

PROPERTY TRANSFER ASSESSMENT:
OLIVER PROPERTY
NORWEGIAN TOWNSHIP
SCHUYLKILL COUNTY, PENNSYLVANIA

PHASE II REPORT

Prepared for:

World Resources Company
Westgate Park
1600 Anderson Road
McLean, Virginia 22102

Prepared by:

Versar Inc.
6850 Versar Center
Springfield, Virginia 22151

Versar Job No. 6115.36

June 8, 1988

DISCLAIMER

The purpose of this property transfer assessment is to identify past and current property uses and any related liabilities, and to evaluate the current status of the property. Versar Inc. does not assume responsibility for the discovery and elimination of hazards that could possibly cause accidents, injuries, or damage. Compliance with submitted recommendations and/or suggestions in no way assures elimination of hazards or the fulfillment of a property owner's obligation under any local, state, or federal laws or any modifications or changes thereto. It is the responsibility of the property owner to notify authorities of any conditions that are in violation of the current legal standards.

Factual information regarding operations and conditions and test data were obtained, in part, from the client and have been assumed by Versar to be correct and complete. Since the facts stated in this report are subject to professional interpretation, they could result in differing conclusions. In addition, the findings and conclusions contained in this report are based on various quantitative and qualitative factors as they existed on or near the date of the survey.

Versar makes no warranty and assumes no liability with respect to the use of information contained in this report. No changes to its form or content may be made without Versar's express written approval.

This report reflects conditions, operations, and practices as observed on the date of the site visit. Changes or modifications to procedures and/or facilities made after the site visit are not included.

PROJECT SUMMARY

Versar completed the second phase of a property transfer assessment of the Oliver property located in Schuylkill County, Pennsylvania, during the period between March 20-25, 1988. The assessment included soil sampling, the installation of groundwater monitoring wells, and subsequent groundwater sampling. Based on these additional investigations, the following environmental issues have been identified:

- Debris samples recovered from the previously identified disposal area adjacent to the east side of the process building were found to contain trace quantities of acetone. Metals concentrations obtained from EP toxicity tests on the debris were generally at very low levels. The debris was not observed during the exploratory boring conducted inside the south section of the building, indicating that the material does not extend under this portion of the structure.
- Groundwater samples recovered from four of the five on-site monitoring wells contained trace quantities of organic compounds in the form of acetone and chloroform. The extremely low concentration of these contaminants mitigates concerns associated with the potential for adverse impacts to human health and/or the environment.
- The small dump area to the south of the perimeter fence was found to contain a mixture of soil, decomposed leaves, and small quantities of scrap metal and general refuse. No questionable materials were observed; further characterization and/or investigation is not required.

Approved for Release:



Bruno Maestri
Director
Hazard Evaluation Division

TABLE OF CONTENTS

	<u>Page No.</u>
I. SOIL SAMPLING: DEBRIS BURIAL AREA.....	1
II. INVESTIGATION: SOUTH DEBRIS AREA.....	10
III. GROUNDWATER MONITORING PROGRAM.....	11
IV. CONCLUSIONS AND RECOMMENDATIONS FOR ADDITIONAL ACTION....	22
ATTACHMENTS.....	24

LIST OF TABLES

Table 1. Volatile Organics and EP Toxicity-Metals Data, Debris Sample.....	9
Table 2. Volatile Organic Compounds Detected in Groundwater Samples:.....	21

LIST OF FIGURES

Figure 1. Layout of World Resources and Adjoining Properties..	2
Figure 2. Location of Outside Borings.....	6
Figure 3. Location of Monitoring Wells and Soil Sampling.....	14

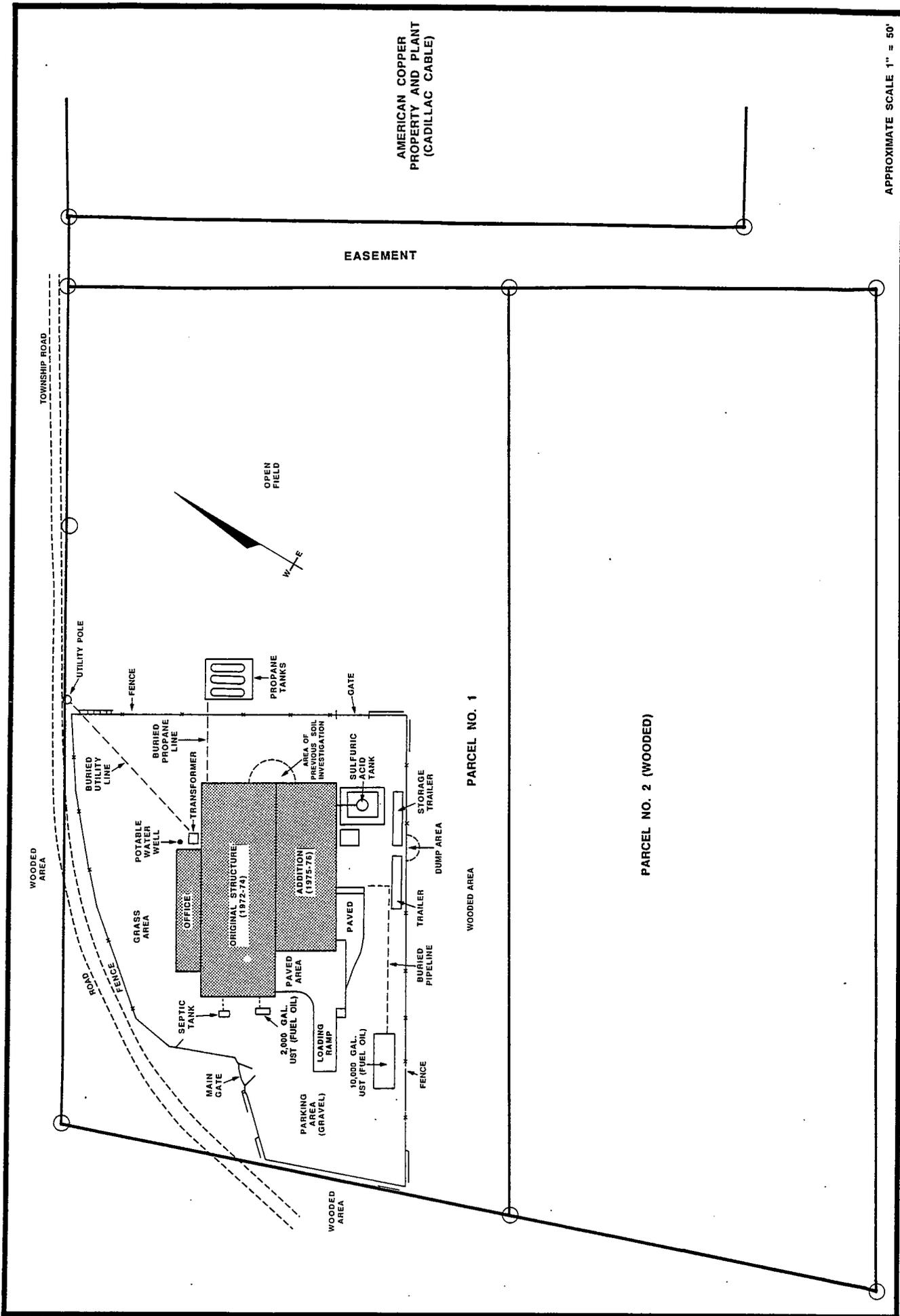
PROPERTY TRANSFER ASSESSMENT: PHASE II

On February 10, 1988, Versar conducted a Phase I property transfer assessment of the Oliver Property/World Resources Company facility in Schuylkill County, Pennsylvania. The results of that assessment were presented in a report dated February 24, 1988, wherein several areas of potential environmental concern were identified and recommendations for further investigations made. These recommendations included soil sampling, the installation of groundwater monitoring wells, and groundwater sampling. This document details the scope, methods, and results of the additional soils and groundwater investigations, and provides recommendations for additional work in specific areas. Detailed information on the site, including a property description, discussion of site geology and groundwater resources, and information on past and current use, was presented in the initial assessment report. A Health and Safety Plan covering all on-site work is provided for reference in Attachment 1.

I. SOIL SAMPLING: DEBRIS BURIAL AREA

A. Background

In the summer of 1987, World Resources personnel discovered an underground pile of used welding rod ends and assorted metal debris. The buried debris was located outside the east wall of the facility, approximately 40 feet from the front of the building (see Figure 1). In November 1987, World Resources personnel attempted to further identify the nature of the buried material and the possible extent of any associated contamination. Information on World's investigation was provided in the Phase I property transfer assessment. Nine 12-inch diameter holes were drilled in the vicinity of the discovery, to a depth of between 2 and 5.5 feet. Two of the holes encountered buried debris in the interval between 1 and 3 feet below the surface. The debris reportedly consisted of a mixture of welding rod tips, scrap metal, and



APPROXIMATE SCALE 1" = 50'

FIGURE 1. LAYOUT OF WORLD RESOURCES AND ADJOINING PROPERTIES

styrofoam pieces. Water entering these holes was described as having an organic smell. The extent of the debris was determined via visual inspection of samples from each of the nine exploratory holes and described as having a radius of approximately ten feet centered on a point approximately 55 feet from the northeast corner of the original building. No determination of the extent of the debris under the concrete floor of the south building addition was attempted. The building was expanded in 1975 and there was concern that the addition may have been built on a portion of the area used for disposal of these waste materials.

Eight of the samples recovered during the exploratory borings (six soil and two water) were eventually analyzed for volatile organics in late December 1987. Soil samples taken from two of the holes contained measurable concentrations of toluene (230 ppb), ethylbenzene (50 ppb), and xylenes (140-530 ppb). The concentrations of volatile organics in the remaining soil and water samples were below the detection limits. According to World Resources personnel, established EPA sample preparation, handling, and preservation protocol were not followed during the course of the sampling effort, and, therefore, the accuracy of the available data is considered to be questionable.

B. Objectives

In order to properly characterize the nature and extent of the potential contamination associated with the identified debris burial area, additional investigative borings and soil sampling was deemed necessary in the following areas: (1) inside the building in the vicinity of the packed tower scrubber, to determine if the buried debris extends under the newer section of the building; and (2) in the identified outside burial area, to recover a representative sample of the debris and underlying soils for laboratory analysis using established protocols.

C. Methods and Observations

(1) Inside Area

On Sunday, March 20, 1988, a hole was cut in the concrete floor at a point located 88.0 inches (7 feet, 4 inches) perpendicular from the east wall of the structure and 125.0 inches (12 feet, 5 inches) perpendicular from the inside wall dividing the original structure from the 1975 addition. An electrically actuated jackhammer was utilized to penetrate the 8-inch steel reinforced concrete floor. Following removal of the concrete debris and steel rebar, the area was thoroughly swept and vacuumed to remove all foreign material. An unsuccessful attempt was made to auger into the underlying fill material utilizing a decontaminated, stainless steel screw type auger. Due to the highly compacted nature of the underlying clayey/gravelly fill material, the auger was refused at a depth of approximately 4 inches. Penetration into the compacted material was accomplished with the electric jackhammer. All contact portions of the hammer were decontaminated prior to use in a nonphosphate detergent solution, followed by a rinse with clean water, deionized water, hexane, deionized water, acetone, and deionized water. Decontaminated equipment was transported to the work area in clean plastic bags. Clean, disposable gloves were worn by all crew members. The work area was blanketed in plastic to prevent the introduction of foreign contaminants. The jack hammer was used to advance the hole to a depth of 20.5 inches below the floor surface. A gasoline engine-powered, 1.5-inch screw auger was then used to advance the hole. The carbon steel bit and auger flights were decontaminated using the methods outlined above. Plastic sheeting was positioned to ensure that no hydrocarbon drippings from the auger engine entered the hole. The boring was then advanced to a total depth of 47.0 inches (3 feet, 11 inches) below floor grade.

No unusual debris was encountered during any phase of the excavation or subsequent boring. Because of the lack of foreign debris, a decision

was made not to sample the clean fill material or underlying rock. Although it was impossible to precisely determine, it is estimated that the highly compacted fill material (and/or disturbed soil horizon) extends to a depth of approximately 36 inches below floor grade. This is underlain by a hard, light brown to tan rock, consisting of a shale or siltstone. Cuttings from this material were very dry and powdery. No evidence of water was observed in the hole.

(2) Outside Area

On Sunday, March 20, 1988, four exploratory borings were drilled in the previously identified debris burial area along the east side of the wall. The location of each of these borings is depicted in Figure 2. Loose gravel and disturbed soils were removed from the surface using a clean pick and shovel. The boring location was then covered with plastic to prevent the introduction of foreign debris into the borehole. A small hole was cut into the center of the sheet. The gasoline-powered, 1.5-inch screw auger was used to advance the borehole. The carbon steel bit and all contact auger flights were decontaminated prior to drilling each hole utilizing the methods previously described in this section. The acetone rinse was omitted for the upper sections of the metal auger flights because of residual patches of decorative paint. Clean, disposable gloves were worn by all field personnel handling the decontaminated equipment. Each of the four holes were then advanced to an approximate depth of 3 to 4 feet below grade.

The first borehole [designated as (a) on Figure 2] was advanced through a thin layer of undifferentiated clayey fill material and into the debris. The debris was observed to contain assorted fragments of wire, welding rod tips, scrap metal cuttings, wood scrap, and styrofoam chips in a dark brown-to-black, medium-to-coarse grained soil-type matrix. On removal of the auger, the hole immediately filled with water to within approximately 18 inches of the surface. A very slight oily sheen was noted on the surface of the auger.

As a result of the intense agitation/aeration caused by the rapidly advanced auger, it was determined that the debris extracted during drilling was too disturbed to be suitable for volatile organics analysis. Because of these concerns, a second exploratory boring [designated as (b) on Figure 2] was drilled near boring (a). This hole did not encounter any of the previously described debris. Water was observed in the hole following extraction of the auger. A very light oily sheen was noted on the auger.

The third borehole [designated as (c) on Figure 2] was drilled in an attempt to locate the debris. No debris was observed in this hole. Water quickly filled the hole to within 18 inches of the surface following extraction of the auger. A very slight oily sheen was again observed on the auger. The fourth hole [(d), Figure 2] was drilled adjacent to boring (a). Although debris was encountered, it was once again determined that the debris was too agitated by the rapid auger rotation to provide an unbiased sample for volatile organics analysis.

On Friday, March 25, 1988, a hole was dug in the area located between borings (a) and (d) and the exterior wall. A clean pick and shovel were used to dig the hole down into the upper six inches of the dark debris layer. The hole was then advanced using a stainless steel scraper. The scraper was decontaminated prior to use, in accordance with the procedures previously outlined herein. Clean, disposable gloves were worn by sampling personnel at all times. The hole was extended to an approximate depth of 16 to 18 inches, at which point the debris became damp. Two samples were recovered at this depth by scraping loose the lightly cemented debris with the cleaned stainless steel scraper. Care was taken to avoid agitating the samples during recovery and placement in the precleaned sample containers. A 4-ounce clear glass jar with a teflon-lined lid was utilized to contain the volatile organics sample. The jar was filled to the top, omitting all headspace in the container. An 8-ounce clear glass jar with a teflon-lined lid was utilized for the EP Toxicity-metals sample. The upper portion of Versar's standard

three-part label was affixed to the sample containers and secured with clear tape. The lower portion of the label was attached to the field notebook as a cross-check mechanism on sample identification. Both samples were immediately placed on ice for shipment to the laboratory for analysis. All sample containerization, preservation, and chain-of-custody procedures followed prescribed EPA methods.

C. Sample Results and Conclusions

The debris samples from the outside area were analyzed for volatile organics and EP Toxicity-metals at Versar's laboratory in Springfield, Virginia. The volatile organic sample was analyzed on March 31, 1988, following EPA-CLP procedures. The only organic compound detected in the sample was acetone, at a concentration of 23 ug/kg. A copy of the analysis and supporting QA/QC documentation is presented in Attachment 2.

The debris sample designated for EP Toxicity-metals analysis was extracted and analyzed according to SW-846 procedures on March 28-30, 1988. The concentration of metals identified during the analysis was very low. Barium (0.791 mg/l), cadmium (0.024 mg/l), selenium (0.027 mg/l), and silver (0.074 mg/l) were detected. Arsenic, chromium, lead, and mercury were below the detection limit. A copy of the analysis and supporting documentation is presented in Attachment 3. A summary of the sample results for the debris is presented in Table 1.

On the basis of the results from a single debris sample, the material sampled is not deemed to be hazardous. Organic contaminants, limited to acetone, are present at very low concentrations. Observations made during drilling of the exploratory boreholes suggest that the debris burial area is not as large, continuous, or homogeneous as previously thought. It appears that the material is mixed with clay and other "clean" fill material. The exploratory augering conducted by WRC

Table 1. Volatile Organics and EP Toxicity-Metals Data,
Debris Sample

Constituent	Concentration	Maximum Concentration of Contaminants for Characteristic of EP Toxicity (mg/l)
I. ORGANICS: VOLATILES		
Acetone	23 ug/kg	Not applicable
II. INORGANICS: EP TOXICITY METALS		
Arsenic	<0.025 mg/l	5.0
Barium	0.791 mg/l	100.0
Cadmium	0.024 mg/l	1.0
Chromium	<0.005 mg/l	5.0
Lead	<0.032 mg/l	5.0
Mercury	<0.002 mg/l	0.2
Selenium	0.027 mg/l	1.0
Silver	0.0074 mg/l	5.0

personnel indicates that the debris/soil mixture is confined to a small area. Data also suggest that the debris area is underlain by a clay layer that may be relatively impermeable, resulting in the very shallow, or "perched" groundwater conditions observed in this area. Although the actual extent of this separation cannot be determined, it is favorable in that it suggests a physical barrier exists to impede or partially restrict the migration of any contaminants associated with the buried debris.

II. INVESTIGATION: SOUTH DEBRIS AREA

A. Background

During the Phase I property transfer assessment inspection of the Oliver property on February 10, 1988, a small earthen mound, measuring approximately eight feet by six feet, was located adjacent to and outside the south perimeter of the fence (see Figure 1). The pile appeared to contain general rubbish and debris, such as beverage containers, scrap metal, and dirt.

B. Objectives

In order to determine if the observed area contained any questionable materials, additional investigation was considered appropriate. The investigation was limited to the digging of several exploratory holes in order to conduct a visual characterization of the material deposited in the dump area. Laboratory analysis of samples of the material was proposed only if visual characterization revealed questionable material.

C. Methods and Observations

On Sunday, March 20, 1988, two evenly spaced holes were dug into the dump area using a hand pick and shovel. The holes were dug to an approximate depth of 18 inches below grade. The material was observed to consist of a mixture of dark top soil, decomposed leaves, small quantities of scrap metal, and several old beverage containers. These containers were generally strewn on the upper portion of the pile.

D. Conclusions

No questionable material was encountered in the holes that would have warranted the recovery of a sample(s) for analysis.

III. GROUNDWATER MONITORING PROGRAM

A. Background

As noted, an underground pile of debris was discovered by World Resources personnel during the summer of 1987 on the east side of the facility. It was not known what constituents had been disposed of in the identified area, or if groundwater had been adversely impacted.

During the February 10, 1988, property transfer assessment inspection, Versar identified several other areas of potential concern with regard to area groundwater resources. Of principal concern were the questionable discharges in a grassy area to the east of the easement separating the Oliver property from the American Copper Company property. Three wet marshy areas were noted west of the American Copper facility, immediately adjacent to that facility's parking lot. The exact sources of the aqueous discharges were not identified, but several manhole access covers and 4-inch PVC standpipes were observed in the area. WRC personnel indicated that the observed discharges were probably associated with the American Copper facility. Other areas of lesser concern with regard to potential impacts to groundwater, identified during the initial property transfer assessment, include the small septic system serving the WRC facility and a small, inactive underground fuel oil tank at the site.

B. Site Geology and Groundwater

General information on the site geology and area groundwater is presented below to provide sufficient background to understand the methods used during the installation of the monitoring wells and certain conclusions made in this section of the report. Detailed information on

area geology and groundwater was presented in the initial assessment report.

This site is located in a relatively complex geologic setting, in an area of highly folded, fractured, and faulted rocks. The plant is situated on the southeast flank of a ridge that represents the surficial expression of a large anticlinal fold in the bedrock. Two significant faults pass within 2,000 feet of the property: the Newtown Fault to the north, and the North Gate Ridge Fault to the south. The site is underlain by the Llewellyn Formation, a sequence of fine- to coarse-grained sandstone, siltstone, shale, and conglomerate deposits interbedded with seams of anthracite coal. The Llewellyn Formation overlies a similar sequence of sediments known as the Pottsville Group.

There is a soil layer present across undisturbed portions of the site, consisting of a mixture of sand, silt, clay, and organic matter. The permeability of the soil is reported to be low, allowing for a slow rate of infiltration of precipitation and having an average tendency for runoff.

Very little specific information was available concerning the occurrence of groundwater in the immediate area prior to installation of the wells. In light of the geologic setting, it was difficult to predict the occurrence, depth, and direction of the groundwater flow in the bedrock at the site. This is due to the folded, fractured, and faulted conditions prevalent in the area, as well as the physical characteristics of the deposits that comprise the bedrock. Groundwater in the vicinity of the site is thought to occur primarily at two levels: a surficial aquifer and a deeper bedrock aquifer. As a result of the highly fractured and faulted nature of local geologic conditions at the site, these two aquifers may be hydraulically linked. Groundwater flow in the water table or surficial aquifer was assumed to generally mirror the topography of the property. As such, the gradient would be to the south,

toward the unnamed creek that extends along the south side of the property.

C. Objectives

In order to evaluate if previous operations at the site or activities on adjoining properties have adversely affected area groundwater, a groundwater monitoring program was recommended. On the basis of available information at the time of the initial assessment, a minimum of four monitoring wells were deemed necessary in the following areas:

- Well No. 1: Located along the north perimeter of parcel No. 1, intended to provide data on background water quality at the site.
- Well No. 2: Located along the east side of parcel No. 1, slightly downgradient from the observed American Copper discharge area.
- Well No. 3: Located in the area south of the facility near the sulfuric acid tank, intended to provide data downgradient from the previously identified debris burial area.
- Well No. 4: Located in the parking lot west of the WRC facility downgradient from the septic leach field and inactive fuel oil tank.

It was recommended that groundwater samples from each of the monitoring wells be obtained and analyzed for volatile organics.

D. Methods and Observations

(1) Monitoring Well Installation

During the period between Monday, March 21, and Wednesday, March 23, 1988, five groundwater monitoring wells were installed at the site. The fifth well was installed to provide additional information to WRC on the American Copper discharge. The approximate location of these wells is depicted in Figure 3. All wells were drilled by Leib Drilling of Ashland, Pennsylvania, under contract with World Resources Company. An Ingersoll-Rand Model 574 air-rotary rig was used.

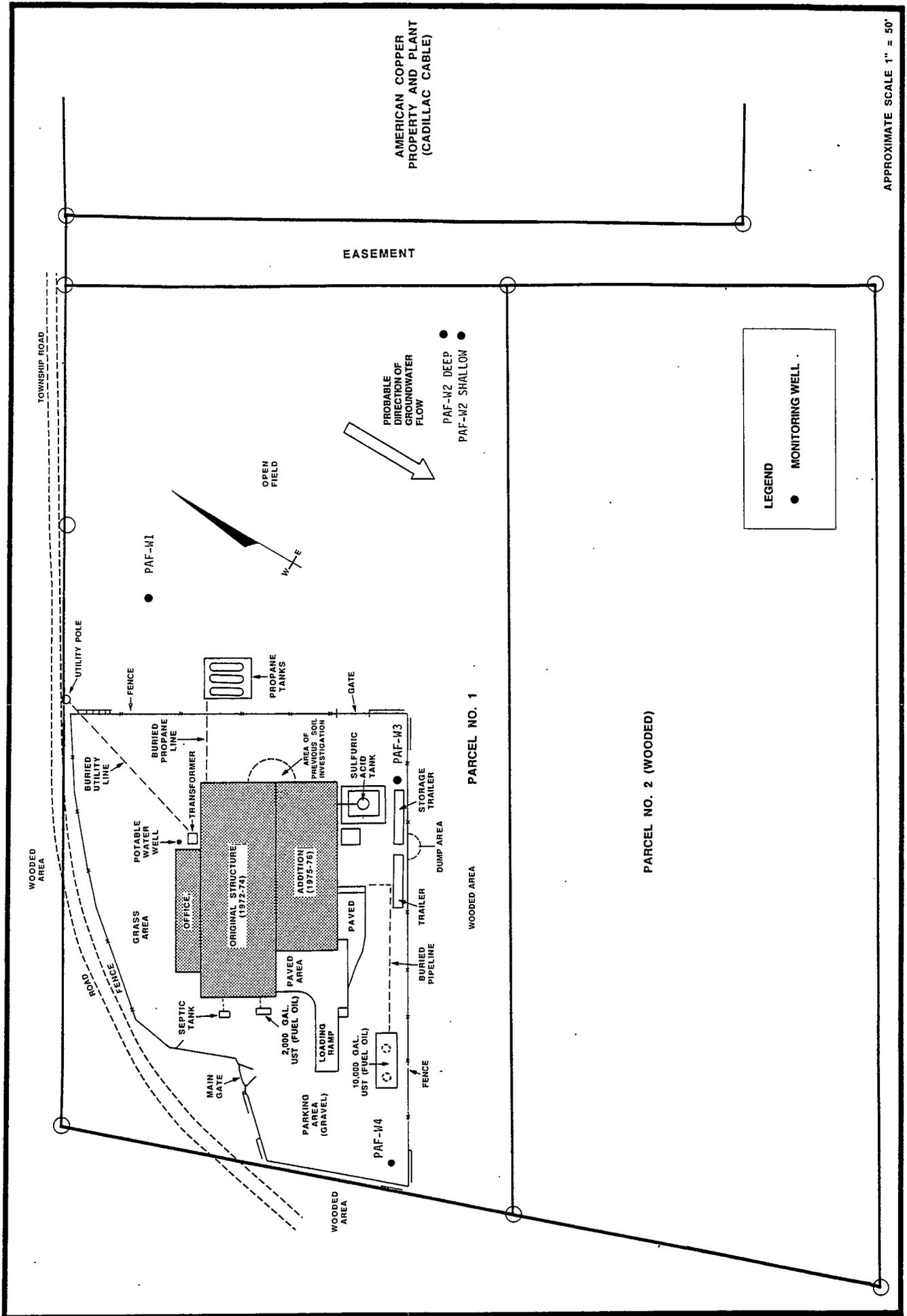


FIGURE 3. LOCATION OF MONITORING WELLS AND SOIL SAMPLING

The drilling rig was carefully decontaminated prior to drilling the first well and between each well. This was done on the contained asphalt pad located adjacent to the WRC facility. All runoff from the wash area was directed into a sump system which returns the sump water back to the facility for reuse in the recycling process. The rig, derrick, drill pipe, hammer bit, and associated drilling equipment were decontaminated in place using a high pressure steam cleaner with a design discharge temperature of 170°F to 180°F. Water for the steam system was taken from the facility's well supplied water system. All cleaning was done by Leib Drilling personnel under the direction of Versar's decontamination specialist. Disposable plastic gloves were worn by all personnel during the decontamination process. The 8.5-inch steel tri-cone roller bit was decontaminated with the steam cleaner while supported on the elevated forks of a forklift. Following decontamination, the bit was then shrouded in plastic for transport to the drill site.

Prior to commencement of drilling, loose surface debris was cleared from the drilling area. The hole was initially advanced with a 6-inch steel air-hammer bit to an approximate depth of 6 to 8 feet below grade. This was done to provide a straight track for the 8.5-inch steel roller bit. The precleaned 8.5-inch bit was then used to drill the well to total depth. Samples of the drill cuttings were collected at 2-foot increments from the cuttings discharge area using a precleaned stainless steel basket wired to a 6-foot wooden pole. The cuttings were placed in labeled plastic Zip-Loc baggies for descriptive analysis. A detailed geologic log for each well is provided in Attachment 4. (All cutting samples are currently being held at Versar's Springfield, Virginia, facility for future reference.)

Due to the relative lack of available information on groundwater occurrence in the area and the complex nature of site geology, special procedures were followed during the drilling of each well. The holes were advanced as slowly as practical (given strict time constraints

imposed on the project and the large size of the drilling rig and associated air compressor system) in order to determine exactly when groundwater was encountered. When signs of moisture were observed during drilling (as evidenced by dampness in drilling cuttings, cohesion of rock fines into clay balls, and/or a reduction in dusting during drilling), drilling was stopped and the rig and air compressors shut down. In general, at least 30 minutes were allowed to elapse in order to allow water to enter the hole. The length of elapsed time depended on the relative amount of moisture observed in the drilling cuttings. Following the shut-down period, the rig was restarted and compressed air circulated down the drill string to lift any standing water in the hole. If no evidence of water was observed entrained in the returning air stream or in residual cuttings carried up the hole, the hole was again advanced. If cuttings continued to have indications of possible moisture, suggesting the continued presence of groundwater, the rig was again shut down and the recharge procedure repeated.

Once the borings were advanced to the desired depth, monitoring wells were constructed. Their construction consisted of Schedule 40 Polyvinyl Chloride (PVC), internally threaded casing and screening. A 0.010-inch slotted screening was selected for use in all of the wells. Screen lengths for each well were determined on the basis of an analysis of the cuttings coupled with the measured depth to water after a 1- to 2-hour shutdown period. On the average, screen lengths were doubled to account for possible seasonal fluctuations in the depth to water. Prior to the installation of the well, the separate sections of screening and casing were removed from factory-sealed boxes. In an attempt to eliminate the introduction of possible contaminants from the well construction materials, the individual sections were decontaminated using a high pressure steam cleaner (water discharge temperature between 170°F to 180°F). The steam cleaning was performed on a precleaned wooden pallet. This pallet was placed on the elevated forks of a forklift to minimize the chance of splashing contaminants from the ground's surface onto the piping during cleaning activities. Also, the forklift was used

to facilitate handling the sections from the decontamination area to the well-site. While handling the sections, all workers donned disposable gloves. These gloves were changed as appropriate.

Starting with either a flush-fitting threaded end plug or threaded bottom cap, the screening was threaded together and secured. While lowering this down the borehole, additional screening or casing was threaded into place. Upon reaching ground level (or slightly above to allow for stickup), a treaded cap was placed on the well to prevent the introduction of debris or contaminants into the well. The casing and screen assembly was then carefully centered in the hole.

The filter pack was constructed using precleaned No. 6 silica sand. Special procedures were followed in order to ensure proper placement of the filter pack. Clean plastic sheeting was placed on the ground around the well head. The sand was then slowly poured down the annular space between the 4-inch PVC pipe and 8.5-inch hole. A decontaminated, 1.5-inch PVC tremie pipe was used during placement of the filter pack to ensure that sand bridging did not occur. The casing was kept centered in the hole at all times during sand placement to allow for a uniform placement of the filter pack. The sand was extended approximately 2 feet above the top of the screen and carefully packed into place using the tremie pipe.

Bentonite pellets were used to form a 2-foot seal above the filter pack. The pellets were placed dry and immediately hydrated with deionized water. Water was poured on the pellets at 5-minute intervals for 30 minutes to ensure that sufficient water was available to completely hydrate the pelletized bentonite and effect a complete seal. The dry placement and subsequent hydration procedures were conducted in accordance with the manufacturer's recommendations. The seals were allowed to sit overnight prior to grouting.

A portland cement/sand mixture was utilized to grout the wells. The mix was blended in a clean, electric cement mixer using water from the

facility's well-fed water system. The grout slurry was transported to the well site in a precleaned galvanized steel tub using a forklift. The grout was placed in the annular space between the 4-inch casing and 8.5-inch hole using a clean shovel. The grout was brought to within 24 to 36 inches of the surface and allowed to cure overnight prior to well development. Specific details on the construction of each well are provided in Attachment 5.

With the exception of the cuttings retained for descriptive analysis, the waste cuttings from each of the wells were bagged and placed in storage on site pending results of water sampling.

(2) Monitoring Well Development

On March 24 and 25, each of the five monitoring wells were developed using a 3-inch teflon bailer. To avoid the possibility of cross-contamination, a separate, dedicated bailer was utilized in the development of each well. Each bailer had previously been dismantled and decontaminated using a nonphosphate detergent, clear water rinse, deionized water rinse, hexane rinse, deionized water rinse, acetone rinse, and final deionized water rinse, and then stored in a sterile plastic bag until use. An appropriate length of new nylon cord was attached to each bailer. Clean, disposable gloves were worn at all times and changed at appropriate intervals during well development.

Prior to development, the depth to water was measured by lowering a decontaminated water level indicator equipped with an electric interface probe into the well. The predevelopment depth to water, corrected to ground level, was recorded. The total depth of the well was also checked using the probe. A discrete grab sample of water was recovered at the commencement of the development process for temperature and pH measurements. This was also repeated at the end of the development process, as necessary. A total of seven well volumes were purged from each well. In some cases, the well was purged dry before seven volumes were reached. All purged fluid was placed in 55-gallon metal drums,

transported back to the WRC facility, and emptied into the runoff recovery sump that is part of the facility's process water system. Relevant purge data are provided in Attachment 6.

(3) Monitoring Well Sampling

On Friday, March 25, each of the five monitoring wells was sampled. Prior to sampling, an additional 3 well volumes were purged from each well (or until the well was dry) using the previously dedicated Teflon bailer. Each bailer was rinsed with deionized water prior to use. Clean, disposable gloves were worn by all sampling team members. A discrete grab sample of water was obtained for temperature and pH measurements before, during, and at the end of the presampling purge. These data are presented in Attachment 7. As during initial development of the wells, all purged fluid was contained and transported to the facility for disposal.

Each of the wells was permitted to recover following the presampling purge. The recharge period was not allowed to exceed two hours prior to sample recovery, consistent with recommended EPA guidelines (RCRA Groundwater Enforcement Guidance Document). Groundwater samples were recovered by slowly lowering the dedicated bailer into the upper section of the water column, taking care to avoid agitating/aerating the fluid in the well bore. Two precleaned, 40-ml glass vials with teflon-lined lids were utilized to contain the VOA samples. The two containers were filled carefully by pouring water samples directly from the same bailer volume. Extreme care was taken to avoid agitating the sample during transfer and ensure that no headspace or bubbles remained in the containers. Water samples were also provided to WRC personnel for metals analysis in their laboratory. The labeled VOA sample containers were immediately placed on ice in a cooler for delivery to Versar's laboratory. All sample containerization, preservation, and chain-of-custody procedures followed prescribed EPA methods.

(4) Sample Results and Conclusions

The water samples were analyzed for volatile organic compounds on April 4, 1988, in Versar's Springfield, Virginia, laboratory following EPA-CLP procedures. Table 2 provides a summary of the volatile organic compounds detected in the groundwater samples. The actual data and supporting QA/QC documentation are provided in Attachment 2, along with the volatile organic analysis for the debris sample. No volatile compounds were detected in the upgradient sample recovered from well No. 1. Acetone was detected in well No. 2-deep at a concentration of 30 ug/l, and in well No. 3 at a concentration of 11 ug/l. Well No. 2-deep is situated downgradient from the American Copper discharge. Well No. 3 is near the identified debris burial area. The observed concentration of acetone in samples from these two wells is considered to be very low. Chloroform was detected at a concentration of 2 ug/l in well Nos. 3, 4, and 2-shallow. Tetrachloroethane was detected in the sample from well No. 4 at a concentration of 3 ug/l. The observed concentrations of chloroform and tetrachloroethene are very low and near the detection limit for these compounds.

At the present time, there are insufficient data to adequately explain the occurrence and distribution of acetone and other trace organics in the groundwater at the site. As noted, the concentration of these constituents is considered to be very low. The absence of volatile organics in well No. 1, which is presently thought to represent upgradient groundwater quality, suggests that the acetone and other trace organics may have come from the identified debris burial area, another on-site source, or source(s) on the American Copper property. However, the complex geologic and hydrologic conditions at the site make it difficult to clearly predict contaminant transport pathways.

Completion of the well survey would provide the necessary elevation data to begin to model groundwater flow at the site. Modeling of hydrogeologic conditions at the site should also help to explain some of

Table 2. Volatile Organic Compounds Detected
in Groundwater Samples

Well No.	Field Sample No.	Analyte	Concentration
PAF-W1	32227	No volatile target compounds detected.	
PAF-W2 Deep	32228	Acetone	30 ug/l
PAF-W2 Shallow	32231	Chloroform	2 ug/l
PAF-W3	32229	Acetone	11 ug/l
		Chloroform	2 ug/l
PAF-W4	32230	Chloroform	2 ug/l
		Tetrachloroethene	3 ug/l

No groundwater standards have been promulgated in the State of Pennsylvania. For purposes of comparison, the following are EPA's established Ambient Water Quality Criteria for the protection of human health:

Acetone - 10^6 ug/l (1,000,000 ug/l)	} Suspected carcinogens; calculated criteria at human health risk of 1×10^{-6} ; less than detection limit.
Chloroform - 0.19 ug/l	
Tetrachloroethene - 0.8 ug/l	

An enforceable Maximum Contaminant Level (MCL) for acceptable levels of chloroform in drinking water has been set at 100 ug/l.

the observations made during the drilling installation, development, and sampling of the wells. Preliminary data suggest that groundwater in the "surficial aquifer" may exist under partially confined conditions. Final groundwater levels in some of the wells rose above observed indications of water noted in cutting samples recovered during drilling. It is reasonable to expect such conditions in light of the unpredictable nature of fractures present in the highly deformed bedrock at the site.

Observations made during drilling also suggest the possibility that groundwater may locally occur at shallower depths under perched or semi-perched conditions. The slight indications of moisture between 15 and 20 feet below ground level in some areas are supportive of this possibility. The lack of positive indications of water at these depths during well installation may be a function of seasonal lows in precipitation contributions and/or low hydraulic conductivity, coupled with the extremely disturbed state of the rock caused by drilling.

IV. CONCLUSIONS AND RECOMMENDATIONS FOR ADDITIONAL ACTION

A. Conclusions

Based on a review of the data obtained during Phase II of the property transfer assessment of the Oliver property, the potential liabilities associated with ownership of the Oliver property include: (1) the existence of trace levels of organic contamination identified in the debris burial area east of the building; and (2) the existence of trace levels of organic contamination in groundwater samples recovered from selected wells.

Concentrations of trace organics are at a level not considered to be of concern from the standpoint of human health or the environment. Acetone exhibits very low human toxicity. Chloroform and tetrachloroethene are suspected carcinogens; as such, standards (such as the water quality criteria listed in Table 2) are often so low as to be below method detection limits. The concentrations of these compounds that were observed are very near the detection limit of state-of-the-art

instrumentation. The extremely low concentrations mitigate concerns regarding the quantified (trace) contamination.

B. Recommendations

To reduce the site's potential for environmental impairment liability, the following actions are recommended:

1. The buried debris located along the east side of the building should be exhumed and disposed of in accordance with applicable regulations.
2. Seasonal variations in groundwater occurrence and flow cannot be accounted for in one-time sampling. Therefore, a detailed survey of the five monitoring wells should be performed. The survey should include the exact well location and the elevation of ground level at the well head to the nearest one-hundredth of a foot. Following completion, the survey data should be incorporated with the existing data and groundwater flow at the site modeled to more accurately predict the site's flow regime.
3. Additional investigations should be conducted into the exact nature of the aqueous discharges observed on the American Copper property. Analysis of groundwater samples from well No. 2-shallow should be expanded to include nitrates, chlorides, and metals.

Certain recommendations made in the initial property transfer assessment (and not addressed in the Phase II assessment) should also be completed. These include:

1. The 2,000-gallon inactive underground fuel oil tank should be exhumed. Soil samples adjacent to and beneath the tank should be collected and analyzed in order to help determine if soil contamination has occurred.
2. The planned repair or replacement of the facility's air compressors should be completed. Contaminated debris both inside and outside of the building should be removed and disposed in a sound environmental manner.
3. Arrangements should be made with Pennsylvania Power and Light to have the on-site electrical transformer tested for PCB content. If the results of the analysis confirm that the transformer contains PCBS or is PCB-contaminated, a routine inspection schedule should be established.
4. An investigation into the environmental compliance and spill history of the American Copper facility should be undertaken by facility personnel.

ATTACHMENTS

OLIVER PROPERTY
NORWEGIAN TOWNSHIP
SCHUYLKILL COUNTY, PENNSYLVANIA

- Attachment 1. Health and Safety Plan
- Attachment 2. Volatile Organics Analysis
- Attachment 3. EP Toxicity-Metals Analysis
- Attachment 4. Well Logs
- Attachment 5. Well Construction Data
- Attachment 6. Initial Well Development Data
- Attachment 7. Sampling Purge Path Data

ATTACHMENT 1
Health and Safety Plan

SITE HEALTH AND SAFETY PLAN FORM

SITE NAME World Resources Company SITE # _____ LOCATION NORWEGIAN TWP., SCHUYLKILL Co., PA REGION _____
 PREPARED BY DAVID J. TSCHACHLER DATE _____ DOCUMENT # _____
 FIRM VERBAR INC WORK ASSIGNMENT # _____
 EPA CONTACT _____ EPA CONTACT PHONE # _____

() AMENDMENT TO EXISTING APPROVED HSP () DATE EXISTING APPROVED HSP _____

OBJECTIVES: Summarize below.

THE PRINCIPAL OBJECTIVE OF THIS ASSIGNMENT IS TO COLLECT SOIL BORINGS FROM INSIDE THE FACILITY AND TO INSTALL GROUNDWATER MONITORING WELLS ON THE FACILITY'S PROPERTY. UPON COMPLETION OF THE MONITORING WELL INSTALLATION, VERBAR PERSONNEL WILL SUBSEQUENTLY DEVELOP AND SAMPLE THE WELLS.

SITE TYPE: Check as many as applicable

Active (X) Landfill () Unknown ()
 Inactive () Uncontrolled () Other, specify:
 Secure (X) Industrial (X)
 Unsecure () Recovery ()
 Enclosed space () Well Field ()

SITE DESCRIPTION AND FEATURES: Summarize below. Include principal operations and unusual features (containers, buildings, dikes, power line, terrain, etc.)

THE SUBJECT PROPERTY IS LOCATED IN NORWEGIAN TOWNSHIP, APPROXIMATELY TWO MILES NORTHWEST OF THE CENTER OF POTTSVILLE IN SCHUYLKILL COUNTY, PENNSYLVANIA. THE PROPERTY CONSISTS OF TWO ADJACENT RECTANGULAR PARCELS OF LAND, EACH APPROXIMATELY 4.5 ACRES IN SIZE. THE WORLD RESOURCES COMPANY EASTERN REGIONAL PROCESSING (WRCP) FACILITY IS LOCATED ON PARCEL No. 1, SOUTH OF AND ADJACENT TO TOWNSHIP ROAD T-618. THE WRCP FACILITY IS BOUNDED TO THE SOUTH BY PARCEL No. 2, WHICH CONSISTS OF UNDEVELOPED WOODED LAND, AND AMERICAN COPPER COMPANY (FORMERLY CADILLAC CABLE) TO THE EAST. UNDEVELOPED WOODED PROPERTY IS LOCATED WEST OF THE FACILITY. THE POTTSVILLE RESUBDIVISION (LOCAL DAILY PAPER) PLANT IS LOCATED APPROXIMATELY ONE-QUARTER MILE NORTH OF THE WRCP FACILITY. THE CLOSEST RESIDENCES ARE LOCATED APPROXIMATELY ONE-QUARTER MILE EAST OF THE WRCP FACILITY. THE LOCATION OF THE WRCP FACILITY AND ASSOCIATED PROPERTY IS DEPICTED ON THE SITE MAP, PAGE 2.

SURROUNDING POPULATION: () Residential () Industrial (X) Rural () Urban OTHER:

THIS PAGE RESERVED FOR SITE MAP

SITE HEALTH AND SAFETY PLAN FORM

SITE HISTORY: Summarize below. In addition to history, include complaints from public, previous agency actions, known exposures or injuries, etc.

PARCEL No. 1 WAS DEVELOPED WITH THE CONSTRUCTION OF A FABRICATED STEEL WAREHOUSE, BUILDING AND ADJOINING OFFICE AREAS. THIS ORIGINAL STRUCTURE WAS USED FOR THE MANUFACTURE OF OIL FILTER HOUSINGS AND STEEL GATES, TRADING UNDER THE NAME OF THE ARGO WELDING COMPANY. OPERATIONS REPORTEDLY INCLUDED STEEL FABRICATION, WELDING, SAND BLASTING, AND SPRAY PAINTING. IN 1975, THE MANUFACTURING AREA WAS EXPANDED WITH THE CONSTRUCTION OF ANOTHER BUILDING, DIRECTLY ADJACENT TO AND SOUTH OF THE ORIGINAL BUILDING. (ALL IMPROVEMENTS ARE LOCATED ON PARCEL No. 1; PARCEL No. 2 REMAINED UNDEVELOPED.) IN 1980, ARGO WELDING COMPANY CEASED OPERATIONS AND ALL MAJOR EQUIPMENT WAS REMOVED FROM THE BUILDINGS, THE PROPERTY AND WAREHOUSES REMAINED VACANT UNTIL LATE 1982, WHEN WORLD RESOURCES LEASED THE SPACE AND BEGAN CONSTRUCTION OF

(CONTINUED)

WASTE TYPES: Liquid Solid Sludge Gas Unknown Other, specify:

WASTE CHARACTERISTICS: Check as many as applicable.

- Corrosive Flammable Radioactive
- Toxic Volatile Unknown
- Inert Reactive Other, specify:

HAZARDS OF CONCERN:

- Heat Stress attach guidelines Noise
- Cold Stress attach guidelines Inorganic Chemicals
- Explosion/Flammable Organic Chemicals
- Oxygen Deficient Other, specify:
- Radiological
- Biological

PRINCIPAL DISPOSAL METHODS AND PRACTICES: Summarize below.

A RESOURCE RECOVERY FACILITY. AT THAT TIME, PERSONNEL WITH WORLD RESOURCES REPORTED FINDING AN ASSORTMENT OF MATERIAL AT THE SITE, PRESUMABLY LEFT OVER FROM PREVIOUS OPERATIONS. THESE MATERIALS INCLUDED: A DRUM OF LACQUER THINNER, SEVERAL CANS OF PAINT, MISCELLANEOUS METAL PARTS, WELDING RODS, AND SAND BLASTING SAND. THE WRCP FACILITY BEGAN OPERATING IN OCTOBER 1983.

SITE HEALTH AND SAFETY PLAN FORM

HAZARDOUS MATERIAL SUMMARY: Circle waste type and estimate amounts by category.

CHEMICALS: Amount/Units:	SOLIDS: Amount/Units:	SLUDGES: Amount/Units:	SOLVENTS: Amount/Units:	OILS: Amount/Units:	OTHER: Amount/Units:
<p>(Acids)</p> <p>Pickling Liquors</p> <p>Caustics</p> <p>Pesticides</p> <p>Dyes/Inks</p> <p>(Cyanides)</p> <p>Phenols</p> <p>Halogens</p> <p>PCBs</p> <p>(Metals)</p> <p>Other, Specify:</p>	<p>Flyash</p> <p>Asbestos</p> <p>Milling/Mine Tailings</p> <p>Ferrous Smelter</p> <p>Non-Ferrous Smelter</p> <p>(Other, Specify: 1.) WELDING RODS, 2.) SANDBLASTING SAND</p>	<p>(Paint Pigments)</p> <p>Metals Sludges</p> <p>POTW</p> <p>Aluminum</p> <p>Other, Specify:</p>	<p>(Halogenated Solvents)</p> <p>Non-Halogenated Solvents</p> <p>Other, Specify:</p>	<p>Oily Wastes</p> <p>Other, Specify:</p>	<p>Laboratory Pharmaceutical</p> <p>Hospital</p> <p>Radiological</p> <p>Municipal</p> <p>(Other, Specify: INDUSTRIAL</p>

OVERALL HAZARD EVALUATION: () High () Medium (X) Low () Unknown
 CHEMICALS ARE PRESENT DUE TO PRODUCTION PROCESSES. HOWEVER, WORK TO BE PERFORMED INSIDE THE FACILITY (SOIL BORINGS) JUSTIFICATION: WILL BE PERFORMED AT NON-PRODUCTION TIMES. ALSO, CONTINUOUS AIR MONITORING WILL OCCUR DURING INTERIM ACTIVITIES. ALL PERSONNEL WILL UPGRADE LEVELS OF PROTECTION IF ACTION LEVELS ARE ENCOUNTERED.

FIRE/EXPLOSION POTENTIAL: () High () Medium (X) Low () Unknown

BACKGROUND REVIEW: (X) Complete () Incomplete

SITE HEALTH AND SAFETY PLAN FORM

KNOWN SITE CONTAMINANTS	HIGHEST OBSERVED CONCENTRATION (Specify units and media)	PEL/TLV ppm or mg/m ³ (Specify)	IDLH ppm or mg/m ³ (Specify)	SYMPTOM/EFFECTS OF ACUTE EXPOSURE	PHOTOIONIZATION POTENTIAL
TOLUENE	230 ppb, S	200 ppm	2000 ppm	FATIGUE, WEAK; CONFUSION, EUPHORIA, DIZZINESS, HEADACHE, DILATED PUPILS, LACRIMATION, NERVOUSNESS, MUSCLE FATIGUE, INSOMNIA, PARESTHESIA, DERMATITIS, PHOTOPHOBIA.	8.82 eV
ETHYL BENZENE	50 ppb, S	100 ppm	2000 ppm	IRRITATED EYES, MUCOUS MEMBRANE, HEADACHE, DERMATITIS, NARCOSIS, COMA	9.245 eV
XYLENES	200 ppb, S	100 ppm (435 mg/m ³)	1000 ppm	DIZZINESS, EXCITEMENT, DROWSINESS, INCOORDINATION, STAGGERING GAIT, IRRITATED EYES, NOSE, THROAT; CORNEAL VACUOLIZATION, ANOREXIA, NAUSEA, VOMIT, ABDOMINAL PAIN, DERMATITIS.	8.56 eV

NA = Not Available NE = None Established U = Unknown

S = Soil SW = Surface Water T = Tailings F = Flyash TK = Tanks
 A = Air GW = Ground water SL = Sludge D = Drums L = Lagoon

SITE HEALTH AND SAFETY PLAN FORM

FIELD ACTIVITIES COVERED UNDER THIS PLAN

TASK DESCRIPTION/SPECIFIC TECHNIQUE/SITE LOCATION

TASK DESCRIPTION/SPECIFIC TECHNIQUE/SITE LOCATION	TYPE	LEVEL OF PROTECTION		SCHEDULE
		Primary	Contingency	
1 SOIL BORING AND SAMPLING / A HAND OPERATED SOIL CORER / INTERIOR OF WRCF FACILITY.	Intrusive Non-intrusive	A B C D Modified	A B C D Modified	3-20-1988
2 MONITORING WELL INSTALLATION, DEVELOPMENT, AND SAMPLING / AIR ROTARY DRILLING / EXTERIOR OF WRCF FACILITY.	Intrusive Non-intrusive	A B C D Modified	A B C D Modified	3-21-1988 THROUGH 4-1-1988
3	Intrusive Non-intrusive	A B C D Modified	A B C D Modified	
4	Intrusive Non-intrusive	A B C D Modified	A B C D Modified	

SITE PERSONNEL AND RESPONSIBILITIES (Include subcontractors)

NAME FIRM/REGION

CDM HEALTH CLEARANCE

RESPONSIBILITIES

WORK ASSIGNMENT MANAGER 1 - 2 - 3 - 4

Site Health and Safety Coordinator 1 - 2 - 3 - 4

SITE HEALTH AND SAFETY PLAN FORM

PROTECTIVE EQUIPMENT: Specify by task. Indicate type and/or material, as necessary.

BLOCK A

Respiratory: () Not needed () Not needed

() SCBA, Airline: _____

() APR: _____

() Cartridge: _____

() Escape Mask: _____

() Other: _____

Head and Eye: () Not needed

(X) Safety Glasses: _____

() Face Shield: _____

() Goggles: _____

(X) Hard Hat: _____

() Other: _____

Boots: () Not needed

Boots: STEEL TOED

Overboots: _____

Prot. Clothing () Not needed

() Encapsulating Suit: _____

() Splash Suit: _____

() Apron: _____

() Tyvek Coverall

() Saranex Coverall

() Coverall: _____

() Other: _____

Gloves: () Not needed

(X) Undergloves: PVC

() Gloves: _____

() Overgloves: _____

Other: Specify below

TASKS: 1 - 2 - 3 - 4

LEVEL: A - B - C - D - Modified

() Contingency

() Primary

BLOCK B

Respiratory: () Not needed () Not needed

() SCBA, Airline: _____

() APR: _____

(X) Cartridge: GMC-H

() Escape Mask: _____

() Other: _____

Head and Eye: () Not needed

(X) Safety Glasses: _____

() Face Shield: _____

() Goggles: _____

(X) Hard Hat: _____

() Other: _____

Boots: () Not needed

Boots: STEEL TOED

Overboots: RUBBER

Prot. Clothing () Not needed

() Encapsulating Suit: _____

() Splash Suit: _____

() Apron: _____

(X) Tyvek Coverall

() Saranex Coverall

() Coverall: _____

() Other: _____

Gloves: () Not needed

(X) Undergloves: PVC

(X) Gloves: NITRILE

() Overgloves: _____

Other: Specify below

TASKS: 1 - 2 - 3 - 4

LEVEL: A - B - C - D - Modified

() Contingency

() Primary

BLOCK C

Respiratory: () Not needed () Not needed

() SCBA, Airline: _____

() APR: _____

() Cartridge: _____

() Escape Mask: _____

() Other: _____

Head and Eye: () Not needed

() Safety Glasses: _____

() Face Shield: _____

() Goggles: _____

() Hard Hat: _____

() Other: _____

Boots: () Not needed

Boots: _____

Overboots: _____

Prot. Clothing () Not needed

() Encapsulating Suit: _____

() Splash Suit: _____

() Apron: _____

() Tyvek Coverall

() Saranex Coverall

() Coverall: _____

() Other: _____

Gloves: () Not needed

() Undergloves: _____

() Gloves: _____

() Overgloves: _____

Other: Specify below

TASKS: 1 - 2 - 3 - 4

LEVEL: A - B - C - D - Modified

() Contingency

() Primary

BLOCK D

Respiratory: () Not needed () Not needed

() SCBA, Airline: _____

() APR: _____

() Cartridge: _____

() Escape Mask: _____

() Other: _____

Head and Eye: () Not needed

() Safety Glasses: _____

() Face Shield: _____

() Goggles: _____

() Hard Hat: _____

() Other: _____

Boots: () Not needed

Boots: _____

Overboots: _____

Prot. Clothing () Not needed

() Encapsulating Suit: _____

() Splash Suit: _____

() Apron: _____

() Tyvek Coverall

() Saranex Coverall

() Coverall: _____

() Other: _____

Gloves: () Not needed

() Undergloves: _____

() Gloves: _____

() Overgloves: _____

Other: Specify below

TASKS: 1 - 2 - 3 - 4

LEVEL: A - B - C - D - Modified

() Contingency

() Primary

SITF HEALTH AND SAFETY PLAN FORM

MONITORING EQUIPMENT: Specify by task. Indicate type, as necessary. Attach additional sheets, as necessary.

INSTRUMENT	TASKS	ACTION GUIDELINES	COMMENTS
Combustible Gas Indicator	1 - 2 - 3 - 4	0 - 10% LEL No explosion hazard. 10 - 25% LEL Potential explosion hazard; notify SHSC. >25% LEL Explosion hazard; interrupt task/evacuate. 21.0% O ₂ Oxygen normal. <21.0% O ₂ Oxygen deficient; notify SHSC. <19.5% O ₂ Interrupt task/evacuate.	() Not needed
Radiation Survey Meter	1 - 2 - 3 - 4	3 x Background: Notify SHSC. > 2 mrem/hr: Interrupt task/evacuate	Note: Annual Exposure not to exceed 100 mrem/yr, or 50 urem/hr average () Not needed
Photoionization Detector () 11.7 ev (X) 10.2 ev () 09.8 ev () _____ ev Type <u>RICTORVAC TIP</u>	①-②-3-4	Specify: AMBIENT AIR QUALITY WILL BE MEASURED DURING ALL ONSITE ACTIVITIES. - LEVEL D BACKGROUND 0-5ppm ABOVE BACKGROUND - LEVEL C GREATER THAN 5ppm ABOVE BACKGROUND IN THE BREATHING ZONE - EVACUATE AREA Specify:	() Not needed
Flame Ionization Detector Type _____	1 - 2 - 3 - 4	Specify:	() Not needed
Detector Tubes/Monitor Type <u>DRAGER</u> Type _____	①-②-3-4	Specify: DRAGER HAZARD-KIT WILL BE AVAILABLE TO FURTHER IDENTIFY CONTAMINANTS.	() Not needed
Respirable Dust Monitor Type _____ Type _____	1 - 2 - 3 - 4	Specify:	() Not needed
Other, Specify:	1 - 2 - 3 - 4	Specify:	

SITE HEALTH AND SAFETY PLAN FORM

DECONTAMINATION PROCEDURES

ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES

Personnel Decontamination Summarize below and/or attach diagram	Sampling Equipment Decontamination Summarize below and/or attach diagram	Heavy Equipment Decontamination Summarize below and/or attach diagram
<p>FIELD DECONTAMINATION WILL CONSIST OF REMOVAL OF DISPOSABLE OUTER BOOTS, GLOVES, AND TYVEK (IF USED). HANDS AND FACE WILL BE THOROUGHLY WASHED.</p> <p>IF LEVEL C EQUIPMENT IS DONNED, PERSONNEL DECONTAMINATION WILL PROCEED AS FOLLOWS:</p> <ul style="list-style-type: none"> • OVERSUIT DROP • OUTER GLOVE REMOVAL • TYVEK REMOVAL • RESPIRATOR REMOVAL • INNER GLOVE REMOVAL <p>() Not needed</p>	<p>() Not needed</p>	<p>() Not needed</p>
<p>Containment and Disposal Method:</p> <p>ALL DISPOSABLE ITEMS WILL BE CONTAINED AND DISPOSED OF ONSITE WITH PERMISSION. IF PERMISSION IS DENIED, WASTES WILL BE RETURNED TO VERSAR, INC, SPRINGFIELD, VA FOR PROPER DISPOSAL.</p>	<p>Containment and Disposal Method</p>	<p>Containment and Disposal Method</p>

SITE HEALTH AND SAFETY PLAN FORM

EMERGENCY CONTACTS

Site Water Supply
 Site Telephone
 Site Radio
 Site Other (Specify)

USEPA Environmental Response Team 202-321-6660
 US Coast Guard Environmental Response Team 800-424-8802
 Association of American Railroads Response Team 202-293-4048
 CHEMTREC 800-424-9300

CONTINGENCY PLANS Summarize below

PRIOR TO AND DURING ONSITE ACTIVITIES, AIR SAMPLING FOR VOLATILE ORGANIC COMPOUNDS WILL BE PERFORMED. IF

REQUIRE EXCEED BACKGROUND LEVEL, ALL FIELD TEAM

MEMBERS WILL UPGRADE TO LEVEL C PERSONAL PROTECTION,

SITE PERSONNEL WILL ALSO NOTE ANY OPERATIONAL ERRORS

AND ANY VISUAL INDICATIONS OF POTENTIALLY HAZARDOUS EXPOSURE LEVELS.

SITE HEALTH AND SAFETY PLAN APPROVALS

EMERGENCY CONTACTS

NAME

PHONE

Regional Health and Safety Supervisor
 Project/Site Manager
 Site Health and Safety Coordinator
 EPA Contact
 Other (specify)
 State Environmental Agency
 State Spill Contractor
 Fire Department
 Police Department
 State Police
 Health Department
 Poison Control Center
CONCENTER (POLICE, FIRE, AMBULANCE)

S. CAMPBELL 703-750-3000
 S. CAMPBELL 703-750-3000

717-622-1234

717-628-3792

MEDICAL EMERGENCY

Hospital Name: **POTTSVILLE HOSPITAL ; WARNE CLINIC** Phone: 717-622-6120

Hospital Address: **420 S. JACKSON ST.**

Name of Contact at Hospital: **EMERGENCY ROOM** Phone:

Name of 24-Hour Ambulance:

Route to Hospital:

MINERVILLE ST. EAST TO 16TH ST.

LEFT ONTO ARCH ST.

RIGHT ONTO 12TH ST.

LEFT ONTO MARKET ST.

RIGHT ONTO CENTRE ST.

LEFT ONTO WASHINGTON ST.

RIGHT ONTO JACKSON ST., HOSPITAL ON

Distance to Hospital

Attach map with route to hospital

UPDATED
 UPDATED
 UPDATED
 UPDATED

L.A. 11/11

Pottsville

GOOD SAMARITAN HOSPITAL

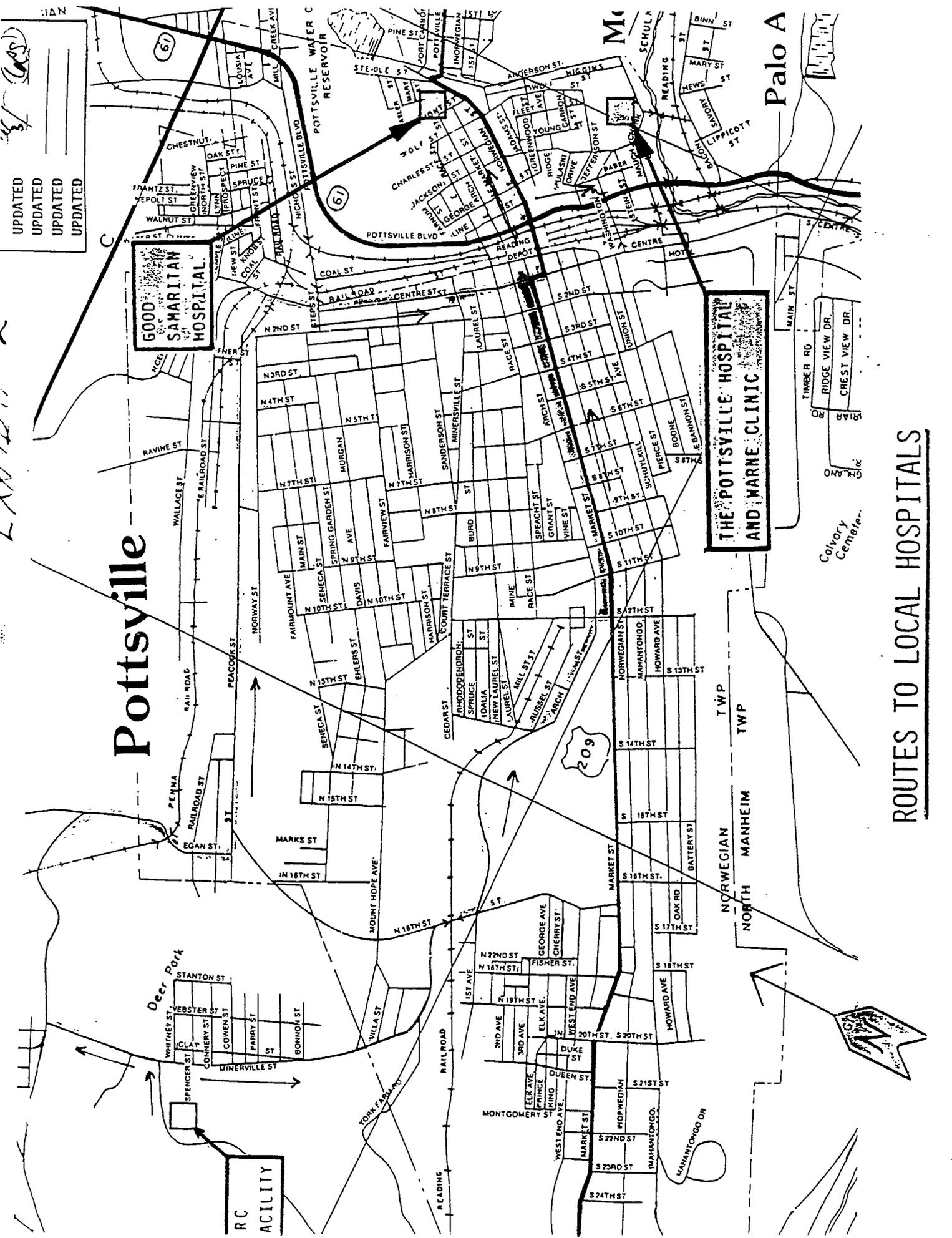
THE POTTSVILLE HOSPITAL AND WARNE CLINIC

RC FACILITY

Deer Park

Palo Alto

ROUTES TO LOCAL HOSPITALS



ATTACHMENT 2
Volatile Organics Analysis



SAMPLE DATA SUMMARY
PACKAGE

PROJECT #4600 - Batch 364
DATE 04/06/88
CLIENT WORLD RESOURCES

Volatile Organics



April 6, 1988

I. Narrative
Volatile Organic Analysis - CLP protocol
Client: World Resources
Versar Project 4600 - Batch 364

This report contains the analytical data for five water samples and one soil sample which arrived intact at Versar on March 25, 1988. The samples listed below were analyzed for volatile organic compounds following EPA CLP procedures. Preliminary results were released from the laboratory on April 5, 1988.

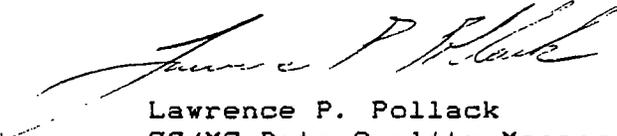
GC/MS instrument calibrations using BFB met CLP contract requirements for volatile analyses. All SPCC and CCC criteria were met for all volatile initial calibration curves and daily continuing calibration check standards. Analyses for volatile organics were performed within specified sample holding times. All analyses occurred during the twelve hour period that followed daily instrument calibration.

All volatile organic surrogate compounds spiked into the water and soil samples met recovery criteria. One set of matrix spike and matrix spike duplicate (MS/MSD) quality control samples were analyzed for each sample matrix. Recovery and relative percent difference (RPD) values met specified ranges with the exception of the 1,1-dichloroethene RPD value which exceeded QC limits by two percent in the water MS/MSD analyses.

Low concentrations of acetone and chloroform were confirmed present in some samples. Tetrachloroethene was confirmed present in sample 32230. No dilutions were required prior to analyses of either water or soil samples. Acetone was detected in the soil sample and was reported on a wet weight basis.

Please contact either Mike Buchanan, Mass Spectrometry Section Chief, or Jay Bernarding, Laboratory Project Manager, should you require any additional information or have any questions pertaining to the analyses of these samples.

Sincerely,



Lawrence P. Pollack
GC/MS Data Quality Manager
Laboratory Operations



April 5, 1988

TO: Jay Bernarding
Laboratory Project Manager

From: Larry Pollack *L. Pollack*
GC/MS Data Quality Manager

RE: Preliminary verbal results
Project 4600 - Batch 364
Volatile Organic Analyses

The table provided below summarizes volatile target compounds confirmed present in one soil sample and five water samples submitted to the Laboratory:

Field Sample No.	Analyte	Concentration
32225	Acetone	23 ug/kg *
32227	No volatile target compounds detected	
32228	Acetone	30 ug/l
32229	Acetone	11 ug/l
	Chloroform	2 ug/l
32230	Chloroform	2 ug/l
	Tetrachloroethene	3 ug/l
32231	Chloroform	2 ug/l
=====		

* Soil sample - concentration reported on "wet weight basis"

No sample required dilution prior to analysis.

Reagent blank and MS/MSD QC data to reported with hardcopy of final data report.

WATER SURROGATE PERCENT RECOVERY SUMMARY

Case No. 4600 B#364 Contract Laboratory Versar Inc. Contract No. _____

SMO TRIPIC NO.	VOLATILE			SEMI-VOLATILE				PESTICIDE		
	TOUENE-08 (88-110)	BFB (88-113)	1,2 DICHLORO-ETHANE-04 (78-114)	NITRO-BENZENE-05 (38-114)	2-FLUORO-BIPHENYL (43-118)	TERPHENYL-014 (33-141)	PHENOL-03 (10-94)	2-FLUORO-PHENOL (21-100)	2,4,6 TRIBROMO-PHENOL (10-123)	DIBUTYL-CHLORIDE (24-134)
32227	109	110	77							
32228	110	111	78							
32229	109	108	80							
32230	110	106	81							
32231	108	109	76							
32232	47	105	88							
32233	48	105	89							
32234	100	101	80							
32235	95	101	80							

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
 ** ADVISORY LIMITS ONLY
 Volatiles: 0 out of 27; outside of QC limits
 Semi-Volatiles: NR out of NR; outside of QC limits
 Pesticides: NR out of NR; outside of QC limits

Comments: NR - NOT REQUIRED

WATER MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 460 B# 364 Contractor Versar Inc. Contract No. _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/L)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	OC LIMITS RECOVERY
VOA SMO SAMPLE NO. 32231	1,1-Dichloroethene	50	0	52	104	61	122	16*	14 61-145
	Trichloroethene	50	0	50	100	50	100	0	14 71-120
	Chlorobenzene	50	0	51	102	52	104	0	13 75-130
	Toluene	50	0	52	104	54	108	4	13 76-125
	Benzene	50	0	48	96	49	98	2	11 78-127
B/N SMO SAMPLE NO. <u>NR</u>	1,2,4-Trichlorobenzene								28 39-98
	Acenaphthene								31 46-118
	2,4-Dinitrotoluene								38 24-96
	Pyrene								31 26-127
ACID SMO SAMPLE NO. <u>NR</u>	N-Nitroso-Di-n-Propylamine								38 41-116
	1,4-Dichlorobenzene								28 36-97
	Pentachlorophenol								50 9-103
	Phenol								42 12-89
	2-Chlorophenol								40 27-123
PEST SMO SAMPLE NO. <u>NR</u>	4-Chloro-3-Methylphenol								42 23-97
	4-Nitrophenol								50 10-80
	Lindane								15 56-123
	Heptachlor Aldrin								20 40-131
Dieldrin Endrin 4,4'-DDT	Dieldrin								22 40-120
	Endrin								18 52-126
	4,4'-DDT								21 56-121

* ASTERISKED VALUES ARE OUTSIDE QC LIMITS.

RECOVERY: VOAs 5 out of 5; outside QC limits
 B/N NR out of NR; outside QC limits
 ACID NR out of NR; outside QC limits
 PEST NR out of NR; outside QC limits

RECOVERY: VOAs 10 out of 10; outside QC limits
 B/N NR out of NR; outside QC limits
 ACID NR out of NR; outside QC limits
 PEST NR out of NR; outside QC limits

Comments: NR - Not Required

SOIL MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Case No. 4600 2#364 Contractor Versar Inc. Contract No. _____

Low Level: Soil Medium Level: _____

FRACTION	COMPOUND	CONC. SPIKE ADDED (ug/Kg)	SAMPLE RESULT	CONC. MS	% REC	CONC. MSD	% REC	RPD	OC LIMITS RPD
VOA SMO SAMPLE NO. <u>32225</u>	1,1-Dichloroethene	50	0	60	120	63	126	5	22 59-172
	Trichloroethene	50	0	52	104	53	106	2	24 62-137
	Chlorobenzene	50	0	54	108	56	112	4	21 60-133
	Toluene	50	0	57	114	60	120	3	21 59-139
	Benzene	50	0	56	112	55	110	2	21 66-142
B/N SMO SAMPLE NO. _____	1,2,4-Trichlorobenzene								23 38-107
	Acenaphthene								19 31-137
	2,4 Dinitrotoluene								47 28-89
	Pyrene								38 35-142
	N-Nitrosodi-n-Propylamine								38 41-126
ACID SMO SAMPLE NO. _____	1,4-Dichlorobenzene								27 28-104
	Pentachlorophenol								47 17-109
	Phenol								35 26-90
	2-Chlorophenol								50 25-102
	4-Chloro-3-Methylphenol								33 26-103
PEST SMO SAMPLE NO. _____	4-Nitrophenol								50 11-114
	Lindane								50 46-127
	Heptachlor								31 35-130
	Aldrin								43 34-132
	Dieldrin								38 31-134
Endrin								45 42-139	
4,4-DDT								50 23-134	

*ASTERISKED VALUES ARE OUTSIDE OC LIMITS.

RPD: VOAs 0 out of 5; outside OC limits
 B/N NR out of NR; outside OC limits
 ACID NR out of NR; outside OC limits
 PEST NR out of NR; outside OC limits
 Comments: NR - NOT RECOVERED

RECOVERY: VOAs 0 out of 5; outside OC limits
 B/N NR out of NR; outside OC limits
 ACID NR out of NR; outside OC limits
 PEST NR out of NR; outside OC limits

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47247
 Sample Matrix: SOIL
 Data Release Authorized By: _____

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 03/31/88
 Date Analyzed: 03/31/88
 Conc/Dil Factor: 1 pH ND
 Percent Moisture: ND

CAS Number	Compound	ug/Kg
174-87-3	Chloromethane	10 u
174-83-9	Bromomethane	10 u
175-01-4	Vinyl Chloride	10 u
175-00-3	Chloroethane	10 u
175-09-2	Methylene Chloride	5 u
167-64-1	Acetone	23 ✓
175-15-0	Carbon Disulfide	5 u
175-35-4	1,1-Dichloroethene	5 u
175-34-3	1,1-Dichloroethane	5 u
1156-60-5	Trans-1,2-Dichloroethene	5 u
167-66-3	Chloroform	5 u
1107-06-2	1,2-Dichloroethane	5 u
178-93-3	2-butanone	10 u
171-55-6	1,1,1-Trichloroethane	5 u
156-23-5	Carbon Tetrachloride	5 u
1108-05-4	Vinyl Acetate	10 u
175-27-4	Bromodichloromethane	5 u

CAS Number	Compound	ug/Kg
178-87-5	1,2-Dichloropropane	5 u
110061-02-6	Trans-1,3-Dichloropropene	5 u
179-01-6	Trichloroethene	5 u
1124-48-1	Dibromochloromethane	5 u
179-00-5	1,1,2-Trichloroethane	5 u
171-43-2	Benzene	5 u
110061-01-5	cis-1,3-Dichloropropene	5 u
1110-75-8	2-chloroethylvinylether	10 u
175-25-2	Bromoform	5 u
1108-10-1	4-Methyl-2-Pentanone	10 u
1591-78-6	2-Hexanone	10 u
1127-18-4	Tetrachloroethene	5 u
179-34-5	1,1,2,2-Tetrachloroethane	5 u
1108-88-3	Toluene	5 u
1108-90-7	Chlorobenzene	5 u
1100-41-4	Ethylbenzene	5 u
1100-42-5	Styrene	5 u
	Total Xylenes	5 u

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

T Spectrum does not meet criteria for confirmation but does indicate compound presence.

ND - NOT DETERMINED

NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32225

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	IVOR.....	NA	NA
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

Sample Number
 32227

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47242
 Sample Matrix: WATER
 Data Release Authorized By: [Signature]

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/04/88
 Date Analyzed: 04/04/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	10 u l	178-87-5	5 u l
174-83-9	10 u l	110061-02-6	5 u l
175-01-4	10 u l	179-01-6	5 u l
175-00-3	10 u l	1124-48-1	5 u l
175-09-2	5 u l	179-00-5	5 u l
167-64-1	10 u l	171-43-2	5 u l
175-15-0	5 u l	110061-01-5	5 u l
175-35-4	5 u l	1110-75-8	10 u l
175-34-3	5 u l	175-25-2	5 u l
1156-60-5	5 u l	1108-10-1	10 u l
167-66-3	5 u l	1591-78-6	10 u l
1107-06-2	5 u l	1127-18-4	5 u l
178-93-3	10 u l	179-34-5	5 u l
171-55-6	5 u l	1108-88-3	5 u l
156-23-5	5 u l	1108-90-7	5 u l
1108-05-4	10 u l	1100-41-4	5 u l
175-27-4	5 u l	1100-42-5	5 u l
			5 u l

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32227

=====

Organics Analysis Data Sheet
 (Page 4)

Tentatively Identified Compounds

	CAS	Compound	Fraction	RT or Scan	Estimated
					(ug/Kg or ug/l)
11.		NO VOLATILES DETECTED.....	IVOA.....		NA ..
12.....					
13.....					
14.....					
15.....					
16.....					
17.....					
18.....					
19.....					
110.....					
111.....					
112.....					
113.....					
114.....					
115.....					
116.....					
117.....					
118.....					
119.....					
120.....					
121.....					
122.....					
123.....					
124.....					
125.....					
126.....					
127.....					
128.....					
129.....					
130.....					

=====

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47243
 Sample Matrix: WATER
 Data Release Authorized By: _____

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/04/88
 Date Analyzed: 04/04/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	10 u	178-87-5	5 u
174-83-9	10 u	110061-02-6	5 u
175-01-4	10 u	179-01-6	5 u
175-00-3	10 u	1124-48-1	5 u
175-09-2	5 u	179-00-5	5 u
167-64-1	30	171-43-2	5 u
175-15-0	5 u	110061-01-5	5 u
175-35-4	5 u	1110-75-8	10 u
175-34-3	5 u	175-25-2	5 u
1156-60-5	5 u	1108-10-1	10 u
167-66-3	5 u	1591-78-6	10 u
1107-06-2	5 u	1127-18-4	5 u
178-93-3	10 u	179-34-5	5 u
171-55-6	5 u	1108-88-3	5 u
156-23-5	5 u	1108-90-7	5 u
1108-05-4	10 u	1100-41-4	5 u
175-27-4	5 u	1100-42-5	5 u
			5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32228

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.	VOA	NA	NA
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47244
 Sample Matrix: WATER
 Data Release Authorized By: [Signature]

Case No: 4600 B#364
 QC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/04/88
 Date Analyzed: 04/04/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1 Chloromethane 10 u	178-87-5	1,2-Dichloropropane 5 u
174-83-9	1 Bromomethane 10 u	110061-02-6	1 Trans-1,3-Dichloropropene 5 u
175-01-4	1 Vinyl Chloride 10 u	179-01-6	1 Trichloroethene 5 u
175-00-3	1 Chloroethane 10 u	1124-48-1	1 Dibromochloromethane 5 u
175-09-2	1 Methylene Chloride 5 u	179-00-5	1,1,2-Trichloroethane 5 u
167-64-1	1 Acetone 11 ✓	171-43-2	1 Benzene 5 u
175-15-0	1 Carbon Disulfide 5 u	110061-01-5	1 cis-1,3-Dichloropropene 5 u
175-35-4	1,1,1-Dichloroethene 5 u	1110-75-8	1 2-chloroethylvinylether 10 u
175-34-3	1,1,1-Dichloroethane 5 u	175-25-2	1 Bromoform 5 u
1156-60-5	1 Trans-1,2-Dichloroethene 5 u	1108-10-1	1 4-Methyl-2-Pentanone 10 u
167-66-3	1 Chloroform 2 J ✓	1591-78-6	1 2-Hexanone 10 u
1107-06-2	1,2-Dichloroethane 5 u	1127-18-4	1 Tetrachloroethene 5 u
178-93-3	1 2-butanone 10 u	179-34-5	1,1,1,2,2-Tetrachloroethane 5 u
171-55-6	1,1,1-Trichloroethane 5 u	1108-88-3	1 Toluene 5 u
156-23-5	1 Carbon Tetrachloride 5 u	1108-90-7	1 Chlorobenzene 5 u
1108-05-4	1 Vinyl Acetate 10 u	1100-41-4	1 Ethylbenzene 5 u
175-27-4	1 Bromodichloromethane 5 u	1100-42-5	1 Styrene 5 u
			1 Total Xylenes 5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32229

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	IVOA.....	NA	NA ..
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

=====

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47245
 Sample Matrix: WATER
 Data Release Authorized By: _____

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/04/88
 Date Analyzed: 04/04/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1Chloromethane 10 u	178-87-5	1,2-Dichloropropane 5 u
174-83-9	1Bromomethane 10 u	110061-02-6	1Trans-1,3-Dichloropropene 5 u
175-01-4	1Vinyl Chloride 10 u	179-01-6	1Trichloroethene 5 u
175-00-3	1Chloroethane 10 u	1124-48-1	1Dibromochloromethane 5 u
175-09-2	1Methylene Chloride 5 u	179-00-5	1,1,2-Trichloroethane 5 u
167-64-1	1Acetone 10 u	171-43-2	1Benzene 5 u
175-15-0	1Carbon Disulfide 5 u	110061-01-5	1cis-1,3-Dichloropropene 5 u
175-35-4	1,1-Dichloroethene 5 u	1110-75-8	12-chloroethylvinylether 10 u
175-34-3	1,1-Dichloroethane 5 u	175-25-2	1Bromoform 5 u
1156-60-5	1Trans-1,2-Dichloroethene 5 u	1108-10-1	14-Methyl-2-Pentanone 10 u
167-66-3	1Chloroform 2 J	1591-78-6	12-Hexanone 10 u
1107-06-2	1,2-Dichloroethane 5 u	1127-18-4	1Tetrachloroethene 3 J
178-93-3	12-butanone 10 u	179-34-5	1,1,1,2-Tetrachloroethane 5 u
171-55-6	1,1,1-Trichloroethane 5 u	1108-88-3	1Toluene 5 u
156-23-5	1Carbon Tetrachloride 5 u	1108-90-7	1Chlorobenzene 5 u
1108-05-4	1Vinyl Acetate 10 u	1100-41-4	1Ethylbenzene 5 u
175-27-4	1Bromodichloromethane 5 u	1100-42-5	1Styrene 5 u
			1Total Xylenes 5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32230

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	IVOA.....	NA	NA ..
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

=====

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47246
 Sample Matrix: WATER
 Data Release Authorized By: [Signature]

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/05/88
 Date Analyzed: 04/05/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1Chloromethane 10 u	178-87-5	11,2-Dichloropropane 5 u
174-83-9	1Bromomethane 10 u	110061-02-6	1Trans-1,3-Dichloropropene 5 u
175-01-4	1Vinyl Chloride 10 u	179-01-6	1Trichloroethene 5 u
175-00-3	1Chloroethane 10 u	1124-48-1	1Dibromochloromethane 5 u
175-09-2	1Methylene Chloride 5 u	179-00-5	11,1,2-Trichloroethane 5 u
167-64-1	1Acetone 10 u	171-43-2	1Benzene 5 u
175-15-0	1Carbon Disulfide 5 u	110061-01-5	1cis-1,3-Dichloropropene 5 u
175-35-4	11,1-Dichloroethene 5 u	1110-75-8	12-chloroethylvinylether 10 u
175-34-3	11,1-Dichloroethane 5 u	175-25-2	1Bromoform 5 u
1156-60-5	1Trans-1,2-Dichloroethene 5 u	1108-10-1	14-Methyl-2-Pentanone 10 u
167-66-3	1Chloroform 2 J	1591-78-6	12-Hexanone 10 u
1107-06-2	11,2-Dichloroethane 5 u	1127-18-4	1Tetrachloroethene 5 u
178-93-3	12-butanone 10 u	179-34-5	11,1,2,2-Tetrachloroethane 5 u
171-55-6	11,1,1-Trichloroethane 5 u	1108-88-3	1Toluene 5 u
156-23-5	1Carbon Tetrachloride 5 u	1108-90-7	1Chlorobenzene 5 u
1108-05-4	1Vinyl Acetate 10 u	1100-41-4	1Ethylbenzene 5 u
175-27-4	1Bromodichloromethane 5 u	1100-42-5	1Styrene 5 u
			1Total Xylenes 5 u

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

T Spectrum does not meet criteria for confirmation but does indicate compound presence.

NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
32231

=====

Organics Analysis Data Sheet
 (Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	VOA.....	NA	NA ..
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

=====

Sample Number |
 | RB U907 |

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: RB U907
 Sample Matrix: SOIL
 Data Release Authorized By: _____

Case No: 4600 - B#364
 GC Report No: 4600 - B#364
 Contract No: _____
 Date Sample Received: LAB GENERATED

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 03/14/88
 Date Analyzed: 03/14/88
 Conc/Dil Factor: 1 pH ND
 Percent Moisture: 100

CAS Number	ug/Kg	CAS Number	ug/Kg
174-87-3	10 u	178-87-5	5 u
174-83-9	10 u	110061-02-6	5 u
175-01-4	10 u	179-01-6	5 u
175-00-3	10 u	1124-48-1	5 u
175-09-2	5 u	179-00-5	5 u
167-64-1	4 J	171-43-2	5 u
175-15-0	5 u	110061-01-5	5 u
175-35-4	5 u	1110-75-8	10 u
175-34-3	5 u	175-25-2	5 u
1156-60-5	5 u	1108-10-1	10 u
167-66-3	5 u	1591-78-6	10 u
1107-06-2	5 u	1127-18-4	5 u
178-93-3	10 u	179-34-5	5 u
171-55-6	5 u	1108-88-3	5 u
156-23-5	5 u	1108-90-7	5 u
1108-05-4	10 u	1100-41-4	5 u
175-27-4	5 u	1100-42-5	5 u
			5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
RB 0907

=====

Organics Analysis Data Sheet
 (Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.	IVQA.	NA	NA
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: RB U1210
 Sample Matrix: SOIL
 Data Release Authorized By: _____

Case No: 4600 - B#364
 GC Report No: 4600 - B#364
 Contract No: _____
 Date Sample Received: LAB GENERATED

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 03/31/88
 Date Analyzed: 03/31/88
 Conc/Dil Factor: 1 pH ND
 Percent Moisture: 100

CAS Number	ug/Kg
174-87-3	10 u
174-83-9	10 u
175-01-4	10 u
175-00-3	10 u
175-09-2	5 u

167-64-1	10 u
175-15-0	5 u
175-35-4	5 u
175-34-3	5 u
1156-60-5	5 u

167-66-3	5 u
1107-06-2	5 u
178-93-3	10 u
171-55-6	5 u
156-23-5	5 u

1108-05-4	10 u
175-27-4	5 u

CAS Number	ug/Kg
178-87-5	5 u
110061-02-6	5 u
179-01-6	5 u
1124-48-1	5 u
179-00-5	5 u

171-43-2	5 u
110061-01-5	5 u
1110-75-8	10 u
175-25-2	5 u
1108-10-1	10 u

1591-78-6	10 u
1127-18-4	5 u
179-34-5	5 u
1108-88-3	5 u
1108-90-7	5 u

1100-41-4	5 u
1100-42-5	5 u
	5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
RBW210

=====

Organics Analysis Data Sheet
 (Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.	VOA	NA	NA
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: RB U1254
 Sample Matrix: WATER
 Data Release Authorized By: _____

Case No: 4600 - B#364
 GC Report No: 4600 - B#364
 Contract No: _____
 Date Sample Received: LAB GENERATED

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/04/88
 Date Analyzed: 04/04/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1 Chloromethane 10 u	178-87-5	1,2-Dichloropropane 5 u
174-83-9	1 Bromomethane 10 u	110061-02-6	1 Trans-1,3-Dichloropropene 5 u
175-01-4	1 Vinyl Chloride 10 u	179-01-6	1 Trichloroethene 5 u
175-00-3	1 Chloroethane 10 u	1124-48-1	1 Dibromochloromethane 5 u
175-09-2	1 Methylene Chloride 4 J ✓	179-00-5	1 1,1,2-Trichloroethane 5 u
167-64-1	1 Acetone 6 J ✓	171-43-2	1 Benzene 5 u
175-15-0	1 Carbon Disulfide 5 u	110061-01-5	1 cis-1,3-Dichloropropene 5 u
175-35-4	1 1,1-Dichloroethene 5 u	1110-75-8	1 2-chloroethylvinylether 10 u
175-34-3	1 1,1-Dichloroethane 5 u	175-25-2	1 Bromoform 5 u
1156-60-5	1 Trans-1,2-Dichloroethene 5 u	1108-10-1	1 4-Methyl-2-Pentanone 10 u
167-66-3	1 Chloroform 5 u	1591-78-6	1 2-Hexanone 10 u
1107-06-2	1 1,2-Dichloroethane 5 u	1127-18-4	1 Tetrachloroethene 5 u
178-93-3	1 2-butanone 10 u	179-34-5	1 1,1,2,2-Tetrachloroethane 5 u
171-55-6	1 1,1,1-Trichloroethane 5 u	1108-88-3	1 Toluene 5 u
156-23-5	1 Carbon Tetrachloride 5 u	1108-90-7	1 Chlorobenzene 5 u
1108-05-4	1 Vinyl Acetate 10 u	1100-41-4	1 Ethylbenzene 5 u
175-27-4	1 Bromodichloromethane 5 u	1100-42-5	1 Styrene 5 u
			1 Total Xylenes 5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
U1254

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	VOA.....	NA	NA
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: RB U1262
 Sample Matrix: WATER
 Data Release Authorized By: [Signature]

Case No: 4600 - B#364
 GC Report No: 4600 - B#364
 Contract No: _____
 Date Sample Received: LAB GENERATED

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/05/88
 Date Analyzed: 04/05/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1 Chloromethane 10 u	178-87-5	1,2-Dichloropropane 5 u
174-83-9	1 Bromomethane 10 u	110061-02-6	1 Trans-1,3-Dichloropropene 5 u
175-01-4	1 Vinyl Chloride 10 u	179-01-6	1 Trichloroethene 5 u
175-00-3	1 Chloroethane 10 u	1124-48-1	1 Dibromochloromethane 5 u
175-09-2	1 Methylene Chloride 5 u	179-00-5	1,1,2-Trichloroethane 5 u
167-64-1	1 Acetone 8 J	171-43-2	1 Benzene 5 u
175-15-0	1 Carbon Disulfide 5 u	110061-01-5	1 cis-1,3-Dichloropropene 5 u
175-35-4	1,1-Dichloroethene 5 u	1110-75-8	1 2-chloroethylvinylether 10 u
175-34-3	1,1-Dichloroethane 5 u	175-25-2	1 Bromoform 5 u
1156-60-5	1 Trans-1,2-Dichloroethene 5 u	1108-10-1	1 4-Methyl-2-Pentanone 10 u
167-66-3	1 Chloroform 5 u	1591-78-6	1 2-Hexanone 10 u
1107-06-2	1,2-Dichloroethane 5 u	1127-18-4	1 Tetrachloroethene 5 u
178-93-3	1 2-butanone 10 u	179-34-5	1,1,1,2-Tetrachloroethane 5 u
171-55-6	1,1,1-Trichloroethane 5 u	1108-88-3	1 Toluene 5 u
156-23-5	1 Carbon Tetrachloride 5 u	1108-90-7	1 Chlorobenzene 5 u
1108-05-4	1 Vinyl Acetate 10 u	1100-41-4	1 Ethylbenzene 5 u
175-27-4	1 Bromodichloromethane 5 u	1100-42-5	1 Styrene 5 u
			1 Total Xylenes 5 u

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

T Spectrum does not meet criteria for confirmation but does indicate compound presence.

NA Compound present in both matrix spike standard and unspiked sample.

=====

SAMPLE ID
RB U12621

=====

Organics Analysis Data Sheet
(Page 4)

Tentatively Identified Compounds

CAS Number	Compound Name	Fraction	RT or Scan	Estimated Concentration (ug/Kg or ug/l)
11.	NO VOLATILES DETECTED.....	IVOA.....	NA	NA ..
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
110.				
111.				
112.				
113.				
114.				
115.				
116.				
117.				
118.				
119.				
120.				
121.				
122.				
123.				
124.				
125.				
126.				
127.				
128.				
129.				
130.				

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47246-MS
 Sample Matrix: WATER
 Data Release Authorized By: _____

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentrations: LOW
 Date Extracted/Prepared: 04/05/88
 Date Analyzed: 04/05/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1 Chloromethane 10 u	178-87-5	1,2-Dichloropropane 5 u
174-83-9	1 Bromomethane 10 u	110061-02-6	1 Trans-1,3-Dichloropropene 5 u
175-01-4	1 Vinyl Chloride 10 u	179-01-6	1 Trichloroethene 5 u
175-00-3	1 Chloroethane 10 u	1124-48-1	1 Dibromochloromethane 5 u
175-09-2	1 Methylene Chloride 5 u	179-00-5	1,1,2-Trichloroethane 5 u
167-64-1	1 Acetone 10 u	171-43-2	1 Benzene 5 u
175-15-0	1 Carbon Disulfide 5 u	110061-01-5	1 cis-1,3-Dichloropropene 5 u
175-35-4	1,1-Dichloroethene 5 u	1110-75-8	1 2-chloroethylvinylether 10 u
175-34-3	1,1-Dichloroethane 5 u	175-25-2	1 Bromoform 5 u
1156-60-5	1 Trans-1,2-Dichloroethene 5 u	1108-10-1	1 4-Methyl-2-Pentanone 10 u
167-66-3	1 Chloroform 2 J	1591-78-6	1 2-Hexanone 10 u
1107-06-2	1,1,2-Dichloroethane 5 u	1127-18-4	1 Tetrachloroethene 5 u
178-93-3	1 2-butanone 10 u	179-34-5	1,1,1,2,2-Tetrachloroethane 5 u
171-55-6	1,1,1-Trichloroethane 5 u	1108-88-3	1 Toluene 5 u
156-23-5	1 Carbon Tetrachloride 5 u	1108-90-7	1 Chlorobenzene 5 u
1108-05-4	1 Vinyl Acetate 10 u	1100-41-4	1 Ethylbenzene 5 u
175-27-4	1 Bromodichloromethane 5 u	1100-42-5	1 Styrene 5 u
			1 Total Xylenes 5 u

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

T Spectrum does not meet criteria for confirmation but does indicate compound presence.

NA Compound present in both matrix spike standard and unspiked sample.

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR Case No: 4600 B#364
 Lab Sample ID No: 47247-MS GC Report No: 4600 B#364
 Sample Matrix: SOIL Contract No: _____
 Data Release Authorized By: _____ Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/01/88
 Date Analyzed: 04/01/88
 Conc/Dil Factor: 1 pH ND
 Percent Moisture: ND

CAS Number	ug/Kg	CAS Number	ug/Kg
174-87-3	1Chloromethane 10 u	178-87-5	11,2-Dichloropropane 5 u
174-83-9	1Bromomethane 10 u	110061-02-6	1Trans-1,3-Dichloropropene 5 u
175-01-4	1Vinyl Chloride 10 u	179-01-6	1Trichloroethene 5 u
175-00-3	1Chloroethane 10 u	1124-48-1	1Dibromochloromethane 5 u
175-09-2	1Methylene Chloride 5 u	179-00-5	11,1,2-Trichloroethane 5 u
167-64-1	1Acetone 20 u	171-43-2	1Benzene 5 u
175-15-0	1Carbon Disulfide 5 u	110061-01-5	1cis-1,3-Dichloropropene 5 u
175-35-4	11,1-Dichloroethene 5 u	1110-75-8	12-chloroethylvinylether 10 u
175-34-3	11,1-Dichloroethane 5 u	175-25-2	1Bromoform 5 u
1156-60-5	1Trans-1,2-Dichloroethene 5 u	1108-10-1	14-Methyl-2-Pentanone 10 u
167-66-3	1Chloroform 5 u	1591-78-6	12-Hexanone 10 u
1107-06-2	11,2-Dichloroethane 5 u	1127-18-4	1Tetrachloroethene 5 u
178-93-3	12-butanone 10 u	179-34-5	11,1,2,2-Tetrachloroethane 5 u
171-55-6	11,1,1-Trichloroethane 5 u	1108-88-3	1Toluene 5 u
156-23-5	1Carbon Tetrachloride 5 u	1108-90-7	1Chlorobenzene 5 u
1108-05-4	1Vinyl Acetate 10 u	1100-41-4	1Ethylbenzene 5 u
175-27-4	1Bromodichloromethane 5 u	1100-42-5	1Styrene 5 u
			1Total Xylenes 5 u

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47246-MSD
 Sample Matrix: WATER
 Data Release Authorized By: _____

Case No: 4600 B#364
 GC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/05/88
 Date Analyzed: 04/05/88
 Conc/Dil Factor: 1 pH NA
 Percent Moisture: 100

CAS Number	ug/l	CAS Number	ug/l
174-87-3	1Chloromethane	178-87-5	1,2-Dichloropropane
174-83-9	1Bromomethane	110061-02-6	1Trans-1,3-Dichloropropene
175-01-4	1Vinyl Chloride	179-01-6	1Trichloroethene
175-00-3	1Chloroethane	1124-48-1	1Dibromochloromethane
175-09-2	1Methylene Chloride	179-00-5	1,1,1,2-Trichloroethane
167-64-1	1Acetone	171-43-2	1Benzene
175-15-0	1Carbon Disulfide	110061-01-5	1cis-1,3-Dichloropropene
175-35-4	1,1,1-Dichloroethene	1110-75-8	12-chloroethylvinylether
175-34-3	1,1,1-Dichloroethane	175-25-2	1Bromoform
1156-60-5	1Trans-1,2-Dichloroethene	1108-10-1	14-Methyl-2-Pentanone
167-66-3	1Chloroform	1591-78-6	12-Hexanone
1107-06-2	1,1,2-Dichloroethane	1127-18-4	1Tetrachloroethene
178-93-3	12-butanone	179-34-5	1,1,1,2,2-Tetrachloroethane
171-55-6	1,1,1,1-Trichloroethane	1108-88-3	1Toluene
156-23-5	1Carbon Tetrachloride	1108-90-7	1Chlorobenzene
1108-05-4	1Vinyl Acetate	1100-41-4	1Ethylbenzene
175-27-4	1Bromodichloromethane	1100-42-5	1Styrene
			1Total Xylenes

Data Reporting Qualifiers

- Value If the result is a value greater than or equal to the detection limit, report the value.
- u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.
- J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)
- C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.
- B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.
- T Spectrum does not meet criteria for confirmation but does indicate compound presence.
- NA Compound present in both matrix spike standard and unspiked sample.

ORGANICS ANALYSIS DATA SHEET (Page 1)

Laboratory Name: VERSAR
 Lab Sample ID No: 47247-MSD
 Sample Matrix: SOIL
 Data Release Authorized By: [Signature]

Case No: 4600 B#364
 BC Report No: 4600 B#364
 Contract No: _____
 Date Sample Received: 03/25/88

VOLATILE COMPOUNDS

Concentration: LOW
 Date Extracted/Prepared: 04/01/88
 Date Analyzed: 04/01/88
 Conc/Dil Factor: 1 pH ND
 Percent Moisture: ND

CAS Number	ug/Kg
174-87-3	10 u
174-83-9	10 u
175-01-4	10 u
175-00-3	10 u
175-09-2	5 u

167-64-1	16
175-15-0	5 u
175-35-4	5 u
175-34-3	5 u
1156-60-5	5 u

167-66-3	5 u
1107-06-2	5 u
178-93-3	10 u
171-55-6	5 u
156-23-5	5 u

1108-05-4	10 u
175-27-4	5 u

CAS Number	ug/Kg
178-87-5	5 u
110061-02-6	5 u
179-01-6	5 u
1124-48-1	5 u
179-00-5	5 u

171-43-2	5 u
110061-01-5	5 u
1110-75-8	10 u
175-25-2	5 u
1108-10-1	10 u

1591-78-6	10 u
1127-18-4	5 u
179-34-5	5 u
1108-88-3	5 u
1108-90-7	5 u

1100-41-4	5 u
1100-42-5	5 u
	5 u

Data Reporting Qualifiers

Value If the result is a value greater than or equal to the detection limit, report the value.

u Compound was analyzed for but not detected. The number is the minimum attainable detection limit for the sample.

J Estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response factor is assumed, or when the mass spectral data indicates the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero. (e.g. 10J)

C This flag applies to pesticide parameters where the identification has been confirmed by GC/MS.

B This flag is used when the analyte is found in the blank as well as the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

T Spectrum does not meet criteria for confirmation but does indicate compound presence.

NA Compound present in both matrix spike standard and unspiked sample.

ATTACHMENT 3
EP Toxicity-Metals Analysis



ANALYSIS NARRATIVE

Project:4600-364
Title:General Organics
Client:World Resources
Date:March 31, 1988

This project consisted of one soil sample which was received March 25, 1988. The sample was extracted according to SW-846, 3rd. Edition, 1986 method 1310, Extraction Procedure Toxicity (EP Tox), between March 28, 1988 and March 29, 1988. The extract was digested for ICP and FAA analysis on March 30, 1988 by SW-846 methods 3010 and 7060/7740. No problems were noted during the extraction or digestion.

The extract was analyzed by ICP, SW-846 method 6010, on March 30, 1988. All reference and check standard recoveries were within ten percent windows. Recoveries for the ICP interference check solution were within 20 percent windows. Extraction, digestion, and calibration blanks were clean with the exception of 58. ug/L barium and 7.9 ug/L chromium in the extraction blank. The barium level is insignificant due to the fact that the sample concentration was more than ten times higher than the blank concentration. The chromium level is low and insignificant. Duplicate RPD's were within 20 percent with the exception of barium where the RPD was 23 percent. This is most likely the result of nonhomogenous sample leaching during extraction. Spike recoveries were within 25 percent windows.

The extract was analyzed by graphite furnace for selenium, SW-846 method 7740, on March 30, 1988. All reference and check standard recoveries were within 20 percent windows. Extraction, digestion, and calibration blanks were clean. Duplicate RPD's were within 20 percent. Spike recovery was within 25 percent windows.

The extract was digested and run by CVAA for mercury, SW-846 method 7470, on March 30, 1988. All reference and check standard recoveries were within 20 percent windows. Extraction, digestion, and calibration blanks were clean. The duplicate RPD was non-calculable since both sample and duplicate were below detection limits. Spike recovery was within 25 percent windows.

Chris T. Pappas

Chris T. Pappas
Special Projects Manager

wjn
4-1-88

DATE 3/31/88

COVER PAGE
INORGANIC ANALYSES DATA PACKAGE

LAB NAME: VERSAR, INC.
SOW SW-846 3RD. ED.

QC REPORT: EXTRACTS

PROJECT NO.: 4600.000C

SAMPLE NUMBERS

FIELD NO.
32226

LAB ID NO.
47248

FIELD NO.

LAB ID NO.

COMMENTS:

ICP INTERELEMENT AND BACKGROUND CORRECTION APPLIED? YES.
CORRECTIONS APPLIED BEFORE GENERATION OF RAW DATA.

FOOTNOTES:

NR - NOT REQUIRED BY CONTRACT AT THIS TIME

FORM I:

DF - DILUTION FACTOR

SD - SAMPLE USED FOR ICP SERIAL DILUTION

FORM I

.....
: SAMPLE NO. :
: 32226 :
:.....

DATE: 3/31/88

INORGANIC ANALYSIS DATA SHEET

LAB NAME: VERSAR INC.

QC REPORT NO.: EXTRACT

SOW NO.: SW-846 3RD ED.

LAB SAMPLE ID. NO.: 47248

MATRIX: EXTRACT

PROJECT-TASK: 4600.0000

BATCH: 364

ELEMENTS IDENTIFIED AND MEASURED

MG/L

1.	ARSENIC	< 0.025
2.	BARIUM	0.791
3.	CADMIUM	0.024
4.	CHROMIUM	< 0.005
5.	LEAD	< 0.032
6.	MERCURY	< 0.002
7.	SELENIUM	0.027
8.	SILVER	0.0074

COMMENTS:

Q.C. REPORT: EXTRACTS

BLANKS

LAB NAME: VERSAR, INC.
 DATE 3/31/88

UNITS: UG/L

COMPOUND	INITIAL CALIB BLANK VALUE	MATRIX CONTINUING CALIB BLANK VALUE				PREP HOH(DIG)	BLANK HOH(EP)
		1	2	3	4		
1. ARSENIC	< 25.	< 25.				< 25.	< 25.
2. BARIUM	< 2.0	< 2.0				< 2.0	58.
3. CADMIUM	< 5.0	< 5.0				< 5.0	< 5.0
4. CHROMIUM	< 5.0	< 5.0				< 5.0	7.9
5. LEAD	< 32.	< 32.				< 32.	< 32.
6. MERCURY	< 2.0	< 2.0	< 2.0			< 2.0	< 2.0
7. SELENIUM	< 5.0	< 5.0	< 5.0	< 5.0		< 5.0	< 5.0
8. SILVER	< 5.0	< 5.0				< 5.0	< 5.0

BLANKS

LAB NAME: VERSAR, INC.

DATE 3/31/88

UNITS: UG/L

COMPOUND	INITIAL CALIB BLANK VALUE	MATRIX CONTINUING CALIB BLANK VALUE				PREP HOH(DIG)	BLANK HOH(EP)
		1	2	3	4		
1. ARSENIC							
2. BARIUM							
3. CADMIUM							
4. CHROMIUM							
5. LEAD							
6. MERCURY							
7. SELENIUM	< 5.0	< 5.0					
8. SILVER							

Q.C. REPORT: EXTRACTS

INITIAL AND CONTINUING CALIBRATION VERIFICATION(3)

LAB NAME: VERSAR, INC.

DATE: 3/31/88

UNITS: UG/L

COMPOUND	INITIAL CALIB. (1)			CONTINUING CALIB. (2)				
	TRUE	FOUND	%R	TRUE	FOUND	%R	FOUND	%R
1. ARSENIC	500.	502.	100.	500.	508.	102.		
2. BARIUM	500.	488.	98.	500.	492.	98.		
3. CADMIUM	500.	489.	98.	500.	496.	99.		
4. CHROMIUM	500.	466.	93.	500.	470.	94.		
5. LEAD	1000.	1020.	102.	1000.	1030.	103.		
6. MERCURY	5.0	4.3	86.	5.06	4.5	89.	4.6	91. F
7. SELENIUM	25.	23.	92.	50.	45.	90.	44.	88. F
8. SILVER	500.	475.	95.	500.	480.	96.		

(1), (2) INITIAL, CONTINUING CALIBRATION SOURCE: EPA, VERSAR

(3) CONTROL LIMITS: MERCURY AND TIN 80-120; ALL OTHER COMPOUNDS 90-110

Q.C. REPORT: EXTRACTE

INITIAL AND CONTINUING CALIBRATION VERIFICATION(3)

LAB NAME: VERSAR, INC.
 DATE: 3/31/88

UNITS: UG/L

COMPOUND	INITIAL CALIB.(1)			CONTINUING CALIB.(2)			FOUND	%R
	TRUE	FOUND	%R	TRUE	FOUND	%R		
1. ARSENIC	500.							
2. BARIUM	500.							
3. CADMIUM	500.							
4. CHROMIUM	500.							
5. LEAD	1000.							
6. MERCURY								F
7. SELENIUM	25.			50.	41.	82.		F
8. SILVER	500.							

(1), (2) INITIAL, CONTINUING CALIBRATION SOURCE: EPA, VERSAR
 (3) CONTROL LIMITS: MERCURY AND TIN 80-120; ALL OTHER COMPOUNDS 90-110

Q.C. REPORT: EXTRACTS

INITIAL AND CONTINUING CALIBRATION VERIFICATION(3)

LAB NAME: VERSAR, INC.

DATE: 3/31/88

UNITS: UG/L

COMPOUND	INITIAL CALIB. (1)			CONTINUING CALIB. (2)			FOUND	%R
	TRUE	FOUND	%R	TRUE	FOUND	%R		
1. ARSENIC	500.							
2. BARIUM	500.							
3. CADMIUM	500.							
4. CHROMIUM	500.							
5. LEAD	1000.							
6. MERCURY								F
7. SELENIUM	25.	22.	88.	50.	50.	100.		F
8. SILVER	500.							

(1), (2) INITIAL, CONTINUING CALIBRATION SOURCE: EPA, VERSAR

(3) CONTROL LIMITS: MERCURY AND TIN 80-120; ALL OTHER COMPOUNDS 90-110

Q.C. REPORT: EXTRACTS

ICP INTERFERENCE CHECK SAMPLE

LAB NAME: VERSAR, INC.

DATE: 3/31/88

CHECK SAMPLE I.D.: INTER
 CHECK SAMPLE SOURCE: EPA
 UNITS: UG/L

COMPOUND	CONTROL LIMITS(1)		TRUE (2)	INITIAL		FINAL	
	MEAN	2X STD.DEV.		OBSERVED	%R	OBSERVED	%R
1. ARSENIC	100.	112.	0.0	25.U	0.0	25.U	0.0
2. BARIUM	491.	9.	483.	475.	98.	474.	98.
3. CADMIUM	920.	5.	909.	933.	103.	937.	103.
4. CHROMIUM	910.	12.	513.	477.	93.	477.	93.
5. LEAD	4480.	38.	4850.	4940.	102.	4910.	101.
6. MERCURY							
7. SELENIUM							
8. SILVER	907.	6.	934.	924.	99.	927.	99.

(1) MEAN BASED ON N = 5

(2) TRUE VALUE OF INTERFERENCE CHECK SAMPLE

Q.C. REPORT: EXTRACTS

DUPLICATES

LAB NAME: VERSAR, INC.

DATE: 3/31/88

FIELD SAMPLE NO.: 32226

LAB SAMPLE ID NO. 47248

MATRIX: EXTRACT

UNITS: MG/L

COMPOUND	CONTROL LIMITS (1)	SAMPLE(S)	DUPLICATE(D)	RPD(2)
1. ARSENIC		< 0.025	< 0.025	NC
2. BARIUM		0.791	0.994	23.
3. CADMIUM	+/- 5.0	0.024	0.023	4.2
4. CHROMIUM		< 0.005	< 0.005	NC
5. LEAD		< 0.032	< 0.032	NC
6. MERCURY		< 0.002	< 0.002	NC
7. SELENIUM		0.027	0.024	12.
8. SILVER		0.0074	< 0.005	NC

(2) RPD = $[(S-D)/((S+D)/2)] \times 100$

NC - NON CALCULABLE RPD DUE TO VALUE(S) LESS THAN CRDL

Q.C. REPORT: EXTRACTS

SPIKE SAMPLE RECOVERY

LAB NAME: VERSAR, INC.

DATE 3/31/88

FIELD SAMPLE NO.: 32226

LAB SAMPLE ID NO. 47248

UNITS: MG/L

MATRIX: EXTRACT

COMPOUND	CONTROL LIMIT %R	SPIKED SAMPLE RESULT (SSR)	SAMPLE RESULT (SR)	SPIKED ADDED (SA)	%R (1)
1. ARSENIC	75-125	0.463	< 0.025	0.50	93.
2. BARIUM	75-125	1.02	0.791	0.20	114.
3. CADMIUM	75-125	0.218	0.024	0.20	97.
4. CHROMIUM	75-125	0.469	< 0.005	0.50	94.
5. LEAD	75-125	0.477	< 0.032	0.50	95.
6. MERCURY	75-125	0.0079	< 0.002	0.008	99.
7. SELENIUM	75-125	0.082	0.027	0.05	110.
8. SILVER	75-125	0.192	0.0074	0.20	92.

(1) %R = [(SSR-SR)/SA] X 100

ATTACHMENT 4

Well Logs

JOB NUMBER: 6115.36.02

PROJECT: World Resources Corp
 LOCATION: _____
 BOREHOLE NUMBER: DAF-W1
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH

COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
0'						LIGHT TO MEDIUM TAN, VERY FINE GRAINED, SLIGHTLY MOIST, WEATHERED MUDSTONE TO SHALE. INDICATION OF IRON STAINING; DRILL CUTTINGS LARGE & ANGULAR, INDICATIVE OF RELATIVELY HARD MATERIAL. CLAY BALLS NOT PRESENT. DRY.
5'	1					
	2					
	3					
	4					
10'	5					
	6					LIGHT TAN IN COLOR, VERY FINE GRAINED, INCREASINGLY MOIST WITH DEPTH, WEATHERED MUDSTONE. DRILL CUTTINGS BECOME LESS ANGULAR TO SUB-ANGULAR. NO CLAY BALLS PRESENT.
15'	7					
	8					
20'	9					VERY DRY / VERY DUSTY. VERY LIGHT TAN TO BUFF IN COLOR, VERY FINE GRAINED, LITTLE MOISTURE, HIGHLY WEATHERED / APPROACHING SAPROLITE LIKE-WEATHERED SHALE. IRON STAINING; DRILL CUTTINGS SUB-ANGULAR TO ROUNDED. NO CLAY BALLS
	10					
25'	11					VERY LIGHT TAN TO LIGHT GRAY, MEDIUM TO FINE GRAIN, NOT MOIST, VERY WEATHERED SHALE TO SAND. SHALE EXHIBITS IRON STAINING; DRILL CUTTINGS SUB-ANGULAR TO ROUNDED. CLAY BALLS ABSENT. VERY DUSTY.
	12					

GEOLOGIST'S SIGNATURE

JOB NUMBER: 6115, 36, 02

PROJECT: World Resources Corp
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W1
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH



COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
30'	15					LIGHT GRAY, MEDIUM GRAINED, NO MAISTURE (VERY DRY) SAND. DRILL CUTTINGS VERY ROUNDED. GRAINS ALL SUB-ANGULAR TO ROUNDED. POWDERY DUE TO LACK OF MOISTURE (NO CLAY BALLS).
	16					
	17					
35'	18				~	DARK BROWN, MEDIUM GRAINED, WELL SORTED, SATURATED SAND IS SILTY SAND. GRAINS ARE ROUNDED, VERY GRITTY CONSIST. YET MAKES A POOR RIBBON.
	19				~	
40'	20				~	DARK BROWN, MEDIUM TO FINE GRAIN SAND, WELL SATURATED SANDY TO SILTY SHALE. DRILL CUTTINGS SUB-ANGULAR TO ROUNDED. GRITTY, SOMEWHAT COHESIVE, CLAY BALLS PRESENT.
	END OF DRILLING					-TD WELL IN HARD SHALE - CGT ≈ 12"
45'						

 GEOLOGIST'S SIGNATURE

JOB NUMBER: 60115.36.02

PROJECT: World Resources Corp
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W2 (DEEP)
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH

COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
0'	1					MEDIUM BROWN, SILTY TO VERY FINE GRAINED, SANDY-LOAM. SLIGHTLY MOIST (DUST ABSENT).
	2					NO CLAY BALLS PRESENT. HOWEVER, SMALL RIBBONS WILL FORM. VERY WELL SORTED, GRAINS HIGHLY ROUND.
	3					
	4					
5'	5					MEDIUM BROWN TO GRAYISH BROWN, VERY FINE GRAINED, SANDY-LOAM. MOISTURE STILL PRESENT, HOWEVER LESS MOIST THAN ABOVE (AGAIN), SMALL RIBBONS WILL FORM. VERY WELL SORTED, ROUNDED GRAINS.
	6					
	7					LIGHT BROWN TO MEDIUM TAN, FINE GRAINED, SANDY-LOAM. MOISTURE STILL PRESENT, BUT LESS MOIST THAN ABOVE. LITTLE OR NO RIBBON FORMS.
15'	8					
	9					MEDIUM TAN, FINE GRAINED, MUDSTONE TO WEATHERED SHALE. CUTTINGS SMALL TO MEDIUM SIZE, SUB-ANGULAR. LITTLE MOISTURE PRESENT.
20'	10					MEDIUM TAN, FINE GRAINED, HARD SHALE
	11					MEDIUM TO DARK BROWN, FINE GRAINED, HIGHLY WEATHERED SHALE, WITH SIGNS OF IRON STAINING. SLIGHTLY SPHERULATED CUTTINGS ROUNDED TO SUB-ANGULAR.
	12					TAN TO GRAY WITH INCREASING DEPTH. VERY FINE GRAIN TO FINE GRAINED MUDSTONE TO WEATHERED SHALE. CUTTINGS SMALL TO MEDIUM SIZE (ALSO INCREASING WITH DEPTH). MICACEOUS CHIPS;
25'	13					
	14					

 GEOLOGIST'S SIGNATURE

JOB NUMBER: 6115.36.02

PROJECT: _____
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W2
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH



COMMENTS: _____

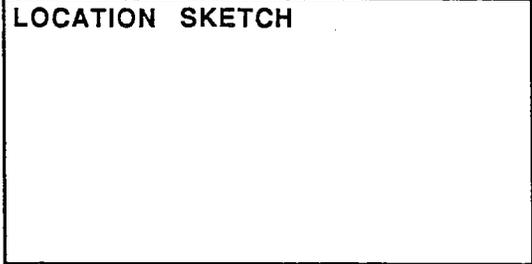
DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
30'	15					CUTTINGS ROUNDED TO SUB-ANGULAR. VERY DUSTY, NO MOISTURE, ABSENCE OF CLAY BALLS.
	16					
	17					TAN TO GRAY FINE GRAINED SHALE TO SILTY LOAM. LITTLE MOISTURE PRESENT. DECREASING WITH DEPTH. CUTTINGS ROUNDED AND SMALL IN SIZE. ABSENCE OF DUST, YET NO CLAY BALLS.
35'	18					
	19					MEDIUM TO LIGHT BROWN, MEDIUM TO FINE, VERY HIGHLY WEATHERED SHALE TO SANDY, SILTY LOAM. SOME DUST, HOWEVER LITTLE MOISTURE IS PRESENT. ABSENCE OF CLAY BALLS.
40'	20					
	21					CUTTINGS OF THE WEATHERED SHALE ARE SMALL TO MEDIUM IN SIZE, AND ROUNDED. LOAM SOFT, BUT NO RIBBON FORMS.
	22					
45'	23					
	24					
50'	25					DARK BROWN, MEDIUM TO FINE GRAIN SANDY LOAM TO SILTY SHALE. GRITTY, SOMEWHAT COHESIVE; DRILL CUTTINGS ARE SMALL IN SIZE, SUBANGULAR TO ROUNDED. NO DUST / MODERATELY SATURATED. CUTTINGS BECOME MORE RESISTANT (SHALE) WITH DEPTH.
	26					END OF DRILLING TO IN DENSE SHALE
55'						

 GEOLOGIST'S SIGNATURE

JOB NUMBER: 6115.26.02

PROJECT: WALTON RESOURCES CORP.
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W3
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH



COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
0'	1					ORANGE TO REDDISH BROWN, MEDIUM TO FINE GRAINED, WEATHERED SHALE TO SANDY LOAM, WITH MEDIUM SIZE PIECES OF RESILANT GRAY SHALE. NO DUST, NO RIBBONS, HOWEVER MOISTURE PRESENT. CUTTINGS: ROUNDED (LOAM MATERIAL).
5'	2					LIGHT BROWN TO MEDIUM TAN, MEDIUM TO FINE GRAINED, HIGHLY WEATHERED SANDSTONE TO SANDY, SILTY LOAM. CUTTINGS ARE SMALL AND ROUNDED, GRAINS ARE ROUNDED. NO DUST PRESENT HOWEVER NOT VERY MOISTY. IRON STAINING PRESENT.
10'	3					MEDIUM BROWN, MEDIUM TO FINE GRAINED, HIGHLY WEATHERED, POORLY CEMENTED, SANDSTONE TO SANDY SILTY LOAM. NO DUST, MODERATELY MOIST/SLIGHTLY SATURATED. CUTTINGS: GRAINS ARE ROUNDED.
15'	4					LIGHT TAN TO LIGHT GRAY, MEDIUM TO FINE GRAINED, HIGHLY WEATHERED, POORLY CEMENTED SANDSTONE. VERY DUSTY, NO MOISTURE PRESENT. CUTTINGS MEDIUM IN SIZE, SUB-ANGULAR TO ROUNDED.
20'	5					LIGHT GRAY, FINE GRAINED, VERY HIGHLY WEATHERED, VERY POORLY CEMENTED SANDSTONE, VERY DUSTY, NO MOISTURE. POWDERY.
25'	6					MEDIUM TAN TO MEDIUM GRAY, MEDIUM TO FINE GRAINED, HIGHLY WEATHERED, POORLY CEMENTED SANDSTONE TO VERY FINE GRAIN SHALE, DUSTY, ALMOST NO TRACES OF MOISTURE PRESENT. CUTTINGS SMALL, SUB-ANGULAR TO ROUNDED. SANDSTONE SHOWS INDICATIONS OF IRON STAINING.
	7					
	8					
	9					
	10					
	11					
	12					
	13					
	14					

GEOLOGIST'S SIGNATURE _____

PROJECT: World Resources Corp.
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W3
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

JOB NUMBER: 6115.36.02

LOCATION SKETCH



COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
30'	15					LIGHT GRAY, VERY FINE GRAINED, SILTSTONE.
	16					VERY DUSTY, NO MOISTURE PRESENT. CUTTINGS
35'	17					ARE SMALL IN SIZE AND SUB-ANGULAR. NO
	18					COHESION / CLAY BALLS.
40'	19					LIGHT TAN TO MEDIUM BUFF, VERY FINE GRAINED
	20					SILTSTONE, DUSTY, BECOMING SLIGHTLY MOIST WITH
	21					DEPTH. CUTTINGS ARE SMALL IN SIZE AND
45'	22					SUB-ANGULAR TO ROUNDED. NO COHESION / CLAY BALLS
	23					LIGHT TAN, VERY FINE GRAINED SILTSTONE TO
50'						SILT. CUTTINGS ARE SMALL IN SIZE AND
						SUB-ANGULAR TO ROUNDED. CLAY BALLS ARE PRESENT
55'						AND ABSENCE OF DUST.
						END OF DRILLING.

 GEOLOGIST'S SIGNATURE

PROJECT: World Resources Corp.
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W4
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

JOB NUMBER: 6115.36.02

LOCATION SKETCH

COMMENTS: _____

DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION (SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
13'	1					ORANGE TO REDDISH BROWN, FINE TO VERY FINE GRAINED SILTSTONE TO WEATHERED SHALE.
14'	2					NO DUST, LITTLE MOISTURE PRESENT. CUTTINGS ARE MEDICAL TO LARGE IN SIZE, AND ARE ROUNDED TO SUB-ANGULAR. PIECE OF RESILANT GRAY TO BLACK SHALE PRESENT.
15'	3					LIGHT BROWN, FINE TO VERY FINE GRAINED, WEATHERED SHALE.
16'	4					NO DUST, MODERATELY MOIST. CUTTINGS ARE SMALL AND ROUND.
17'	5					LIGHT BROWN TO MEDIUM TAN, FINE TO VERY FINE GRAINED SHALE TO SILTSTONE. DUST PRESENT, HOWEVER MOISTURE IS TOO. CUTTINGS ARE SMALL TO
18'	6					MEDIUM IN SIZE, AND ARE ROUNDED TO SUB-ANGULAR IN SHAPE.
19'	7					
20'	8					
21'	9					MEDIUM ORANGISH BROWN, FINE TO VERY FINE GRAINED SILTY LOAM, WITH TRACES OF WEATHERED MUDSTONE WITH MICACEOUS GRAINS. NO DUST, SOME MOISTURE.
22'	10					LIGHT BROWN, FINE TO VERY FINE GRAINED SILTY LOAM WITH TRACES OF WEATHERED MUDSTONE TO SILTSTONE, WITH MICACEOUS GRAINS. NO DUST, MODERATELY MOIST.
23'	11					MEDIUM BROWN, FINE TO VERY FINE GRAINED, SILTY LOAM. NO DUST, MOISTURE PRESENT.
24'	12					LIGHT BROWN, FINE TO VERY FINE GRAINED SILTY LOAM, WITH TRACES OF WEATHERED SILTSTONE WITH MICACEOUS GRAINS. DUST ABSENT, MODERATELY MOIST.
25'	13					MEDIUM TO LIGHT BROWN, FINE TO VERY FINE GRAINED, HIGHLY WEATHERED SHALE, SOME DUST, VERY LITTLE MOISTURE, CUTTINGS VERY SMALL AND ROUNDED.
	14					OLIVE TO LIGHT BROWN, FINE TO VERY FINE GRAINED, SILTY LOAM TO HIGHLY WEATHERED SHALE. DUST ABSENT, MOISTURE PRESENT.

GEOLOGIST'S SIGNATURE _____

JOB NUMBER: 6115.36.02

PROJECT: WALD Resources Corp.
 LOCATION: _____
 BOREHOLE NUMBER: PAF-W4 (DEEP)
 DATE DRILLED: _____
 FIELD REPRESENTATIVE: _____
 DRILLING CONTRACTOR: _____
 DRILLER: _____
 DRILLING METHOD: _____
 HOLE DIAMETER: _____
 GROUND ELEVATION: _____
 CONDITION OF GROUND SURFACE: _____

LOCATION SKETCH



COMMENTS: _____

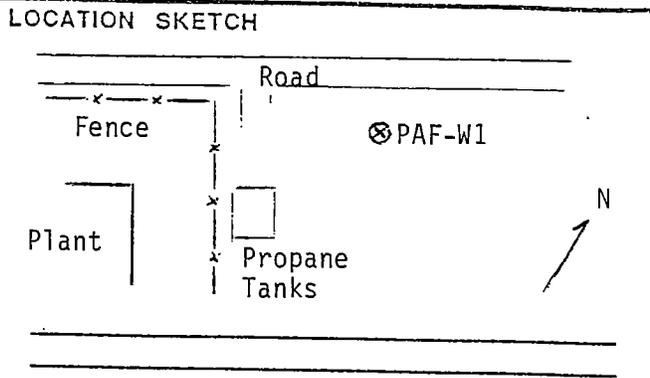
DEPTH	NUMBER	INTERVAL AND TYPE	ADVANCED/RECOVERED	BLOW COUNTS PER 6 INCHES	WATER TABLE	SAMPLE DESCRIPTION
						(SOIL OR ROCK TYPE, COLOR, GRAIN SIZE, SORTING, ROUNDNESS, PLASTICITY, MOISTURE CONTENT, TRACE MATERIALS, ODOR, STAINING, TRACE GAS READINGS)
30'	15					LIGHT BROWN TO TAN FINE TO VERY FINE GRAINED SILTY LOAM TO WEATHERED SILTSTONE. DUSTY, NO MOISTURE PRESENT. CUTTINGS SMALL AND ROUNDED.
	16					MEDIUM BROWN, FINE TO VERY FINE GRAINED SILTSTONE. CUTTINGS SMALL TO SUB-ANGULAR, DUSTY, INCREASINGLY MOIST WITH DEEPER DEPTH.
	17					
35'	18					MEDIUM TO LIGHT BROWN, FINE TO VERY FINE GRAINED SILTY SHALE. CUTTINGS ARE SMALL AND MODERATELY ROUNDED. DUST ABSENT, CLAY BALLS PRESENT, ABUNDANT MOISTURE.
	19					
40'						TO 6" INTO DENSE SHALE
45'						
50'						
55'						

GEOLOGIST'S SIGNATURE

ATTACHMENT 5
Well Construction Data

WELL CONSTRUCTION RECORD

PROJECT: WORLD RESOURCES JOB NUMBER 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W1 GROUND ELEVATION: TBD
 DATE INSTALLED: 3/21/88 WELL CASING ELEVATION: TBD
 FIELD REPRESENTATIVE: Campbell/Tschachler PROTECTOR CASING ELEVATION: _____
 DRILLING CONTRACTOR: Leib Drilling
 DRILLER: G Leib LICENSE NO. NA
 DRILLING METHOD: Air Rotary
 RIG TYPE: Ingersol Rand
 CONDITION OF GROUND SURFACE: Good
 FORMATION SCREENED: Llewellyn



BIT TYPE	HOLE DIA. (IN.)	END DEPTH* (FT.)	FLUID TYPE
Steel Hammer	6"	7' 8"	Air
Steel Roller	8 1/2"	40' 6"	Air

TIME LOG			
ACTIVITY	DATE	START	END
DRILLING	3/21/88	1015	1430
CASING	3/21/88	1530	1630
FILTER PACK	3/21/88	1645	1725
SEAL	3/21/88	1745	1815
GROUT	3/22/88		
DEVELOPMENT SURVEY	3/23/88		
OTHER			

PROTECTOR, CASING & SCREEN RECORD				
DESCRIPTION	DIA. (IN.)	TOTAL LENGTH	TOP *	BOTTOM *
Schedule 40 PVC	4"	25' 6"	0	25' 6"
Schedule 40 PVC- Slotted Screen	.010" 4"	15'	25' 6"	40' 6"

GROUND WATER LEVELS

DURING DRILLING:

- Slight possibility of moisture @ 15-20' no water after 30 min.
- Water encountered @ 36'

COMPLETION MATERIALS RECORD		
DESCRIPTION	TOP *	BOTTOM *
#6 Silica Sand	20' 6"	40' 6"
Wyoming Bentonite Pellets	19'	20' 6"
Sakrete (Portland Cement/Sand Mix)	2' 6"	19'

WELL DEVELOPMENT

-Begin well development 3/23/88. Removed 38 gal. (approx. 7 well volumes) using 3" teflon bailer w/ nylon cord. See development table for info.

* DEPTH FROM GROUND SURFACE

COMMENTS: _____

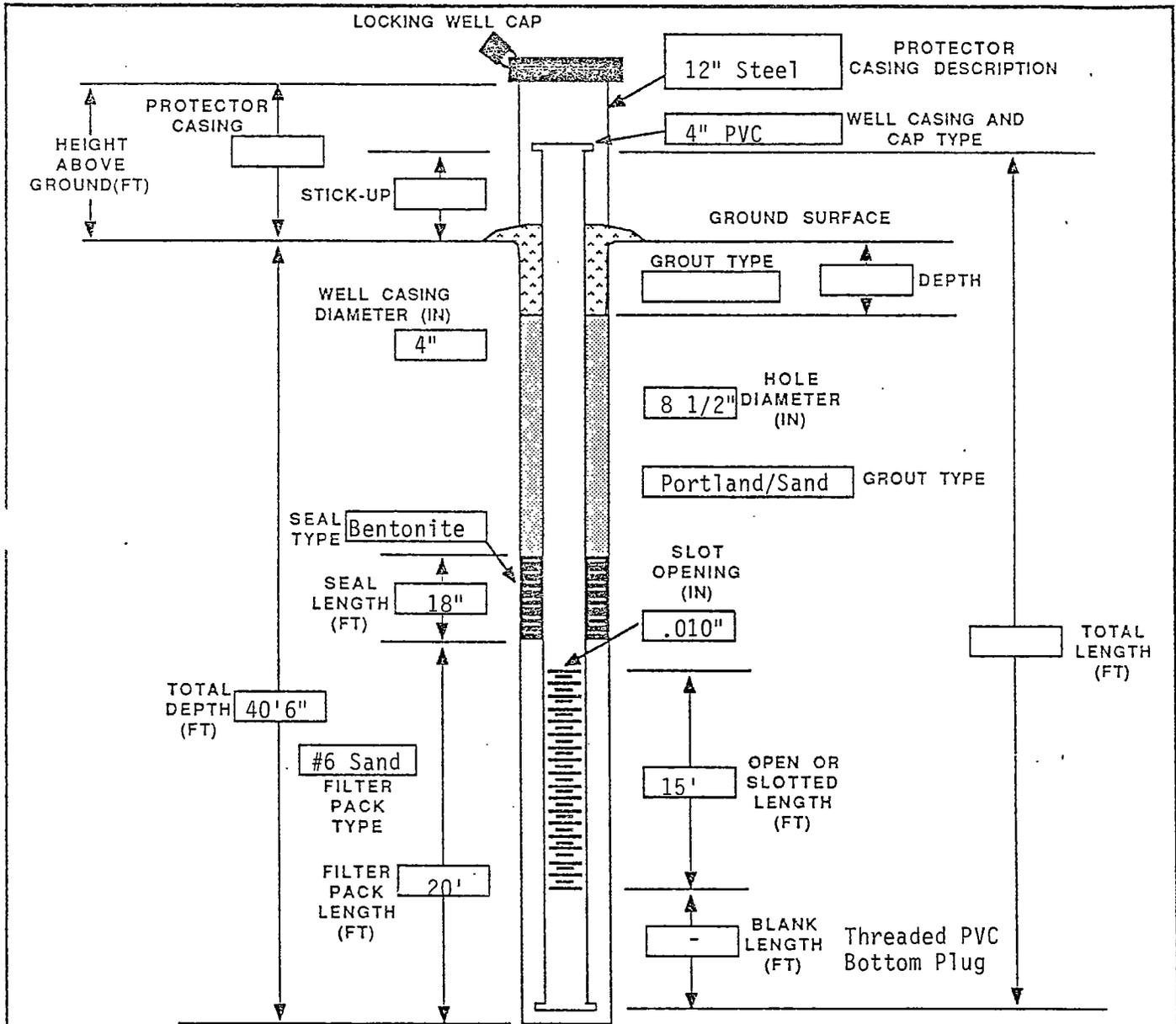
PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36

LOCATION: Pottsville, PA

WELL NUMBER: PAE-W1 ELEVATION: _____

DATE INSTALLED: 3/21/88

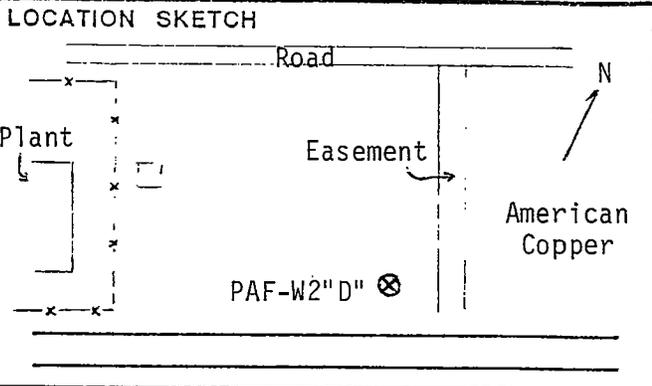
- GROUND CASING PROTECTOR CASING
 ABOVE GROUND LEVEL ABOVE MEAN SEA LEVEL



COMMENTS: _____

WELL CONSTRUCTION RECORD

PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W2 DEEP GROUND ELEVATION: _____
 DATE INSTALLED: 3/23/88 WELL CASING ELEVATION: _____
 FIELD REPRESENTATIVE: Campbell/Tschachler PROTECTOR CASING ELEVATION: _____
 DRILLING CONTRACTOR: Leib Drilling
 DRILLER: G. Leib LICENSE NO. NA
 DRILLING METHOD: Air Rotary
 RIG TYPE: Ingersol Rand
 CONDITION OF GROUND SURFACE: Good
 FORMATION SCREENED: Llewellyn



BIT TYPE	HOLE DIA. (IN.)	END DEPTH* (FT.)	FLUID TYPE
Steel Hammer	6"	approx. 7'	Air
Steel Roller	8 1/2"	51'	Air

TIME LOG			
ACTIVITY	DATE	START	END
DRILLING	3/23/88	0835	1515
CASING	3/23/88	1700	1720
FILTER PACK	3/23/88	1815	1830
SEAL	3/23/88	1830	1900
GROUT	3/24/88	0930	1010
DEVELOPMENT SURVEY	3/25/88		
OTHER			

PROTECTOR, CASING & SCREEN RECORD				
DESCRIPTION	DIA. (IN.)	TOTAL LENGTH	TOP *	BOTTOM *
Conductor Casing	12"	4'6"	0	4'6"
Schedule 40 PVC	4"	26'	0	26'
Schedule 40 PVC- .010 Slotted Screen	4"	25'	26'	51'

GROUND WATER LEVELS
 DURING DRILLING:
 -Evidence of moisture 6-18'; no water after 30 min.
 -Slight ind. of water @25', 40-50'; no water after 45 min.
 -Water @ 46' after 3 hrs.

COMPLETION MATERIALS RECORD		
DESCRIPTION	TOP *	BOTTOM *
#6 Silica Sand	24'	51'
Wyoming Bentonite Pellets	22'	24'
Sakrete (Portland Cement/Sand Mix)	2'6"	22'

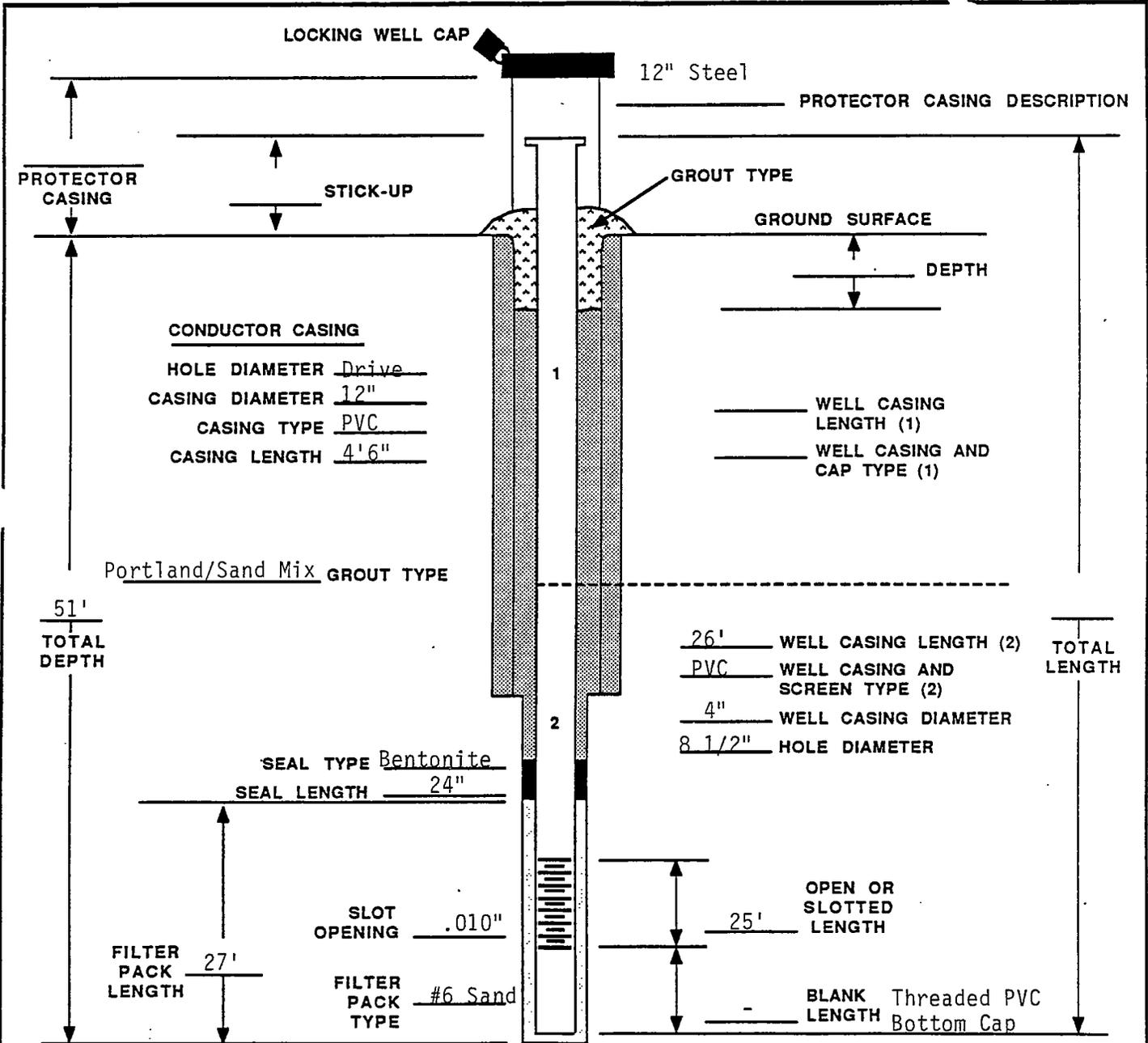
WELL DEVELOPMENT
 -Begin development on 3/25/88. Removed 40 gal. (approx 7 well volumes) using 3" teflon bailer w/ nylon cord.

* DEPTH FROM GROUND SURFACE

COMMENTS: _____

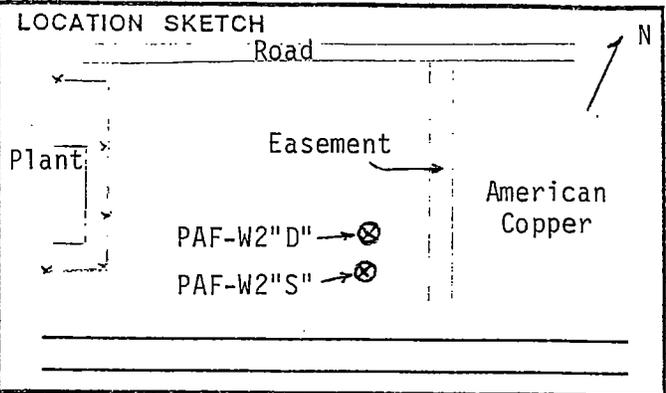
PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W2 DEEP ELEVATION: _____
 DATE INSTALLED: 3/23/88

GROUND CASING PROTECTOR CASING
 ABOVE GROUND LEVEL ABOVE MEAN SEA LEVEL



COMMENTS: _____

PROJECT: WORLD RESOURCES JOB NUMBER 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W2 SHALLOW GROUND ELEVATION: _____
 DATE INSTALLED: 3/23/88 WELL CASING ELEVATION: _____
 FIELD REPRESENTATIVE: Campbell/Tschachler PROTECTOR CASING ELEVATION: _____
 DRILLING CONTRACTOR: Leib Drilling
 DRILLER: G. Leib LICENSE NO. NA
 DRILLING METHOD: Air Rotary
 RIG TYPE: Ingersol Rand
 CONDITION OF GROUND SURFACE: Good
 FORMATION SCREENED: Llewellyn



BIT TYPE	HOLE DIA. (IN.)	END DEPTH* (FT.)	FLUID TYPE
Steel Roller	8 1/2"	18'6"	Air

TIME LOG			
ACTIVITY	DATE	START	END
DRILLING	3/23/88	1545	1730
CASING	3/23/88	1745	1800
FILTER PACK	3/23/88	1800	1815
SEAL	3/23/88	1815	1845
GROUT	3/24/88	0920	0930
DEVELOPMENT SURVEY	3/25/88		
OTHER			

PROTECTOR, CASING & SCREEN RECORD				
DESCRIPTION	DIA. (IN.)	TOTAL LENGTH	TOP *	BOTTOM *
Schedule 40PVC	4"	3'4"	0	3.4'
Schedule 40 PVC- .010 Slotted Screen	4"	15'	3'4"	18'4"

GROUND WATER LEVELS
 DURING DRILLING:
 -Evidence of water @± 6-18'
 -Water @ 14' after 1.5hrs.

COMPLETION MATERIALS RECORD		
DESCRIPTION	TOP *	BOTTOM *
#6 Silica Sand	2'10"	18'4"
Wyoming Bentonite Pellets	16"	2'10"
Sakrete (Portland Cement/Sand Mix)	14"	16"

WELL DEVELOPMENT
 -Begin well development on 3/25/88. Removed 8 gal. (almost purged well to dryness), using a 3" teflon bailer w/ nylon cord. See development table for info.

* DEPTH FROM GROUND SURFACE

COMMENTS: _____

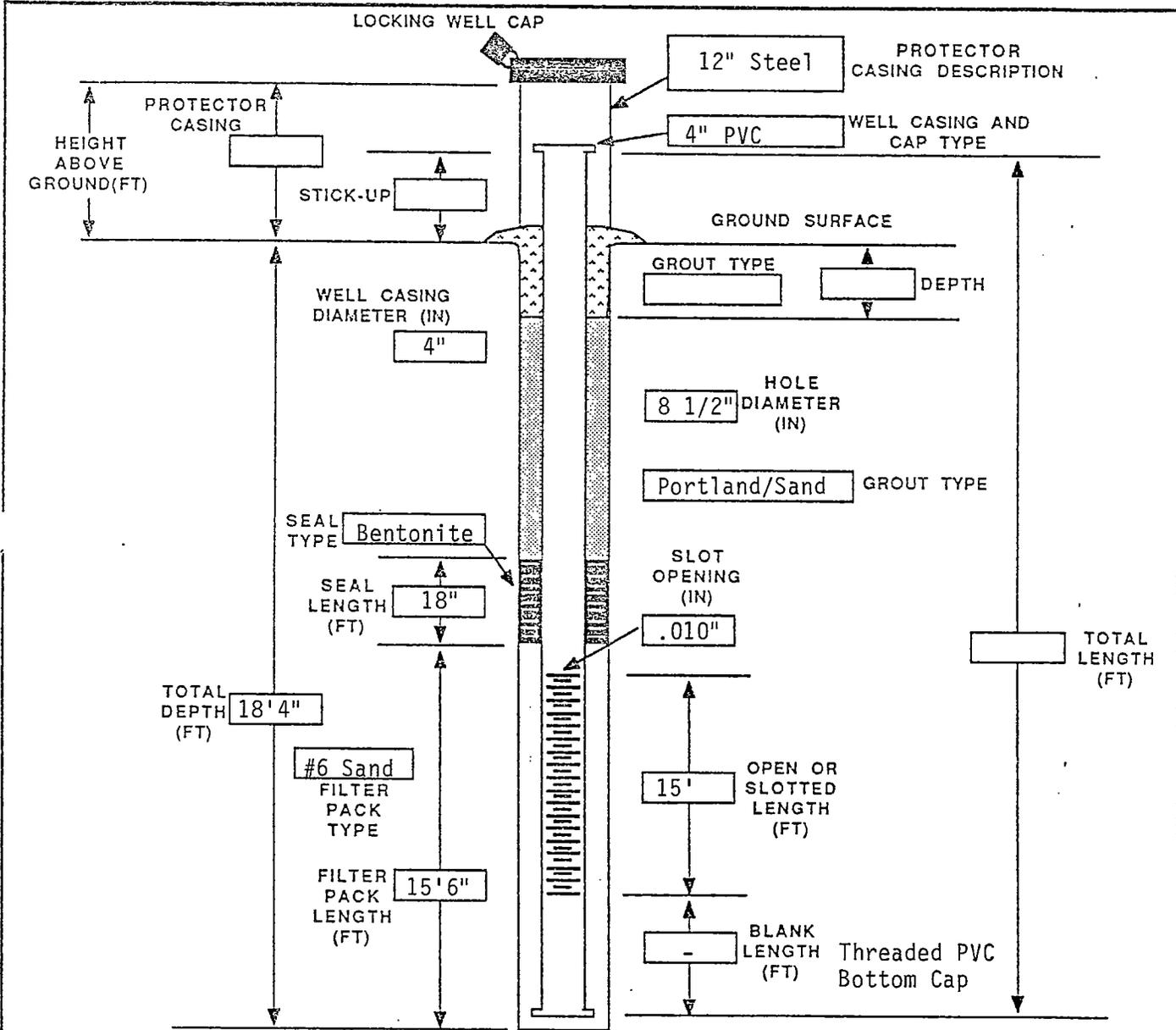
PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36

LOCATION: Pottsville, PA

WELL NUMBER: PAF-W2 SHALLOW ELEVATION: _____

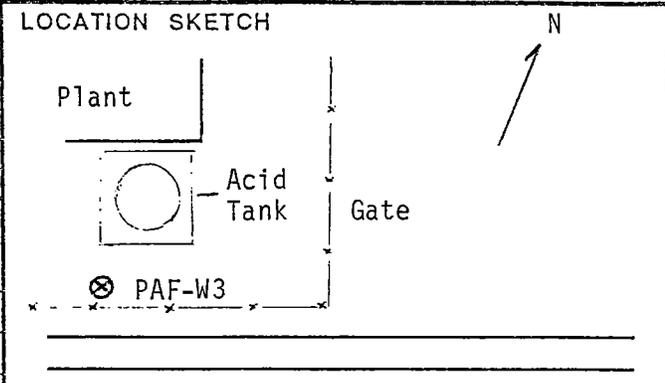
DATE INSTALLED: 3/23/88

- GROUND CASING PROTECTOR CASING
 ABOVE GROUND LEVEL ABOVE MEAN SEA LEVEL



COMMENTS: _____

PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W3 GROUND ELEVATION: _____
 DATE INSTALLED: 3/22/88 WELL CASING ELEVATION: _____
 FIELD REPRESENTATIVE: Campbell/Tschachler PROTECTOR CASING ELEVATION: _____
 DRILLING CONTRACTOR: Leib Drilling
 DRILLER: G. Leib LICENSE NO. NA
 DRILLING METHOD: Air Rotary
 RIG TYPE: Ingersol Rand
 CONDITION OF GROUND SURFACE: Good
 FORMATION SCREENED: Llewellyn



BIT TYPE	HOLE DIA. (IN.)	END DEPTH* (FT.)	FLUID TYPE
Steel Hammer	6"	7'3"	Air
Steel Roller	8 1/2"	46'	Air

TIME LOG			
ACTIVITY	DATE	START	END
DRILLING	3/22/88	1335	1700
CASING	3/22/88	1730	1750
FILTER PACK	3/22/88	1755	1815
SEAL	3/22/88	1820	1850
GROUT	3/23/88	1205	1235
DEVELOPMENT SURVEY	3/24/88		
OTHER			

PROTECTOR, CASING & SCREEN RECORD				
DESCRIPTION	DIA. (IN.)	TOTAL LENGTH	TOP *	BOTTOM *
Schedule 40 PVC	4"	30'6"	0	30'6"
Schedule 40 PVC- .010	4"	15'	30'6"	45'6"
Slotted Screen				
Bottom Cap	4"	6"	45'6"	46'

GROUND WATER LEVELS

DURING DRILLING:

- Possible evidence of moisture @ 10-12', no water after 30 min.
- Evidence of moisture @ 38' increasing w/ depth
- Water @ 38' after 2.5 hrs.

COMPLETION MATERIALS RECORD		
DESCRIPTION	TOP *	BOTTOM *
#6 Silica Sand	29'	46'
Wyoming Bentonite Pellets	27'	29'
Sakrete (Portland Cement/Sand Mix)	2'5"	27'

WELL DEVELOPMENT

-Begin well development on 3/24/88. Removed 40 gal. (approx. 7 well volumes) using 3" teflon bailer w/ nylon cord. See development table for info.

* DEPTH FROM GROUND SURFACE

COMMENTS: _____

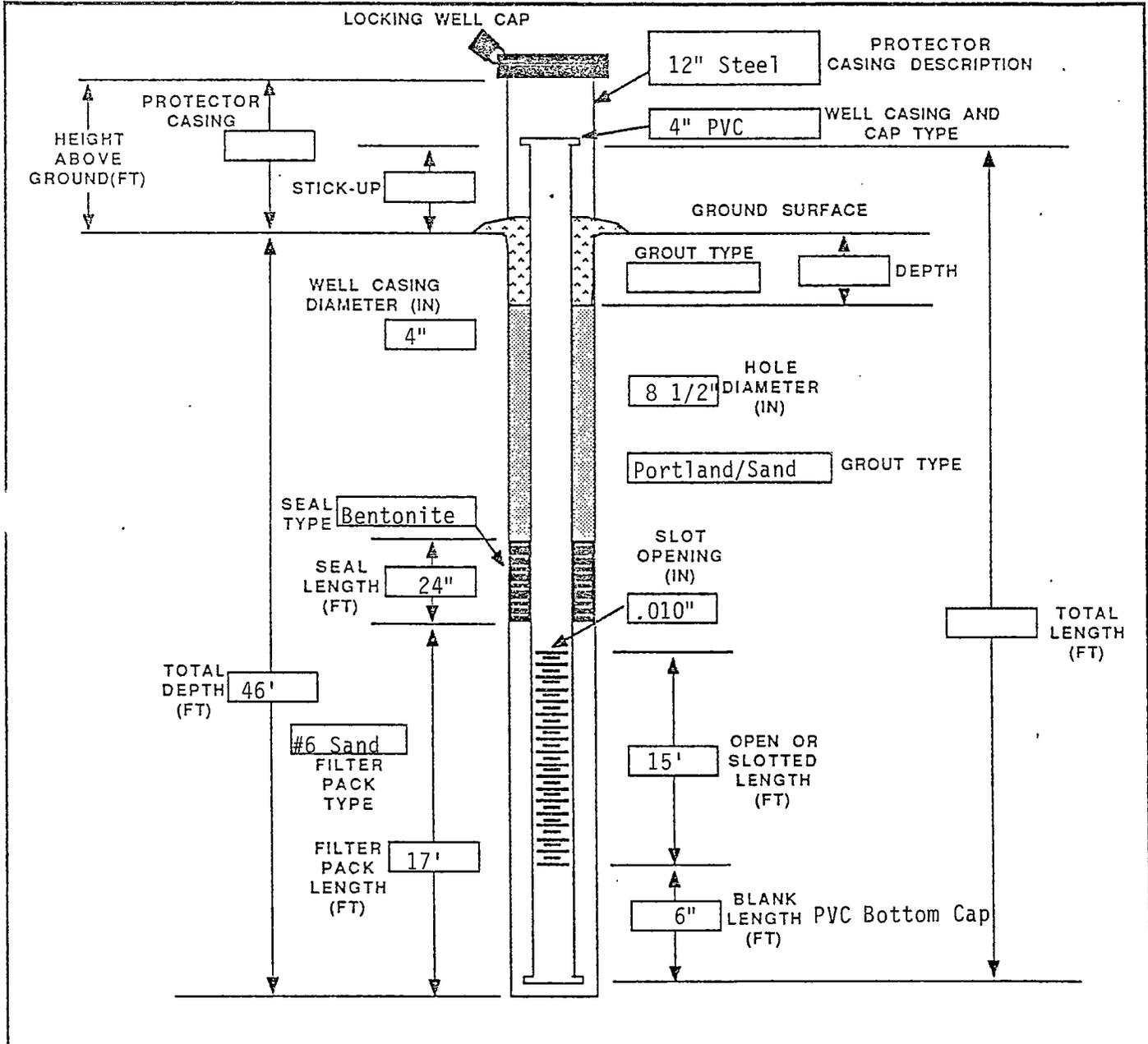
PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36

LOCATION: Pottsville, PA

WELL NUMBER: PAF-W3 ELEVATION: _____

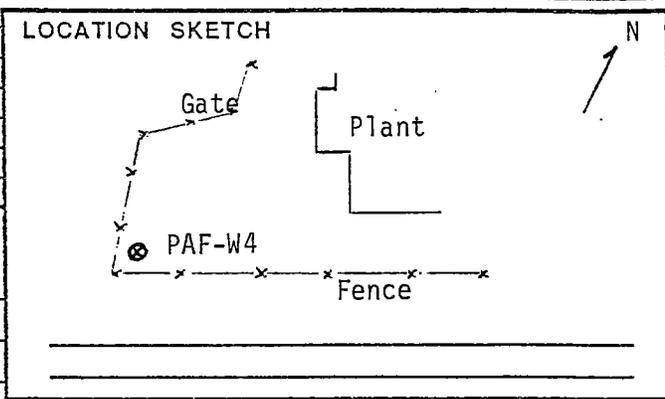
DATE INSTALLED: 3/22/88

- GROUND CASING PROTECTOR CASING
 ABOVE GROUND LEVEL ABOVE MEAN SEA LEVEL



COMMENTS: _____

PROJECT: WORLD RESOURCES JOB NUMBER 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W4 GROUND ELEVATION: _____
 DATE INSTALLED: 3/22/88 WELL CASING ELEVATION: _____
 FIELD REPRESENTATIVE: Campbell/Tschachler PROTECTOR CASING ELEVATION: _____
 DRILLING CONTRACTOR: Leib Drilling
 DRILLER: G. Leib LICENSE NO. NA
 DRILLING METHOD: Air Rotary
 RIG TYPE: Ingersol Rand
 CONDITION OF GROUND SURFACE: Good
 FORMATION SCREENED: Llewellyn



BIT TYPE	HOLE DIA. (IN.)	END DEPTH* (FT.)	FLUID TYPE
Steel Hammer	6"	6'6"	Air
Steel Roller	8 1/2"	40'6"	Air

TIME LOG			
ACTIVITY	DATE	START	END
DRILLING	3/22/88	0915	1045
CASING	3/22/88	1105	1140
FILTER PACK	3/22/88	1400	1425
SEAL	3/22/88	1430	1500
GROUT	3/23/88		
DEVELOPMENT SURVEY	3/24/88		
OTHER			

PROTECTOR, CASING & SCREEN RECORD				
DESCRIPTION	DIA. (IN.)	TOTAL LENGTH	TOP *	BOTTOM *
Schedule 40 PVC	4"	20'	0'	20'
Schedule 40 PVC-.010"	4"	20'	20'	40'
Slotted Screen				
Bottom Cap	4"	6"	40'	40'6"

GROUND WATER LEVELS

DURING DRILLING:

- Slight evidence of moisture @ 6-8', 15-20'; no water after 30 min.
- Increasing indication of water @ 30-40'.
- Water @ 27' after 1 hr.

COMPLETION MATERIALS RECORD		
DESCRIPTION	TOP *	BOTTOM *
#6 Silica Sand	18'6"	40'6"
Wyoming Bentonite Pellets	16'6"	18'6"
Sakrete (Portland Cement/Sand Mix)	2'6"	16'6"

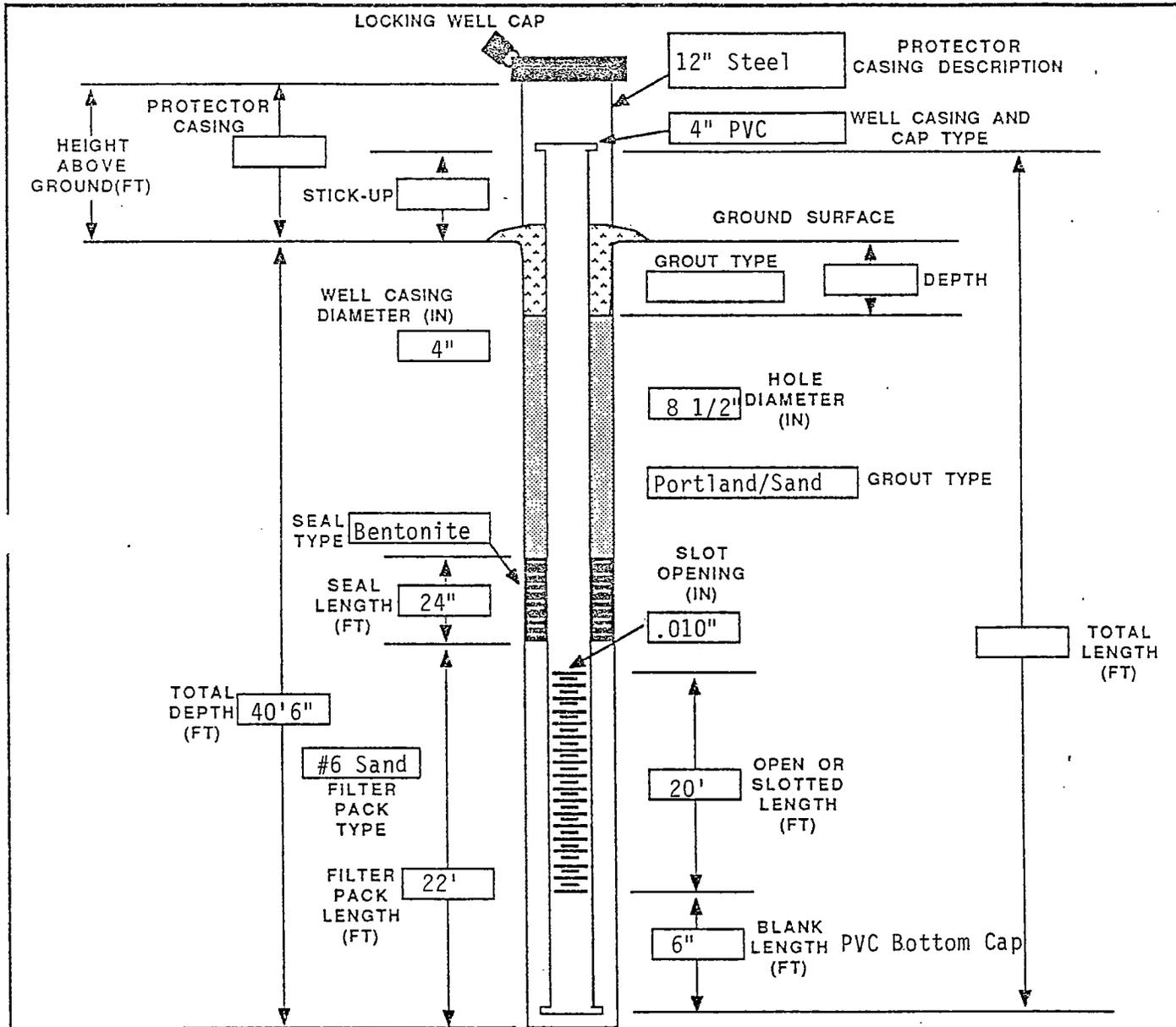
WELL DEVELOPMENT

- Begin well development on 3/24/88.
- Removed 35 gal. (approx. 7 well vol.), using 3" teflon bailer w/ nylon cord.
- See development table for info.

* DEPTH FROM GROUND SURFACE

COMMENTS: _____

PROJECT: WORLD RESOURCES JOB NUMBER: 6115.36
 LOCATION: Pottsville, PA
 WELL NUMBER: PAF-W4 ELEVATION: _____
 DATE INSTALLED: 3/22/88 GROUND CASING PROTECTOR CASING
 ABOVE GROUND LEVEL ABOVE MEAN SEA LEVEL



COMMENTS: _____

ATTACHMENT 6

Initial Well Development Data

Attachment 6. Initial Well Development Data; World Resources, Pottsville, Pennsylvania

Well	Date	Depth of Well	Time		Depth to Water		Physical Parameters		Purge Volume	Comments
			BP	EP	BP	EP	BP	EP		
PAF-W1	3/24/88	40'6"	1100	1205	31'9"	35'8"	Temp pH	13.4°C 5.41	13.3°C 5.16	35 gal. Turbid
PAF-W2 (Deep)	3/25/88	50'5"	0835	0950	15'5"	48'7"	Temp pH	12.0°C 5.61	12.1°C 5.87	45 gal. Turbid
PAF-W2 (Shallow)	2/24/88	18'4"	1545	1600	11'4"	17'2"	Temp pH	8.8°C 5.17	7.6°C 4.69	8 gal. Slightly turbid
PAF-W3	3/24/88	45'5"	1400	1515	24'6"	29'8"	Temp pH	13.1°C 5.64	12.4°C 5.56	40 gal. Turbid
PAF-W4	3/24/88	39'7"	1235	1320	27'8"	28'2"	Temp pH	13.6°C 5.84	13.1°C 5.50	35 Gal. Turbid

Note: BP - Before purging
EP - End of purge

ATTACHMENT 7

Sampling Purge Path Data

Attachment 7. Sampling Purge Path; World Resources, Pottsville, PA

Well	Date	Time		Depth to Water		Physical Parameter				Purge Volume	
		BP	EP	S	BP	EP	BP	DP	EP		
PAF-W1	3/25/88	1042	1110	1245	32'2"	35'1"	Temp	12.8°C	12.1°C	12.1°C	20 gallons
							pH	5.21	5.22	5.01	
PAF-W2 (Deep)	3/25/88	1220	1240	1347	35'0"	47'0"	Temp	11.4°C	-	11.0°C	14 gallons
							pH	5.57	-	5.76	
PAF-W3 (Shallow)	3/25/88	1000	1025	1210	11'4"	16'10"	Temp	7.8°C	-	7.5°C	8 gallons
							pH	5.36	-	5.70	
PAF-W3	3/25/88	1120	1200	1335	24'4"	32'0"	Temp	12.3°C	11.3°C	11.2°C	35 gallons
							pH	5.45	5.56	5.56	
PAF-W4	3/25/88	1300	1330	1413	27'10"	28'6"	Temp	12.7°C	12.4°C	12.4°C	24 gallons
							pH	5.25	5.26	5.25	

Note: BP - Before purge
 DP - During purge
 EP - End of purge
 S - Sample