B2	Beta	11/24/2006	12/13/2011	1.05E+00	P	-5.42E+01	2.32E+00	5.88E+01
LB4110R - B3	Beta	11/24/2006	12/13/2011	1.47E+00	P	-5.38E+01	3.09E+00	6.00E+01
LB4110R - B4	Beta	11/24/2006	12/13/2011	1.12E+00	P	-5.44E+01	2.15E+00	5.86E+01
LB4110R - C1	Beta	11/24/2006	12/13/2011	1.15E+00	P	-5.39E+01	3.56E+00	6.10E+01
LB4110R - C2	Beta	11/24/2006	12/13/2011	1.68E+00	P	-5.42E+01	3.04E+00	6.02E+01
LB4110R - C3	Beta	11/24/2006	12/13/2011	1.45E+00	P	-5.46E+01	2.88E+00	6.04E+01
LB4110R - C4	Beta	11/24/2006	12/13/2011	1.50E+00	P	-6.16E+01	3.36E+00	6.83E+01
LB4110R - D1	Beta	11/24/2006	12/13/2011	7.12E+00	P	-5.04E+01	6.90E+00	6.42E+01
LB4110R - D2	Beta	11/24/2006	12/13/2011	1.20E+00	P	-5.51E+01	2.18E+00	5.95E+01
LB4110R - D3	Beta	11/24/2006	12/13/2011	3.52E+00	P	-5.84E+01	6.32E+00	7.11E+01
LB4110R - D4	Beta	11/24/2006	12/13/2011	1.32E+00	P	-5.48E+01	2.53E+00	5.99E+01
LB5100 - 1	Beta	7/10/2006	10/26/2007	4.52E+00	F	-3.19E-01	1.58E+00	3.48E+00

GPC Detector Report
(ALL Efficiencies)

121174

Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Alpha	11/18/2007	12/13/2011	0.0420	F	0.1151	0.2382	0.3612
LB4110A - A2	Alpha	11/18/2007	12/13/2011	0.0371	F	0.0997	0.2093	0.3189
LB4110A - A3	Alpha	11/18/2007	12/13/2011	0.0350	F	0.0993	0.2069	0.3145
LB4110A - A4	Alpha	11/18/2007	12/13/2011	0.0396	F	0.1055	0.2176	0.3297
LB4110A - B1	Alpha	11/18/2007	12/13/2011	0.2193	P	0.2064	0.2270	0.2475
LB4110A - B2	Alpha	11/18/2007	12/13/2011	0.2142	P	0.2088	0.2249	0.2410
LB4110A - B3	Alpha	11/18/2007	12/13/2011	0.2331	P	0.2259	0.2410	0.2561
LB4110A - B4	Alpha	11/18/2007	12/13/2011	0.2317	P	0.2224	0.2380	0.2537
LB4110A - C1	Alpha	11/18/2007	12/13/2011	0.2258	P	0.2102	0.2214	0.2326
LB4110A - C2	Alpha	11/18/2007	12/13/2011	0.2267	P	0.2050	0.2259	0.2468
LB4110A - C3	Alpha	11/18/2007	12/13/2011	0.2525	P	0.2374	0.2494	0.2614
LB4110A - C4	Alpha	11/18/2007	12/13/2011	0.2220	P	0.2061	0.2272	0.2482
LB4110A - D1	Alpha	11/18/2007	12/13/2011	0.2298	P	0.2190	0.2365	0.2540
LB4110A - D2	Alpha	11/18/2007	12/13/2011	0.2621	P	0.2449	0.2611	0.2773
LB4110A - D3	Alpha	11/18/2007	12/13/2011	0.2614	P	0.2464	0.2663	0.2861
LB4110A - D4	Alpha	11/18/2007	12/13/2011	0.1913	P	0.1784	0.2043	0.2302
LB4110R - A1	Alpha	11/24/2006	12/13/2011	0.2377	P	0.2043	0.2396	0.2748
LB4110R - A2	Alpha	11/24/2006	12/13/2011	0.2222	P	0.1949	0.2227	0.2505
LB4110R - A3	Alpha	11/24/2006	12/13/2011	0.2243	P	0.2003	0.2266	0.2528
LB4110R - A4	Alpha	11/24/2006	12/13/2011	0.2479	P	0.2184	0.2465	0.2746
LB4110R - B1	Alpha	11/24/2006	12/13/2011	0.2222	P	0.1881	0.2276	0.2670
LB4110R - B2	Alpha	11/24/2006	12/13/2011	0.2106	P	0.1817	0.2195	0.2573
LB4110R - B3	Alpha	11/24/2006	12/13/2011	0.2375	P	0.2073	0.2449	0.2824
LB4110R - B4	Alpha	11/24/2006	12/13/2011	0.2237	P	0.1978	0.2347	0.2716
LB4110R - C1	Alpha	11/24/2006	12/13/2011	0.2057	P	0.1872	0.2161	0.2449
LB4110R - C2	Alpha	11/24/2006	12/13/2011	0.2223	P	0.1988	0.2260	0.2532
LB4110R - C3	Alpha	11/24/2006	12/13/2011	0.2407	P	0.2084	0.2412	0.2740
LB4110R - C4	Alpha	11/24/2006	12/13/2011	0.2130	P	0.1942	0.2269	0.2596
LB4110R - D1	Alpha	11/24/2006	12/13/2011	0.2277	P	0.1982	0.2285	0.2588
LB4110R - D2	Alpha	11/24/2006	12/13/2011	0.2566	P	0.2296	0.2592	0.2889
LB4110R - D3	Alpha	11/24/2006	12/13/2011	0.2511	P	0.2256	0.2536	0.2816
LB4110R - D4	Alpha	11/24/2006	12/13/2011	0.1963	P	0.1747	0.2068	0.2389
LB5100 - 1	Alpha	7/10/2006	10/26/2007	0.3368	P	0.3332	0.3455	0.3578

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GPC Detector Report
(ALL Efficiencies)

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Detector	Alpha/Beta	Calibration Date	Count Date	Eff	PFW	LCL	Mean	UCL
LB4110A - A1	Beta	11/18/2007	12/13/2011	0.5269	P	0.4751	0.5783	0.6815
LB4110A - A2	Beta	11/18/2007	12/13/2011	0.4515	P	0.4107	0.5114	0.6122
LB4110A - A3	Beta	11/18/2007	12/13/2011	0.4516	P	0.4208	0.5167	0.6126
LB4110A - A4	Beta	11/18/2007	12/13/2011	0.4757	P	0.4408	0.5387	0.6366
LB4110A - B1	Beta	11/18/2007	12/13/2011	0.5150	P	0.4928	0.5335	0.5742
LB4110A - B2	Beta	11/18/2007	12/13/2011	0.5098	P	0.4929	0.5315	0.5701
LB4110A - B3	Beta	11/18/2007	12/13/2011	0.5341	P	0.5058	0.5494	0.5930
LB4110A - B4	Beta	11/18/2007	12/13/2011	0.5313	P	0.5226	0.5541	0.5856
LB4110A - C1	Beta	11/18/2007	12/13/2011	0.5025	P	0.4802	0.5031	0.5261
LB4110A - C2	Beta	11/18/2007	12/13/2011	0.5047	P	0.4402	0.5029	0.5656
LB4110A - C3	Beta	11/18/2007	12/13/2011	0.5879	P	0.5647	0.5881	0.6114
LB4110A - C4	Beta	11/18/2007	12/13/2011	0.5160	P	0.4798	0.5289	0.5780
LB4110A - D1	Beta	11/18/2007	12/13/2011	0.5526	P	0.5120	0.5618	0.6115
LB4110A - D2	Beta	11/18/2007	12/13/2011	0.5695	P	0.5211	0.5994	0.6777
LB4110A - D3	Beta	11/18/2007	12/13/2011	0.6053	P	0.5660	0.6199	0.6738
LB4110A - D4	Beta	11/18/2007	12/13/2011	0.4508	P	0.4167	0.4845	0.5523
LB4110R - A1	Beta	11/24/2006	12/13/2011	0.5508	P	0.4812	0.5697	0.6581
LB4110R - A2	Beta	11/24/2006	12/13/2011	0.5176	P	0.4165	0.5087	0.6009
LB4110R - A3	Beta	11/24/2006	12/13/2011	0.5261	P	0.4647	0.5447	0.6248
LB4110R - A4	Beta	11/24/2006	12/13/2011	0.6025	P	0.5095	0.5914	0.6733
LB4110R - B1	Beta	11/24/2006	12/13/2011	0.5266	P	0.4554	0.5466	0.6379
LB4110R - B2	Beta	11/24/2006	12/13/2011	0.5116	P	0.4322	0.5239	0.6155
LB4110R - B3	Beta	11/24/2006	12/13/2011	0.5817	P	0.5009	0.5913	0.6817
LB4110R - B4	Beta	11/24/2006	12/13/2011	0.5398	P	0.4695	0.5554	0.6412
LB4110R - C1	Beta	11/24/2006	12/13/2011	0.4885	P	0.4259	0.5049	0.5839
LB4110R - C2	Beta	11/24/2006	12/13/2011	0.5261	P	0.4519	0.5315	0.6112
LB4110R - C3	Beta	11/24/2006	12/13/2011	0.5772	P	0.4804	0.5732	0.6661
LB4110R - C4	Beta	11/24/2006	12/13/2011	0.5093	P	0.4456	0.5349	0.6242
LB4110R - D1	Beta	11/24/2006	12/13/2011	0.5347	P	0.4635	0.5453	0.6272
LB4110R - D2	Beta	11/24/2006	12/13/2011	0.6068	P	0.5231	0.6110	0.6989
LB4110R - D3	Beta	11/24/2006	12/13/2011	0.5952	P	0.5081	0.5909	0.6737
LB4110R - D4	Beta	11/24/2006	12/13/2011	0.4604	P	0.4039	0.4920	0.5802
LB5100 - 1	Beta	7/10/2006	10/26/2007	0.4428	F	0.4555	0.4731	0.4906

SECTION XI

BARIUM-133 ANALYTICAL TRACER DATA

KB 12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 11:36:33.01

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116301_GE5_BAFIL_171799.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : SPIKE
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 11:21:16.
Sample ID : 1111163-01 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.15 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	11.13	14	9	0.14	112.44	105	15	1.58E-02	56.6	
2	0	13.17	12	13	0.17	131.92	124	13	1.33E-02	68.3	
3	0	18.86	6	8	0.10	186.53	180	9	6.43E-03	101.2	
4	0	21.20	77	48	0.66	208.95	202	17	8.60E-02	25.1	
5	0	31.00	2259	75	0.75	302.90	291	28	2.51E+00	2.4	
6	3	35.13	477	23	0.71	342.47	330	39	5.29E-01	5.3	2.11E+00
7	3	36.23	73	4	0.60	353.00	330	39	8.09E-02	25.4	
8	0	52.95	83	19	0.52	513.35	501	23	9.19E-02	16.0	
9	0	61.91	305	42	0.74	599.21	585	28	3.39E-01	7.6	
10	2	66.09	96	26	0.81	639.38	626	25	1.06E-01	16.9	2.06E+00
11	2	66.58	46	23	0.67	644.00	626	25	5.07E-02	29.2	
12	2	79.81	67	10	0.81	770.86	763	34	7.44E-02	15.5	9.06E-01
13	2	81.25	968	13	0.66	784.66	763	34	1.08E+00	3.3	
14	7	110.89	13	9	0.35	1068.89	1067	25	1.48E-02	35.2	1.32E+00
15	7	112.18	224	29	0.87	1081.22	1067	25	2.49E-01	8.6	
16	0	116.57	48	35	0.97	1123.31	1111	21	5.36E-02	29.7	
17	0	239.37	12	13	0.59	2300.72	2289	19	1.28E-02	66.5	
18	1	276.22	12	4	0.93	2654.00	2647	22	1.28E-02	57.6	1.64E+00
19	1	276.85	51	4	0.93	2660.00	2647	22	5.65E-02	16.0	
20	0	303.57	117	0	0.45	2916.20	2902	24	1.30E-01	9.2	
21	0	334.63	58	6	0.47	3213.99	3199	24	6.44E-02	15.6	
22	2	356.83	428	7	0.96	3426.88	3412	32	4.76E-01	5.1	2.07E+00
23	2	357.37	73	6	1.00	3432.00	3412	32	8.10E-02	29.4	
24	5	384.84	116	7	1.28	3695.36	3679	26	1.29E-01	9.2	7.37E+00
25	5	385.53	17	2	0.67	3701.98	3679	26	1.92E-02	26.1	
26	0	387.70	153	14	0.80	3722.78	3708	25	1.70E-01	9.6	
27	0	391.95	38	5	1.62	3763.59	3749	25	4.21E-02	20.9	

Sample ID : 1111163-01 Acquisition date : 4-DEC-2011 11:21:16

Total number of lines in spectrum	27	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	7	25.93%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.886E+02	4.887E+02	0.814E+02	16.65	
		Total Activity :	4.886E+02	4.887E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.020E+00	1.020E+00	1.155E+00	113.31	
PA-234	4.47E+09Y	1.00	3.581E+00	3.581E+00	1.805E+00	50.40	
TH-234	4.47E+09Y	1.00	2.757E+02	2.757E+02	0.437E+02	15.84	
		Total Activity :	2.803E+02	2.803E+02			

Grand Total Activity : 7.689E+02 7.690E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-01
Acquisition date : 4-DEC-2011 11:21:16

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.886E+02	4.887E+02	16.65	OK
	302.84	17.80	2.575E+00	7.664E+02	7.665E+02	32.23	OK
	356.01	60.00	4.312E+00	4.973E+02	4.973E+02	17.74	OK

Final Mean for 3 Valid Peaks = 4.887E+02+/- 8.138E+01 (16.65%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.020E+00	1.020E+00	113.31	OK
	10.11	20.20	1.000E+02	2.120E+00	2.120E+00	113.31	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	5.940E+03	5.940E+03	30.65	OK

Final Mean for 3 Valid Peaks = 1.020E+00+/- 1.155E+00 (113.31%)

PA-234	9.89	89.00	1.000E+02	4.812E-01	4.812E-01	113.31	OK
	21.72	64.90*	1.000E+02	3.581E+00	3.581E+00	50.40	OK
	37.93	23.75	1.000E+02	9.205E+00	9.205E+00	51.00	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.581E+00+/- 1.805E+00 (50.40%)

TH-234	63.29	3.80*	8.750E+01	2.757E+02	2.757E+02	15.84	OK

Final Mean for 1 Valid Peaks = 2.757E+02+/- 4.366E+01 (15.84%)

Flag: "*" = Keyline

Sample ID : 1111163-01 Acquisition date : 4-DEC-2011 11:21:16

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.887E+02	8.138E+01	1.400E+01	2.061E+00	34.914
PA-231	1.020E+00	1.155E+00	2.049E+00	2.306E-02	0.498
PA-234	3.581E+00	1.805E+00	1.124E+00	1.265E-02	3.186
TH-234	2.757E+02	4.366E+01	2.489E+01	3.202E-01	11.075

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	4.057E+00		1.295E+01	2.550E+01	8.643E+00	0.159
CD-109	8.400E+01		1.080E+02	2.126E+02	2.046E+01	0.395
NP-237	-3.615E+01		3.000E+01	4.565E+01	4.026E+00	-0.792
AM-241	-2.925E-01		1.760E+00	2.562E+00	2.884E-02	-0.114

ICB 12/1/14

VAX/VMS Peak Search Report Generated 4-DEC-2011 11:56:03.94

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116302_GE5_BAFIL_171803.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : BLANK
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 11:40:10.
Sample ID : 1111163-02 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.16 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	14.21	7	14	0.90	141.88	129	14	7.22E-03	127.8	
2	0	21.21	88	39	0.62	209.04	201	20	9.81E-02	22.0	
3	3	25.01	17	4	0.62	245.49	242	19	1.90E-02	29.8	1.35E+00
4	3	25.85	20	8	0.63	253.55	242	19	2.24E-02	39.3	
5	0	30.99	2270	87	0.74	302.77	290	31	2.52E+00	2.4	
6	1	35.12	434	27	0.66	342.44	332	27	4.82E-01	5.8	6.41E-01
7	1	36.06	80	4	0.66	351.42	332	27	8.91E-02	22.6	
8	0	53.40	63	61	1.53	517.70	496	29	6.98E-02	32.0	
9	0	61.95	289	30	0.67	599.60	584	30	3.21E-01	7.5	
10	0	66.20	95	38	0.68	640.35	630	23	1.05E-01	17.7	
11	2	79.82	62	26	0.72	770.98	759	37	6.87E-02	24.5	6.68E-01
12	2	81.26	963	12	0.68	784.74	759	37	1.07E+00	3.3	
13	0	102.57	20	15	1.10	989.13	978	19	2.24E-02	45.7	
14	0	112.14	237	36	0.85	1080.81	1068	22	2.64E-01	8.4	
15	1	116.12	47	11	0.75	1119.00	1111	25	5.25E-02	18.8	4.81E-01
16	1	117.13	25	3	0.82	1128.72	1111	25	2.79E-02	32.6	
17	0	276.96	44	7	0.22	2661.09	2650	21	4.86E-02	19.4	
18	5	303.43	98	3	0.86	2914.85	2903	24	1.09E-01	12.5	2.37E+00
19	5	304.17	55	0	0.95	2922.00	2903	24	6.10E-02	16.5	
20	0	334.46	66	8	0.34	3212.35	3198	24	7.28E-02	15.3	
21	0	356.81	457	9	0.91	3426.62	3410	29	5.08E-01	4.9	
22	0	384.75	117	0	0.88	3694.52	3679	30	1.30E-01	9.2	
23	1	387.30	75	15	1.02	3719.00	3709	28	8.34E-02	18.0	4.50E+00
24	1	387.93	145	15	1.02	3725.00	3709	28	1.61E-01	10.5	
25	2	391.79	54	0	1.02	3762.00	3751	23	5.96E-02	11.5	1.88E+00
26	2	392.42	16	0	1.01	3768.05	3751	23	1.77E-02	33.8	
27	0	415.54	36	0	0.70	3989.72	3977	23	4.00E-02	16.7	

Sample ID : 1111163-02 Acquisition date : 4-DEC-2011 11:40:10

Total number of lines in spectrum	27	
Number of unidentified lines	21	
Number of lines tentatively identified by NID	6	22.22%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.864E+02	4.864E+02	0.809E+02	16.63	
		Total Activity :	4.864E+02	4.864E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.613E+02	2.613E+02	0.406E+02	15.55	
		Total Activity :	2.613E+02	2.613E+02			

Grand Total Activity : 7.477E+02 7.477E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-02 Acquisition date : 4-DEC-2011 11:40:10

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.864E+02	4.864E+02	16.63	OK
	302.84	17.80	2.575E+00	6.398E+02	6.399E+02	36.32	OK
	356.01	60.00	4.312E+00	5.302E+02	5.302E+02	17.49	OK

Final Mean for 3 Valid Peaks = 4.864E+02+/- 8.091E+01 (16.63%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.613E+02	2.613E+02	15.55	OK

Final Mean for 1 Valid Peaks = 2.613E+02+/- 4.063E+01 (15.55%)

Flag: "*" = Keyline

Sample ID : 1111163-02 Acquisition date : 4-DEC-2011 11:40:10

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.864E+02	8.091E+01	1.261E+01	1.857E+00	38.561
TH-234	2.613E+02	4.063E+01	2.294E+01	2.951E-01	11.392

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-3.862E+00		1.635E+01	2.908E+01	9.857E+00	-0.133
CD-109	2.036E+01		1.011E+02	1.890E+02	1.819E+01	0.108
PA-231	-2.143E-01		8.575E-01	1.522E+00	1.713E-02	-0.141
PA-234	4.085E+00	+	1.805E+00	2.251E+00	2.534E-02	1.814
NP-237	8.115E+00		2.754E+01	5.204E+01	4.591E+00	0.156
AM-241	3.058E-01		1.730E+00	2.669E+00	3.005E-02	0.115

KB 12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 12:12:33.33

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116303_GE5_BAFIL_171805.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 1 0-1
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 11:57:16.
Sample ID : 1111163-03 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	21.01	53	36	0.64	207.17	200	17	5.93E-02	28.7	
2	0	25.35	18	8	0.46	248.73	243	14	2.04E-02	38.7	
3	0	31.00	2024	80	0.75	302.86	291	26	2.25E+00	2.5	
4	2	35.08	443	14	0.62	342.06	330	31	4.92E-01	5.5	1.40E+00
5	2	35.91	86	10	0.60	350.00	330	31	9.57E-02	26.7	
6	3	52.27	12	16	0.53	506.84	504	23	1.39E-02	42.8	2.54E+00
7	3	53.50	47	18	0.70	518.58	504	23	5.18E-02	25.1	
8	0	61.91	240	37	0.66	599.21	585	23	2.66E-01	8.4	
9	0	66.25	153	17	1.02	640.83	629	32	1.70E-01	10.5	
10	0	77.34	20	15	0.20	747.20	738	15	2.22E-02	42.6	
11	0	81.18	850	33	0.71	784.02	766	32	9.44E-01	3.8	
12	0	112.26	182	43	0.71	1082.03	1071	21	2.02E-01	10.8	
13	5	116.30	52	21	1.00	1120.72	1110	22	5.80E-02	23.5	1.90E+00
14	5	117.16	12	6	0.44	1129.00	1110	22	1.37E-02	33.5	
15	0	153.30	15	4	0.54	1475.45	1469	13	1.63E-02	36.3	
16	0	277.17	46	7	0.97	2663.10	2648	25	5.11E-02	18.5	
17	0	303.55	128	17	0.78	2916.03	2904	21	1.42E-01	10.9	
18	0	307.76	28	0	0.35	2956.39	2946	19	3.11E-02	18.9	
19	1	333.73	27	5	0.88	3205.38	3201	24	2.96E-02	14.6	6.08E-01
20	1	334.84	43	9	0.98	3216.00	3201	24	4.81E-02	19.5	
21	0	356.82	389	3	0.72	3426.72	3412	28	4.32E-01	5.2	
22	1	384.59	110	3	1.02	3693.00	3679	26	1.22E-01	8.9	4.25E+00
23	1	385.11	28	3	1.02	3698.00	3679	26	3.06E-02	32.3	
24	0	387.70	124	15	0.76	3722.81	3707	31	1.37E-01	11.4	

Sample ID : 1111163-03 Acquisition date : 4-DEC-2011 11:57:16

Total number of lines in spectrum	24	
Number of unidentified lines	19	
Number of lines tentatively identified by NID	5	20.83%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.290E+02	4.291E+02	0.732E+02	17.06	
		Total Activity :	4.290E+02	4.291E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.163E+02	2.163E+02	0.376E+02	17.39	
		Total Activity :	2.163E+02	2.163E+02			

Grand Total Activity : 6.453E+02 6.454E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-03 Acquisition date : 4-DEC-2011 11:57:16

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.290E+02	4.291E+02	17.06	OK
	302.84	17.80	2.575E+00	8.360E+02	8.361E+02	34.23	OK
	356.01	60.00	4.312E+00	4.512E+02	4.512E+02	17.78	OK

Final Mean for 3 Valid Peaks = 4.291E+02+/- 7.321E+01 (17.06%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.163E+02	2.163E+02	17.39	OK

Final Mean for 1 Valid Peaks = 2.163E+02+/- 3.761E+01 (17.39%)

Flag: "*" = Keyline

Sample ID : 1111163-03 Acquisition date : 4-DEC-2011 11:57:16

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.291E+02	7.321E+01	1.309E+01	1.928E+00	32.770
TH-234	2.163E+02	3.761E+01	1.941E+01	2.497E-01	11.143

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.064E+00		1.518E+01	2.863E+01	9.705E+00	0.072
CD-109	5.626E+01		9.402E+01	1.860E+02	1.790E+01	0.302
PA-231	1.289E-01		1.027E+00	1.890E+00	2.127E-02	0.068
PA-234	2.467E+00	+	1.418E+00	1.919E+00	2.160E-02	1.286
NP-237	-2.342E+01		2.803E+01	4.532E+01	3.998E+00	-0.517
AM-241	2.261E-01		1.677E+00	2.580E+00	2.904E-02	0.088

KB 12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 12:28:23.21

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116304_GE5_BAFIL_171806.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 1 0-1
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 12:13:04.
Sample ID : 1111163-04 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	6.96	36	6	1.66	72.44	61	24	3.98E-02	24.6	
2	0	16.47	10	12	0.29	163.55	159	9	1.12E-02	74.9	
3	1	20.68	21	25	0.56	204.00	198	19	2.33E-02	59.4	1.53E+00
4	1	21.21	76	25	0.56	209.00	198	19	8.42E-02	19.7	
5	0	31.00	2087	59	0.71	302.89	289	31	2.32E+00	2.5	
6	3	35.13	414	27	0.64	342.52	333	26	4.60E-01	5.8	1.62E+00
7	3	35.93	148	7	0.73	350.12	333	26	1.65E-01	14.7	
8	0	53.62	34	43	0.75	519.76	508	21	3.77E-02	45.3	
9	0	61.89	250	42	0.87	599.05	588	25	2.78E-01	8.6	
10	0	66.15	113	55	0.83	639.88	625	30	1.25E-01	18.7	
11	2	79.76	48	6	0.84	770.39	760	37	5.35E-02	21.3	8.95E-01
12	2	81.23	825	3	0.66	784.48	760	37	9.17E-01	3.5	
13	0	112.12	232	29	0.76	1080.66	1066	29	2.58E-01	8.6	
14	0	116.47	37	35	0.55	1122.35	1108	23	4.16E-02	38.2	
15	0	161.12	16	9	0.52	1550.40	1539	15	1.81E-02	40.5	
16	4	276.64	54	11	0.93	2658.00	2650	17	6.03E-02	16.0	1.41E+00
17	4	277.30	12	6	0.61	2664.36	2650	17	1.36E-02	36.9	
18	1	302.91	52	1	1.04	2909.91	2903	26	5.80E-02	16.3	6.93E-01
19	1	303.76	72	3	0.95	2918.00	2903	26	8.00E-02	16.0	
20	0	308.07	13	6	0.67	2959.35	2949	17	1.41E-02	44.8	
21	1	333.90	10	2	0.98	3207.00	3196	28	1.10E-02	85.8	2.51E+00
22	1	334.42	69	3	0.98	3212.00	3196	28	7.65E-02	12.6	
23	0	356.81	382	3	0.93	3426.62	3412	26	4.25E-01	5.2	
24	0	384.63	78	10	0.64	3693.34	3678	26	8.62E-02	14.7	
25	5	386.57	35	5	0.86	3712.01	3708	31	3.87E-02	13.0	3.11E+00
26	5	387.20	10	12	1.02	3718.00	3708	31	1.15E-02	126.2	
27	5	387.84	103	13	0.60	3724.18	3708	31	1.15E-01	13.4	
28	1	391.16	17	4	1.06	3756.02	3748	19	1.87E-02	38.2	1.02E+00
29	1	391.89	24	5	0.95	3762.98	3748	19	2.69E-02	21.0	

Sample ID : 1111163-04 Acquisition date : 4-DEC-2011 12:13:04

Total number of lines in spectrum	29	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	5	17.24%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.167E+02	4.167E+02	0.700E+02	16.81	
		Total Activity :	4.167E+02	4.167E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.261E+02	2.261E+02	0.401E+02	17.74	
		Total Activity :	2.261E+02	2.261E+02			

Grand Total Activity : 6.428E+02 6.428E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-04 Acquisition date : 4-DEC-2011 12:13:04

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.167E+02	4.167E+02	16.81	OK
	302.84	17.80	2.575E+00	3.421E+02	3.422E+02	41.88	OK
	356.01	60.00	4.312E+00	4.436E+02	4.437E+02	17.82	OK

Final Mean for 3 Valid Peaks = 4.167E+02+/- 7.004E+01 (16.81%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.261E+02	2.261E+02	17.74	OK

Final Mean for 1 Valid Peaks = 2.261E+02+/- 4.012E+01 (17.74%)

Flag: "*" = Keyline

Sample ID : 1111163-04 Acquisition date : 4-DEC-2011 12:13:04

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.167E+02	7.004E+01	1.463E+01	2.155E+00	28.478
TH-234	2.261E+02	4.012E+01	2.077E+01	2.672E-01	10.885

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-4.012E-01		1.548E+01	2.854E+01	9.675E+00	-0.014
CD-109	7.672E+01		1.032E+02	2.040E+02	1.963E+01	0.376
PA-231	1.125E-01		1.003E+00	1.665E+00	1.875E-02	0.068
PA-234	3.509E+00	+	1.393E+00	2.064E+00	2.323E-02	1.700
NP-237	-1.079E+01		2.540E+01	4.395E+01	3.877E+00	-0.246
AM-241	-8.638E-02		1.501E+00	2.256E+00	2.539E-02	-0.038

KB
12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 12:44:04.67

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116305_GE5_BAFIL_171809.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 2 11-12
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 12:28:47.
Sample ID : 1111163-05 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.12 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.15	10	6	0.11	131.74	124	12	1.15E-02	56.5	
2	0	21.16	86	29	0.58	208.57	202	16	9.56E-02	18.7	
3	0	31.00	1856	93	0.76	302.91	291	23	2.06E+00	2.7	
4	3	35.12	418	25	0.71	342.42	334	26	4.65E-01	5.7	2.15E+00
5	3	36.12	46	39	0.60	352.00	334	26	5.11E-02	45.3	
6	0	53.44	32	25	0.42	518.08	509	19	3.53E-02	38.2	
7	2	61.47	53	20	0.66	595.00	587	30	5.88E-02	31.4	1.71E+00
8	2	62.02	114	29	0.77	600.33	587	30	1.26E-01	16.6	
9	0	66.29	112	36	0.67	641.24	627	28	1.24E-01	16.1	
10	0	81.21	833	30	0.64	784.31	768	29	9.25E-01	3.8	
11	0	112.16	176	30	0.79	1081.04	1065	27	1.96E-01	10.3	
12	0	116.52	25	19	0.84	1122.81	1113	16	2.83E-02	38.0	
13	0	277.06	62	0	0.71	2662.06	2649	23	6.89E-02	12.7	
14	2	303.44	100	3	0.94	2914.91	2903	24	1.11E-01	10.7	9.54E-01
15	2	303.87	12	3	0.77	2919.09	2903	24	1.38E-02	81.6	
16	0	334.41	56	8	0.31	3211.92	3195	27	6.26E-02	17.6	
17	0	356.86	343	8	0.91	3427.10	3413	30	3.81E-01	5.7	
18	0	384.71	72	6	0.76	3694.17	3680	26	8.02E-02	13.8	
19	1	387.30	35	10	1.02	3719.00	3709	27	3.88E-02	33.6	2.68E+00
20	1	388.45	46	7	1.02	3730.00	3709	27	5.07E-02	21.0	
21	0	415.62	22	4	0.34	3990.46	3982	17	2.42E-02	27.2	

Sample ID : 1111163-05 Acquisition date : 4-DEC-2011 12:28:47

Total number of lines in spectrum	21	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	7	33.33%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.205E+02	4.205E+02	0.717E+02	17.05	
		Total Activity :	4.205E+02	4.205E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.028E+02	1.028E+02	0.343E+02	33.41	
AM-241	432.20Y	1.00	4.426E+00	4.426E+00	2.782E+00	62.85	
		Total Activity :	1.072E+02	1.072E+02			

Grand Total Activity : 5.277E+02 5.277E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-05 Acquisition date : 4-DEC-2011 12:28:47

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.205E+02	4.205E+02	17.05	OK
	302.84	17.80	2.575E+00	6.520E+02	6.521E+02	34.04	OK
	356.01	60.00	4.312E+00	3.983E+02	3.983E+02	18.38	OK

Final Mean for 3 Valid Peaks = 4.205E+02+/- 7.169E+01 (17.05%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.028E+02	1.028E+02	33.41	OK

Final Mean for 1 Valid Peaks = 1.028E+02+/- 3.433E+01 (33.41%)

AM-241	59.54	35.90*	1.000E+02	4.426E+00	4.426E+00	62.85	OK

Final Mean for 1 Valid Peaks = 4.426E+00+/- 2.782E+00 (62.85%)

Flag: "*" = Keyline

Sample ID : 1111163-05 Acquisition date : 4-DEC-2011 12:28:47

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.205E+02	7.169E+01	1.185E+01	1.745E+00	35.474
TH-234	1.028E+02	3.433E+01	2.836E+01	3.649E-01	3.623
AM-241	4.426E+00	2.782E+00	2.553E+00	2.874E-02	1.733

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.737E+00		1.445E+01	2.616E+01	8.868E+00	-0.105
CD-109	4.957E+01		8.625E+01	1.728E+02	1.663E+01	0.287
PA-231	-2.143E-01		8.575E-01	1.522E+00	1.713E-02	-0.141
PA-234	3.982E+00	+	1.498E+00	2.199E+00	2.475E-02	1.811
NP-237	-2.383E+01		2.284E+01	3.509E+01	3.095E+00	-0.679

KB 12/14/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 13:00:36.83

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116306_GE5_BAFIL_171811.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 3 2-3
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 12:44:43.
Sample ID : 1111163-06 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.13 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	10.70	18	20	0.35	108.31	101	16	1.95E-02	61.9	
2	0	21.08	81	32	0.60	207.81	199	18	8.98E-02	20.5	
3	0	25.09	19	13	0.33	246.27	239	17	2.09E-02	49.5	
4	0	31.02	1847	114	0.71	303.05	293	27	2.05E+00	2.9	
5	4	35.14	396	11	0.71	342.59	333	24	4.40E-01	5.4	1.09E+00
6	4	36.07	75	1	0.50	351.50	333	24	8.34E-02	17.7	
7	0	52.20	19	29	0.78	506.18	495	16	2.13E-02	58.5	
8	0	53.33	39	9	0.62	517.04	510	17	4.35E-02	21.7	
9	0	61.90	211	40	0.74	599.16	587	24	2.34E-01	9.6	
10	0	66.10	126	22	1.03	639.43	625	27	1.40E-01	12.6	
11	0	81.28	753	55	0.62	784.93	772	27	8.37E-01	4.3	
12	0	112.16	201	35	1.00	1081.05	1065	29	2.24E-01	9.9	
13	0	116.42	35	25	1.03	1121.83	1109	22	3.84E-02	35.9	
14	0	277.16	32	11	0.59	2663.02	2650	21	3.50E-02	26.5	
15	0	303.63	109	13	1.03	2916.78	2902	25	1.21E-01	11.7	
16	0	307.89	25	2	0.56	2957.65	2945	21	2.76E-02	23.4	
17	1	334.12	56	2	1.07	3209.13	3198	26	6.19E-02	16.0	4.22E+00
18	1	334.84	69	3	0.98	3216.00	3198	26	7.69E-02	11.3	
19	0	356.91	369	7	0.46	3427.57	3412	30	4.10E-01	5.5	
20	2	384.37	31	0	1.01	3690.90	3681	25	3.45E-02	28.3	1.27E+00
21	2	385.01	74	0	1.02	3697.00	3681	25	8.18E-02	12.6	
22	0	387.70	109	12	0.54	3722.85	3709	24	1.21E-01	11.9	

Sample ID : 1111163-06 Acquisition date : 4-DEC-2011 12:44:43

Total number of lines in spectrum	22	
Number of unidentified lines	15	
Number of lines tentatively identified by NID	7	31.82%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.802E+02	3.802E+02	0.668E+02	17.56	
		Total Activity :	3.802E+02	3.802E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.254E+00	1.254E+00	1.554E+00	123.94	
PA-234	4.47E+09Y	1.00	3.740E+00	3.740E+00	1.542E+00	41.25	
TH-234	4.47E+09Y	1.00	1.905E+02	1.905E+02	0.375E+02	19.67	
		Total Activity :	1.955E+02	1.955E+02			

Grand Total Activity : 5.758E+02 5.758E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-06 Acquisition date : 4-DEC-2011 12:44:43

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.802E+02	3.802E+02	17.56	OK
	302.84	17.80	2.575E+00	7.108E+02	7.108E+02	35.23	OK
	356.01	60.00	4.312E+00	4.281E+02	4.282E+02	18.11	OK

Final Mean for 3 Valid Peaks = 3.802E+02+/- 6.677E+01 (17.56%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.254E+00	1.254E+00	123.94	OK
	10.11	20.20	1.000E+02	2.607E+00	2.607E+00	123.94	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	5.509E+03	5.509E+03	33.78	OK

Final Mean for 3 Valid Peaks = 1.254E+00+/- 1.554E+00 (123.94%)

PA-234	9.89	89.00	1.000E+02	5.918E-01	5.918E-01	123.94	OK
	21.72	64.90*	1.000E+02	3.740E+00	3.740E+00	41.25	OK
	37.93	23.75	1.000E+02	9.493E+00	9.493E+00	35.69	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.740E+00+/- 1.542E+00 (41.25%)

TH-234	63.29	3.80*	8.750E+01	1.905E+02	1.905E+02	19.67	OK

Final Mean for 1 Valid Peaks = 1.905E+02+/- 3.749E+01 (19.67%)

Flag: "*" = Keyline

Sample ID : 1111163-06 Acquisition date : 4-DEC-2011 12:44:43

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.802E+02	6.677E+01	1.463E+01	2.155E+00	25.984
PA-231	1.254E+00	1.554E+00	1.621E+00	1.825E-02	0.774
PA-234	3.740E+00	1.542E+00	8.880E-01	9.996E-03	4.212
TH-234	1.905E+02	3.749E+01	2.077E+01	2.672E-01	9.173

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.760E+00		1.288E+01	2.485E+01	8.423E+00	0.071
CD-109	1.315E+02		9.105E+01	1.972E+02	1.898E+01	0.667
NP-237	-3.011E+01		2.823E+01	4.384E+01	3.867E+00	-0.687
AM-241	-2.931E-01		1.671E+00	2.436E+00	2.743E-02	-0.120

KB
12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 13:18:12.83

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116307_GE5_BAFIL_171813.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 4 4-5
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 13:02:56.
Sample ID : 1111163-07 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	13.19	12	14	0.45	132.18	125	11	1.37E-02	64.8	
2	3	20.91	69	6	0.74	206.12	194	25	7.65E-02	17.9	2.06E+00
3	3	21.41	34	2	0.56	211.00	194	25	3.80E-02	31.1	
4	0	25.20	22	8	0.33	247.33	242	11	2.46E-02	32.8	
5	0	31.00	1893	121	0.65	302.94	291	23	2.10E+00	2.7	
6	4	35.06	310	28	0.56	341.85	334	25	3.45E-01	7.1	1.45E+00
7	4	36.05	101	13	0.64	351.34	334	25	1.12E-01	18.9	
8	0	53.46	41	19	0.52	518.23	510	17	4.58E-02	26.2	
9	0	61.91	201	42	0.76	599.25	585	25	2.23E-01	10.2	
10	1	65.74	53	19	0.67	636.00	627	29	5.94E-02	24.5	2.02E+00
11	1	66.68	45	23	0.67	645.00	627	29	5.05E-02	31.6	
12	0	77.48	17	13	0.42	748.53	741	12	1.87E-02	45.2	
13	0	81.29	686	24	0.65	785.04	776	23	7.63E-01	4.2	
14	0	112.28	188	62	0.56	1082.23	1069	25	2.09E-01	12.2	
15	0	116.55	29	29	0.33	1123.09	1114	17	3.21E-02	41.9	
16	0	161.22	37	7	0.55	1551.42	1542	20	4.15E-02	21.8	
17	2	276.55	13	10	1.02	2657.11	2648	22	1.44E-02	63.4	4.71E-01
18	2	277.08	44	10	0.75	2662.25	2648	22	4.90E-02	19.1	
19	0	303.65	112	0	0.63	2916.99	2904	25	1.24E-01	9.4	
20	4	334.30	71	2	0.96	3210.81	3199	21	7.91E-02	11.1	3.60E+00
21	4	334.88	19	2	0.64	3216.41	3199	21	2.07E-02	28.4	
22	1	338.70	69	8	0.98	3253.00	3241	23	7.64E-02	10.2	1.20E+01
23	1	339.22	10	5	0.98	3258.00	3241	23	1.11E-02	51.9	
24	0	356.87	336	9	1.05	3427.22	3412	27	3.74E-01	5.8	
25	4	384.49	67	15	1.02	3692.00	3678	28	7.47E-02	17.7	8.35E-01
26	4	384.89	31	14	1.49	3695.90	3678	28	3.48E-02	34.2	
27	0	387.82	90	28	0.98	3723.99	3709	25	9.95E-02	16.0	
28	6	391.27	31	1	1.02	3757.00	3746	25	3.45E-02	20.4	5.10E-01
29	6	391.73	10	2	0.54	3761.43	3746	25	1.16E-02	61.4	
30	6	392.40	11	1	0.54	3767.85	3746	25	1.18E-02	29.2	

Sample ID : 1111163-07 Acquisition date : 4-DEC-2011 13:02:56

Total number of lines in spectrum	30	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	6	20.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.465E+02	3.465E+02	0.603E+02	17.41	
			---	---			
Total Activity :			3.465E+02	3.465E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.812E+02	1.812E+02	0.376E+02	20.77	
			---	---			
Total Activity :			1.812E+02	1.812E+02			

Grand Total Activity :	5.277E+02	5.278E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-07
Acquisition date : 4-DEC-2011 13:02:56

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.465E+02	3.465E+02	17.41	OK
	302.84	17.80	2.575E+00	7.337E+02	7.338E+02	32.47	OK
	356.01	60.00	4.312E+00	3.903E+02	3.903E+02	18.53	OK

Final Mean for 3 Valid Peaks = 3.465E+02+/- 6.033E+01 (17.41%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.812E+02	1.812E+02	20.77	OK

Final Mean for 1 Valid Peaks = 1.812E+02+/- 3.765E+01 (20.77%)

Flag: "*" = Keyline

Sample ID : 1111163-07 Acquisition date : 4-DEC-2011 13:02:56

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.465E+02	6.033E+01	2.162E+01	3.183E+00	16.030
TH-234	1.812E+02	3.765E+01	2.836E+01	3.649E-01	6.389

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	1.187E+01		1.367E+01	2.783E+01	9.434E+00	0.427
CD-109	3.050E+01		9.643E+01	1.840E+02	1.771E+01	0.166
PA-231	-5.581E-01		1.060E+00	1.779E+00	2.003E-02	-0.314
PA-234	1.582E+00	+	9.859E-01	1.898E+00	2.136E-02	0.833
NP-237	-2.791E+01		2.900E+01	4.595E+01	4.053E+00	-0.607
AM-241	-2.991E-01		1.577E+00	2.301E+00	2.590E-02	-0.130

KB 12/14/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 13:34:54.14

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116308_GE5_BAFIL_171814.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 5 4-5
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 13:19:34.
Sample ID : 1111163-08 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.09 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	6	20.37	13	10	0.30	200.94	199	22	1.48E-02	41.3	1.40E+00
2	6	21.14	92	28	0.65	208.34	199	22	1.02E-01	18.1	
3	0	24.94	19	14	1.53	244.79	234	19	2.10E-02	53.1	
4	0	30.99	2100	74	0.71	302.78	289	31	2.33E+00	2.5	
5	6	35.02	265	36	0.50	341.47	335	26	2.95E-01	8.3	2.48E+00
6	6	35.63	210	46	1.07	347.31	335	26	2.33E-01	14.3	
7	0	53.44	40	13	0.48	518.05	511	13	4.48E-02	22.3	
8	0	62.00	276	11	0.73	600.10	586	32	3.07E-01	6.7	
9	0	66.22	117	47	0.34	640.55	630	22	1.30E-01	15.7	
10	4	79.84	59	11	0.72	771.17	764	33	6.56E-02	18.6	1.00E+00
11	4	81.24	840	23	0.65	784.63	764	33	9.33E-01	3.6	
12	0	112.18	209	57	0.61	1081.22	1068	25	2.32E-01	10.8	
13	0	116.39	38	23	0.81	1121.62	1111	20	4.27E-02	30.7	
14	0	161.01	38	9	1.19	1549.34	1539	19	4.17E-02	23.4	
15	1	276.74	20	5	0.93	2659.00	2648	22	2.25E-02	39.2	2.03E+00
16	1	277.27	36	3	0.93	2664.00	2648	22	4.04E-02	18.0	
17	0	303.59	110	9	0.75	2916.41	2903	25	1.23E-01	11.0	
18	9	334.03	86	0	1.43	3208.19	3197	25	9.59E-02	9.8	4.21E+00
19	9	334.21	10	0	0.98	3210.00	3197	25	1.10E-02	85.5	
20	9	334.78	31	0	0.42	3215.43	3197	25	3.50E-02	24.0	
21	8	356.60	182	18	0.93	3424.63	3411	28	2.03E-01	12.0	8.00E-01
22	8	357.09	207	17	0.97	3429.28	3411	28	2.30E-01	10.2	
23	0	384.78	71	15	0.72	3694.77	3678	27	7.93E-02	16.8	
24	2	387.41	31	11	1.02	3720.00	3710	28	3.44E-02	40.5	1.09E+00
25	2	387.83	72	17	1.07	3724.10	3710	28	8.04E-02	19.8	
26	1	391.68	10	7	1.02	3761.00	3750	25	1.15E-02	76.9	6.30E-01
27	1	392.10	37	5	1.02	3765.00	3750	25	4.07E-02	22.6	
28	0	415.77	35	3	1.34	3991.90	3980	23	3.90E-02	19.4	

Sample ID : 1111163-08 Acquisition date : 4-DEC-2011 13:19:34

Total number of lines in spectrum	28	
Number of unidentified lines	23	
Number of lines tentatively identified by NID	5	17.86%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.241E+02	4.242E+02	0.717E+02	16.90	
		Total Activity :	4.241E+02	4.242E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.496E+02	2.496E+02	0.351E+02	14.06	
		Total Activity :	2.496E+02	2.496E+02			

Grand Total Activity : 6.737E+02 6.738E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-08 Acquisition date : 4-DEC-2011 13:19:34

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.241E+02	4.242E+02	16.90	OK
	302.84	17.80	2.575E+00	7.236E+02	7.236E+02	34.40	OK
	356.01	60.00	4.312E+00	2.117E+02	2.117E+02	28.06	OK

Final Mean for 3 Valid Peaks = 4.242E+02+/- 7.169E+01 (16.90%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.496E+02	2.496E+02	14.06	OK

Final Mean for 1 Valid Peaks = 2.496E+02+/- 3.510E+01 (14.06%)

Flag: "*" = Keyline

Sample ID : 1111163-08 Acquisition date : 4-DEC-2011 13:19:34

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.242E+02	7.169E+01	1.443E+01	2.124E+00	29.406
TH-234	2.496E+02	3.510E+01	2.754E+01	3.543E-01	9.062

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	2.979E+00		1.499E+01	2.852E+01	9.669E+00	0.104
CD-109	4.356E+00		9.675E+01	1.784E+02	1.717E+01	0.024
PA-231	-2.688E-02		9.600E-01	1.744E+00	1.963E-02	-0.015
PA-234	4.248E+00	+	1.549E+00	2.358E+00	2.654E-02	1.802
NP-237	-2.131E+01		2.385E+01	3.796E+01	3.349E+00	-0.561
AM-241	1.591E-01		1.528E+00	2.362E+00	2.659E-02	0.067

KB 12/4/11

VAX/VMS Peak Search Report Generated 4-DEC-2011 13:52:14.69

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116309_GE5_BAFIL_171816.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 6 10-11
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 13:36:59.
Sample ID : 1111163-09 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.17 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	3.51	25	21	0.40	39.32	38	5	2.74E-02	39.7	
2	0	4.27	13	17	0.51	46.64	43	11	1.39E-02	69.0	
3	0	9.43	15	5	0.23	96.14	90	12	1.64E-02	41.7	
4	0	21.20	79	47	0.62	208.94	194	23	8.73E-02	25.1	
5	0	31.00	1946	73	0.81	302.87	289	30	2.16E+00	2.6	
6	2	35.12	374	32	0.73	342.39	332	25	4.16E-01	6.6	1.36E+00
7	2	36.05	67	17	0.60	351.33	332	25	7.40E-02	19.9	
8	1	53.06	15	21	0.71	514.38	509	16	1.68E-02	50.4	3.26E+00
9	1	53.64	32	9	0.64	520.00	509	16	3.59E-02	25.1	
10	0	61.95	258	23	0.58	599.59	585	27	2.86E-01	7.6	
11	0	66.38	95	47	0.53	642.13	629	27	1.06E-01	20.1	
12	0	75.90	11	9	0.38	733.37	725	14	1.19E-02	60.6	
13	0	77.49	21	11	0.44	748.64	740	16	2.37E-02	36.4	
14	4	79.79	36	25	1.01	770.69	761	37	4.02E-02	30.3	1.30E+00
15	4	81.27	793	16	0.69	784.91	761	37	8.81E-01	3.7	
16	0	84.10	25	6	0.12	812.01	803	17	2.81E-02	27.1	
17	0	112.21	197	36	0.72	1081.50	1071	23	2.19E-01	10.1	
18	0	117.00	15	46	0.42	1127.43	1111	20	1.63E-02	100.2	
19	1	276.74	23	3	0.93	2659.00	2651	22	2.54E-02	32.4	1.10E+00
20	1	277.16	41	5	0.93	2663.00	2651	22	4.50E-02	19.5	
21	1	303.14	18	5	1.05	2912.09	2904	23	1.98E-02	55.0	1.26E+00
22	1	303.76	115	7	0.95	2918.00	2904	23	1.28E-01	9.6	
23	0	334.52	60	6	0.65	3212.91	3199	25	6.72E-02	15.3	
24	0	356.90	362	7	1.12	3427.53	3412	28	4.02E-01	5.5	
25	0	384.75	57	6	0.66	3694.48	3679	25	6.31E-02	16.0	
26	1	387.30	36	11	1.02	3719.00	3709	28	4.02E-02	35.2	1.29E+00
27	1	387.93	146	16	1.02	3725.00	3709	28	1.62E-01	9.9	

Sample ID : 1111163-09 Acquisition date : 4-DEC-2011 13:36:59

Total number of lines in spectrum	27	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	7	25.93%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.002E+02	4.003E+02	0.680E+02	16.98	
		Total Activity :	4.002E+02	4.003E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	1.058E+00	1.058E+00	0.883E+00	83.41	
PA-234	4.47E+09Y	1.00	3.637E+00	3.637E+00	1.835E+00	50.46	
TH-234	4.47E+09Y	1.00	2.328E+02	2.328E+02	0.366E+02	15.74	
		Total Activity :	2.374E+02	2.374E+02			

Grand Total Activity : 6.377E+02 6.377E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-09 Acquisition date : 4-DEC-2011 13:36:59

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.002E+02	4.003E+02	16.98	OK
	302.84	17.80	2.575E+00	1.166E+02	1.166E+02	113.18	OK
	356.01	60.00	4.312E+00	4.202E+02	4.203E+02	18.15	OK

Final Mean for 3 Valid Peaks = 4.003E+02+/- 6.796E+01 (16.98%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	1.058E+00	1.058E+00	83.41	OK
	10.11	20.20	1.000E+02	2.200E+00	2.200E+00	83.41	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	9.040E+02	9.040E+02	112.74	OK

Final Mean for 3 Valid Peaks = 1.058E+00+/- 8.826E-01 (83.41%)

PA-234	9.89	89.00	1.000E+02	4.994E-01	4.994E-01	83.41	OK
	21.72	64.90*	1.000E+02	3.637E+00	3.637E+00	50.46	OK
	37.93	23.75	1.000E+02	8.424E+00	8.424E+00	39.98	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 3.637E+00+/- 1.835E+00 (50.46%)

TH-234	63.29	3.80*	8.750E+01	2.328E+02	2.328E+02	15.74	OK

Final Mean for 1 Valid Peaks = 2.328E+02+/- 3.665E+01 (15.74%)

Flag: "*" = Keyline

Sample ID : 1111163-09 Acquisition date : 4-DEC-2011 13:36:59

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.003E+02	6.796E+01	1.132E+01	1.666E+00	35.371
PA-231	1.058E+00	8.826E-01	1.865E+00	2.100E-02	0.567
PA-234	3.637E+00	1.835E+00	1.124E+00	1.265E-02	3.236
TH-234	2.328E+02	3.665E+01	2.435E+01	3.133E-01	9.559

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	9.580E+00		1.493E+01	2.950E+01	1.000E+01	0.325
CD-109	2.312E+01		9.320E+01	1.772E+02	1.705E+01	0.130
NP-237	1.514E+01		2.567E+01	4.831E+01	4.261E+00	0.313
AM-241	-1.077E+00		1.772E+00	2.373E+00	2.671E-02	-0.454

VAX/VMS Peak Search Report Generated 4-DEC-2011 14:07:53.38

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116310_GE5_BAFIL_171819.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 7 5-6
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 13:52:35.
Sample ID : 1111163-10 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	19.55	27	7	1.14	193.11	184	16	3.01E-02	30.0	
2	0	21.05	87	24	0.56	207.55	200	16	9.61E-02	16.6	
3	0	25.31	14	11	0.21	248.31	240	13	1.53E-02	59.4	
4	0	30.99	2235	114	0.79	302.85	289	31	2.48E+00	2.6	
5	1	35.12	405	25	0.63	342.42	329	29	4.50E-01	6.1	1.59E+00
6	1	35.91	143	14	0.60	350.00	329	29	1.59E-01	16.2	
7	0	53.35	57	32	0.59	517.14	507	22	6.38E-02	25.2	
8	0	62.09	232	54	0.85	600.97	589	30	2.58E-01	10.7	
9	4	66.06	163	14	0.98	639.01	625	31	1.81E-01	9.0	4.67E+00
10	4	66.99	11	8	0.45	648.01	625	31	1.19E-02	71.1	
11	4	67.55	11	3	0.44	653.30	625	31	1.27E-02	30.3	
12	2	79.82	67	31	0.84	770.93	754	41	7.42E-02	27.9	1.02E+00
13	2	81.26	888	19	0.67	784.81	754	41	9.87E-01	3.5	
14	0	112.21	208	39	0.83	1081.53	1072	19	2.31E-01	9.4	
15	0	116.42	61	24	0.40	1121.88	1108	24	6.77E-02	22.1	
16	0	133.62	13	19	1.28	1286.77	1271	23	1.45E-02	78.7	
17	0	160.92	16	12	0.70	1548.54	1541	14	1.83E-02	45.1	
18	0	277.12	41	7	0.69	2662.59	2647	24	4.55E-02	19.8	
19	0	303.64	131	18	0.66	2916.87	2903	24	1.46E-01	10.9	
20	0	307.90	31	2	0.12	2957.69	2945	21	3.44E-02	20.4	
21	0	334.45	65	13	0.34	3212.30	3197	24	7.24E-02	17.0	
22	0	356.91	429	3	0.91	3427.62	3412	29	4.76E-01	4.9	
23	0	384.74	85	10	0.59	3694.40	3680	28	9.45E-02	13.5	
24	1	387.51	85	10	1.02	3721.00	3708	28	9.48E-02	16.3	4.28E+00
25	1	388.24	101	5	1.02	3728.00	3708	28	1.12E-01	12.4	

Sample ID : 1111163-10 Acquisition date : 4-DEC-2011 13:52:35

Total number of lines in spectrum	25	
Number of unidentified lines	20	
Number of lines tentatively identified by NID	5	20.00%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.485E+02	4.486E+02	0.753E+02	16.80	
		Total Activity :	4.485E+02	4.486E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.093E+02	2.093E+02	0.455E+02	21.74	
		Total Activity :	2.093E+02	2.093E+02			

Grand Total Activity : 6.579E+02 6.579E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-10 Acquisition date : 4-DEC-2011 13:52:35

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.485E+02	4.486E+02	16.80	OK
	302.84	17.80	2.575E+00	8.581E+02	8.582E+02	34.21	OK
	356.01	60.00	4.312E+00	4.976E+02	4.976E+02	17.49	OK

Final Mean for 3 Valid Peaks = 4.486E+02+/- 7.534E+01 (16.80%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.093E+02	2.093E+02	21.74	OK

Final Mean for 1 Valid Peaks = 2.093E+02+/- 4.551E+01 (21.74%)

Flag: "*" = Keyline

Sample ID : 1111163-10 Acquisition date : 4-DEC-2011 13:52:35

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.486E+02	7.534E+01	1.286E+01	1.893E+00	34.892
TH-234	2.093E+02	4.551E+01	1.741E+01	2.240E-01	12.026

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	3.842E+00		1.480E+01	2.839E+01	9.622E+00	0.135
CD-109	4.075E+01		1.149E+02	2.152E+02	2.071E+01	0.189
PA-231	-5.339E-02		9.789E-01	1.768E+00	1.990E-02	-0.030
PA-234	4.004E+00	+	1.342E+00	2.129E+00	2.397E-02	1.880
NP-237	-5.988E+00		3.116E+01	5.496E+01	4.848E+00	-0.109
AM-241	8.744E-01		1.776E+00	2.925E+00	3.292E-02	0.299

VAX/VMS Peak Search Report Generated 4-DEC-2011 14:25:14.00

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116311_GE5_BAFIL_171820.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 8 2-3
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 14:09:19.
Sample ID : 1111163-11 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.11 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

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Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	4.59	16	13	0.44	49.73	45	12	1.76E-02	50.9	
2	0	20.68	127	10	0.78	203.91	184	33	1.42E-01	11.2	
3	0	25.23	18	2	0.46	247.59	242	10	1.97E-02	28.9	
4	0	31.01	1967	57	0.80	302.98	289	29	2.19E+00	2.5	
5	2	35.14	396	21	0.69	342.60	335	25	4.40E-01	5.7	1.26E+00
6	2	36.12	85	18	0.60	352.00	335	25	9.45E-02	23.7	
7	0	53.74	30	36	0.58	520.92	507	18	3.34E-02	43.9	
8	0	59.35	10	17	0.20	574.73	560	18	1.07E-02	93.3	
9	0	61.91	241	23	0.96	599.28	587	23	2.68E-01	7.8	
10	1	65.53	36	5	0.67	634.00	628	31	4.04E-02	23.7	1.55E+00
11	1	66.16	94	12	0.67	640.00	628	31	1.04E-01	13.9	
12	0	70.09	16	6	0.51	677.65	670	13	1.74E-02	38.4	
13	3	79.96	84	20	0.92	772.30	759	38	9.33E-02	29.6	2.54E+00
14	3	81.29	706	18	0.64	785.04	759	38	7.85E-01	4.0	
15	0	91.85	12	11	0.50	886.34	877	16	1.35E-02	58.8	
16	0	98.03	11	11	1.52	945.55	932	22	1.19E-02	73.6	
17	0	108.84	11	13	1.02	1049.18	1036	19	1.26E-02	70.6	
18	0	110.75	5	23	0.39	1067.52	1055	15	5.58E-03	182.7	
19	3	112.17	177	21	0.85	1081.09	1071	20	1.96E-01	9.4	1.62E+00
20	3	112.79	21	3	0.74	1087.07	1071	20	2.37E-02	47.0	
21	0	116.26	47	20	0.62	1120.34	1109	20	5.28E-02	24.3	
22	0	161.45	16	17	0.71	1553.60	1538	20	1.77E-02	58.9	
23	0	277.15	43	9	1.33	2662.94	2649	22	4.81E-02	20.0	
24	0	303.59	91	0	1.06	2916.41	2902	24	1.01E-01	10.5	
25	1	334.42	74	12	1.07	3211.94	3198	25	8.26E-02	14.3	1.18E+00
26	1	334.84	10	7	0.98	3216.00	3198	25	1.10E-02	88.5	
27	0	356.89	366	10	0.70	3427.44	3413	28	4.07E-01	5.6	
28	0	384.69	69	7	0.92	3693.95	3678	26	7.62E-02	15.1	
29	0	387.74	136	15	0.63	3723.17	3708	27	1.51E-01	10.6	

Sample ID : 1111163-11 Acquisition date : 4-DEC-2011 14:09:19

Total number of lines in spectrum	29	
Number of unidentified lines	22	
Number of lines tentatively identified by NID	7	24.14%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.567E+02	3.567E+02	0.615E+02	17.25	
		Total Activity :	3.567E+02	3.567E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	2.177E+02	2.177E+02	0.351E+02	16.13	
AM-241	432.20Y	1.00	8.065E-01	8.065E-01	15.06E-01	186.73	
		Total Activity :	2.185E+02	2.185E+02			

Grand Total Activity : 5.752E+02 5.752E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-11 Acquisition date : 4-DEC-2011 14:09:19

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.567E+02	3.567E+02	17.25	OK
	302.84	17.80	2.575E+00	5.961E+02	5.962E+02	33.71	OK
	356.01	60.00	4.312E+00	4.247E+02	4.248E+02	18.23	OK

Final Mean for 3 Valid Peaks = 3.567E+02+/- 6.154E+01 (17.25%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	2.177E+02	2.177E+02	16.13	OK

Final Mean for 1 Valid Peaks = 2.177E+02+/- 3.511E+01 (16.13%)

AM-241	59.54	35.90*	1.000E+02	8.065E-01	8.065E-01	186.73	OK

Final Mean for 1 Valid Peaks = 8.065E-01+/- 1.506E+00 (186.73%)

Flag: "*" = Keyline

Sample ID : 1111163-11
Acquisition date : 4-DEC-2011 14:09:19

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.567E+02	6.154E+01	1.237E+01	1.821E+00	28.844
TH-234	2.177E+02	3.511E+01	2.836E+01	3.649E-01	7.674
AM-241	8.065E-01	1.506E+00	1.420E+00	1.598E-02	0.568

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	9.347E+00		1.488E+01	2.939E+01	9.964E+00	0.318
CD-109	9.828E+01		9.637E+01	1.982E+02	1.907E+01	0.496
PA-231	-5.109E-01		8.068E-01	1.336E+00	1.504E-02	-0.382
PA-234	5.895E+00	+	1.348E+00	1.868E+00	2.103E-02	3.156
NP-237	-7.497E+00		2.587E+01	4.565E+01	4.026E+00	-0.164

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VAX/VMS Peak Search Report Generated 4-DEC-2011 14:47:35.56

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116312_GE5_BAFIL_171821.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 9 5-6
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 14:32:16.
Sample ID : 1111163-12 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.21 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	1	20.33	38	21	0.53	200.64	196	20	4.21E-02	23.6	2.54E+00
2	1	21.25	82	17	0.62	209.46	196	20	9.08E-02	15.7	
3	0	30.98	2169	113	0.77	302.75	290	25	2.41E+00	2.5	
4	1	35.13	462	24	0.66	342.46	330	30	5.14E-01	5.5	1.19E+00
5	1	36.11	97	18	0.66	351.85	330	30	1.08E-01	21.4	
6	0	53.48	55	34	0.55	518.42	504	23	6.09E-02	27.1	
7	1	61.57	141	49	0.66	596.00	588	25	1.56E-01	13.8	5.17E+00
8	1	62.20	161	47	0.66	602.00	588	25	1.79E-01	12.9	
9	1	65.85	101	17	0.67	637.00	628	33	1.12E-01	13.1	1.84E+00
10	1	66.44	47	21	0.73	642.64	628	33	5.26E-02	31.8	
11	2	79.76	51	20	0.84	770.39	760	34	5.70E-02	27.0	1.07E+00
12	2	81.27	915	25	0.68	784.87	760	34	1.02E+00	3.5	
13	0	112.20	191	40	0.71	1081.46	1068	23	2.12E-01	10.2	
14	1	116.30	54	14	0.82	1120.72	1111	26	6.04E-02	20.0	1.86E+00
15	1	117.57	25	1	0.68	1132.88	1111	26	2.72E-02	20.0	
16	0	134.51	9	10	0.41	1295.30	1286	13	9.75E-03	74.3	
17	0	143.40	17	11	0.24	1380.58	1371	17	1.85E-02	46.5	
18	0	161.36	36	17	0.69	1552.75	1538	26	3.97E-02	31.7	
19	0	277.09	59	2	0.87	2662.32	2647	24	6.54E-02	14.2	
20	5	303.42	91	9	0.97	2914.78	2903	25	1.01E-01	13.8	8.18E-01
21	5	303.97	37	7	0.95	2920.00	2903	25	4.06E-02	31.8	
22	0	307.76	22	5	0.45	2956.38	2945	18	2.39E-02	28.0	
23	1	334.21	30	7	0.98	3210.00	3198	27	3.33E-02	29.4	7.48E-01
24	1	334.84	19	3	0.98	3216.00	3198	27	2.11E-02	42.8	
25	0	356.94	393	15	0.88	3427.89	3412	27	4.37E-01	5.5	
26	1	384.49	76	7	0.92	3692.02	3682	24	8.44E-02	13.7	3.45E+00
27	1	385.22	76	6	1.02	3699.00	3682	24	8.46E-02	12.4	
28	1	387.72	164	17	1.12	3722.98	3708	29	1.82E-01	9.6	1.23E+00
29	1	388.34	38	11	1.12	3728.98	3708	29	4.19E-02	33.8	
30	0	392.20	28	6	0.65	3765.91	3752	22	3.07E-02	27.3	
31	0	415.43	25	2	0.65	3988.67	3974	23	2.76E-02	23.9	

Sample ID : 1111163-12 Acquisition date : 4-DEC-2011 14:32:16

Total number of lines in spectrum	31	
Number of unidentified lines	24	
Number of lines tentatively identified by NID	7	22.58%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	4.618E+02	4.618E+02	0.774E+02	16.77	
		Total Activity :	4.618E+02	4.618E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
TH-234	4.47E+09Y	1.00	1.452E+02	1.452E+02	0.380E+02	26.14	
		Total Activity :	1.452E+02	1.452E+02			

Grand Total Activity : 6.070E+02 6.071E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-12 Acquisition date : 4-DEC-2011 14:32:16

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	4.618E+02	4.618E+02	16.77	OK
	302.84	17.80	2.575E+00	5.938E+02	5.939E+02	38.16	OK
	356.01	60.00	4.312E+00	4.561E+02	4.561E+02	18.16	OK

Final Mean for 3 Valid Peaks = 4.618E+02+/- 7.742E+01 (16.77%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
TH-234	63.29	3.80*	8.750E+01	1.452E+02	1.452E+02	26.14	OK

Final Mean for 1 Valid Peaks = 1.452E+02+/- 3.797E+01 (26.14%)

Flag: "*" = Keyline

Sample ID : 1111163-12 Acquisition date : 4-DEC-2011 14:32:16

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	4.618E+02	7.742E+01	1.237E+01	1.821E+00	37.342
TH-234	1.452E+02	3.797E+01	2.489E+01	3.202E-01	5.835

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	9.704E+00		1.694E+01	3.263E+01	1.106E+01	0.297
CD-109	1.223E+02		9.171E+01	1.963E+02	1.889E+01	0.623
PA-231	-4.968E-01		9.360E-01	1.576E+00	1.774E-02	-0.315
PA-234	3.779E+00	+	1.199E+00	2.232E+00	2.513E-02	1.693
NP-237	-5.126E+00		2.621E+01	4.683E+01	4.130E+00	-0.109
AM-241	2.236E-01		1.677E+00	2.579E+00	2.903E-02	0.087

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VAX/VMS Peak Search Report Generated 4-DEC-2011 15:17:17.17

Configuration : DKA100:[GAMMA.SCUSR.ARCHIVE]SMP_111116313_GE5_BAFIL_171823.CN
Analyses by : PEAK V16.9 PEAKEFF V2.2
Client ID : CORE 10 8-9
Deposition Date :
Sample Date : 4-DEC-2011 00:00:00. Acquisition date : 4-DEC-2011 15:01:59.
Sample ID : 1111163-13 Sample Quantity : 1.00000E+00 filter
Sample type : FILTER Sample Geometry : 0
Detector name : GE5 Detector Geometry: BAFIL
Elapsed live time: 0 00:15:00.00 Elapsed real time: 0 00:15:01.14 0.1%
Start channel : 25 End channel : 4096
Sensitivity : 3.00000 Gaussian : 10.00000
Critical level : No

Pk	It	Energy	Area	Bkgnd	FWHM	Channel	Left	Pw	Cts/Sec	%Err	Fit
1	0	7.61	14	2	0.28	78.68	74	9	1.54E-02	33.2	
2	0	9.51	5	6	0.26	96.90	91	8	5.15E-03	112.1	
3	0	16.47	15	6	1.01	163.63	157	12	1.67E-02	41.6	
4	0	21.29	61	34	0.73	209.84	201	17	6.76E-02	26.4	
5	0	31.01	1918	55	0.77	303.04	289	34	2.13E+00	2.6	
6	1	35.15	340	63	0.63	342.65	333	28	3.78E-01	8.0	4.86E+00
7	1	36.02	100	60	0.60	351.00	333	28	1.11E-01	25.0	
8	0	53.55	36	26	0.63	519.08	511	19	3.96E-02	33.5	
9	0	61.90	251	7	1.00	599.12	589	21	2.79E-01	6.7	
10	4	66.25	99	13	0.98	640.85	628	28	1.09E-01	14.1	1.64E+00
11	4	67.18	19	5	0.73	649.76	628	28	2.16E-02	39.5	
12	0	81.29	685	41	0.69	785.02	777	19	7.61E-01	4.3	
13	0	112.23	156	36	0.87	1081.68	1073	20	1.73E-01	11.8	
14	0	116.31	37	27	0.59	1120.83	1109	18	4.08E-02	32.8	
15	0	303.55	99	8	0.87	2915.97	2903	22	1.10E-01	11.5	
16	1	334.42	49	11	0.98	3212.00	3199	24	5.43E-02	19.1	9.05E-01
17	1	334.94	13	6	0.98	3217.00	3199	24	1.39E-02	56.4	
18	0	356.85	347	10	0.70	3427.06	3413	27	3.86E-01	5.7	
19	0	384.83	78	0	0.78	3695.26	3682	26	8.67E-02	11.3	
20	4	386.97	21	4	1.00	3715.81	3709	25	2.32E-02	35.7	1.28E+00
21	4	387.82	125	11	1.02	3724.00	3709	25	1.38E-01	10.4	

Sample ID : 1111163-13 Acquisition date : 4-DEC-2011 15:01:59

Total number of lines in spectrum	21	
Number of unidentified lines	14	
Number of lines tentatively identified by NID	7	33.33%

Nuclide Type : FISSION

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
BA-133	10.50Y	1.00	3.457E+02	3.458E+02	0.606E+02	17.51	
		Total Activity :	3.457E+02	3.458E+02			

Nuclide Type : NATURAL

Nuclide	Hlife	Decay	Wtd Mean Uncorrected pCi/filter	Wtd Mean Decay Corr pCi/filter	Decay Corr 2-Sigma Error	2-Sigma %Error	Flags
PA-231	3.28E+04Y	1.00	3.315E-01	3.315E-01	7.432E-01	224.19	
PA-234	4.47E+09Y	1.00	2.814E+00	2.814E+00	1.490E+00	52.94	
TH-234	4.47E+09Y	1.00	2.265E+02	2.265E+02	0.318E+02	14.05	
		Total Activity :	2.297E+02	2.297E+02			

Grand Total Activity : 5.754E+02 5.754E+02

Flags: "K" = Keyline not found "M" = Manually accepted
"E" = Manually edited "A" = Nuclide specific abn. limit

Sample ID : 1111163-13 Acquisition date : 4-DEC-2011 15:01:59

Nuclide Type: FISSION

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
BA-133	81.00	33.00*	1.802E+01	3.457E+02	3.458E+02	17.51	OK
	302.84	17.80	2.575E+00	6.498E+02	6.499E+02	34.99	OK
	356.01	60.00	4.312E+00	4.028E+02	4.029E+02	18.41	OK

Final Mean for 3 Valid Peaks = 3.458E+02+/- 6.055E+01 (17.51%)

Nuclide Type: NATURAL

Nuclide	Energy	%Abn	%Eff	Uncorrected pCi/filter	Decay Corr pCi/filter	2-Sigma %Error	Status
PA-231	9.28	42.00*	1.000E+02	3.315E-01	3.315E-01	224.19	OK
	10.11	20.20	1.000E+02	6.893E-01	6.893E-01	224.19	OK
	283.67	1.60	2.191E+00	----- Line Not Found		-----	Absent
	302.67	2.30	2.572E+00	5.036E+03	5.036E+03	33.53	OK

Final Mean for 3 Valid Peaks = 3.315E-01+/- 7.432E-01 (224.19%)

PA-234	9.89	89.00	1.000E+02	1.564E-01	1.564E-01	224.19	OK
	21.72	64.90*	1.000E+02	2.814E+00	2.814E+00	52.94	OK
	37.93	23.75	1.000E+02	1.260E+01	1.260E+01	50.20	OK
	131.42	20.40	2.473E+00	----- Line Not Found		-----	Absent

Final Mean for 3 Valid Peaks = 2.814E+00+/- 1.490E+00 (52.94%)

TH-234	63.29	3.80*	8.750E+01	2.265E+02	2.265E+02	14.05	OK

Final Mean for 1 Valid Peaks = 2.265E+02+/- 3.182E+01 (14.05%)

Flag: "*" = Keyline

Sample ID : 1111163-13 Acquisition date : 4-DEC-2011 15:01:59

---- Identified Nuclides ----

Nuclide	Activity (pCi/filter)	Act error	MDA (pCi/filter)	MDA error	Act/MDA
BA-133	3.458E+02	6.055E+01	1.686E+01	2.482E+00	20.508
PA-231	3.315E-01	7.432E-01	1.827E+00	2.056E-02	0.181
PA-234	2.814E+00	1.490E+00	1.037E+00	1.167E-02	2.714
TH-234	2.265E+02	3.182E+01	2.224E+01	2.861E-01	10.185

---- Non-Identified Nuclides ----

Nuclide	Key-Line Activity (pCi/filter)	K.L. Ided	Act error	MDA (pCi/filter)	MDA error	Act/MDA
CO-57	-2.591E+00		1.483E+01	2.686E+01	9.104E+00	-0.096
CD-109	4.937E+01		9.077E+01	1.796E+02	1.728E+01	0.275
NP-237	-3.455E+00		2.645E+01	4.764E+01	4.202E+00	-0.073
AM-241	1.689E+00		1.044E+00	2.249E+00	2.531E-02	0.751