TECHNICAL MEMORANDUM

TO: Dennis Crumpler / OAQPS

FROM: Eric Boswell / NAREL

COPY: Ms. Cindy Castronovo / CARB
Dr. Richard Tropp / DRI
Ms. RaeAnn Haynes / ODEQ
Dr. R.K.M. Jayanty / RTI
Dr. Raul Dominguez / AQMD
Dr. Charles McDade / UCD

AUTHOR: Jewell Smiley / NAREL

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SUBJECT: Experimental Inter-comparison of Speciation Laboratories

Introduction

This study was conducted as part of the EPA's quality assurance oversight for two air monitoring networks that include the Chemical Speciation Network (CSN) and the Interagency Monitoring of Protected Visual Environments (IMPROVE) Program. The purpose of this study was to evaluate specific laboratory performance at those laboratories that routinely analyze chemical speciation samples.

This study required each participating laboratory to analyze a set of blind Performance Testing (PT) filter samples. The PT samples were prepared at the National Air and Radiation Environmental Laboratory (NAREL) located in Montgomery, AL. NAREL was able to create replicate filter samples for this study by using collocated Met One speciation samplers. The collocated samplers were programmed to collect $PM_{2.5}$ from the Montgomery air and simultaneously load several filters during each collection event. A sufficient number of replicates were prepared so that each laboratory could receive the following set of PT samples.

- Gravimetric Mass Analysis – ten Teflon® filter samples and two metallic weights
- Ion Chromatography (IC) Analysis – six Nylon® filter samples or six Teflon® filter samples
- Carbon by Thermal Optical Analysis (TOA) – six quartz filter samples
- Elemental analysis by X-Ray Fluorescence (XRF) – six 47-mm or eight 25-mm Teflon® filter samples

Detailed instructions for analyzing and reporting the PT samples were provided by NAREL. This report will compare and discuss the analytical results received from all of the laboratories. Some of the laboratories received a full set of PT samples, and some received a partial set due to limitations that will be explained later in the appropriate section of this report. Table 1 identifies all of the laboratories along with their level of participation.

Table 1. List of Participating Laboratories

Laboratory	Location	Analyses Reported
California Air Resources Board (CARB)	Sacramento, CA	Gravimetric mass IC analysis, Nylon® filters TOA carbon, IMPROVE_A method Elements by XRF (47-mm filters)
Desert Research Institute (DRI)	Reno, NV	Gravimetric mass IC analysis, Teflon® filters IC analysis, Nylon® filters TOA carbon, CSN method TOA carbon, IMPROVE_A method Elements by XRF (25- & 47-mm filters)
Oregon Dept. of Environmental Quality (ODEQ)	Portland, OR	Gravimetric mass IC analysis, Nylon® filters Elements by XRF (47-mm filters)
Research Triangle Institute (RTI)	Research Triangle Park, NC	Gravimetric mass IC analysis, Nylon® filters TOA carbon, CSN method TOA carbon, IMPROVE_A method Elements by XRF (25- & 47-mm filters)
South Coast Air Quality Management District (AQMD)	Diamond Bar, CA	Gravimetric mass IC analysis, Nylon® filters TOA carbon, IMPROVE method Elements by XRF (47-mm filters)
University of California / Davis (UCD)	Davis, CA	Gravimetric mass Elements by XRF (25- & 47-mm filters)
EPA's National Air and Radiation Environmental Laboratory (NAREL)	Montgomery, AL	Gravimetric mass IC analysis, Teflon® filters IC analysis, Nylon® filters TOA carbon, CSN method TOA carbon, IMPROVE_A method

Mass determination typically proceeds by weighing the Teflon® collection filter before and after the sampling event. The amount of Particulate Matter ($PM_{2.5}$) captured onto the surface of the filter can be calculated by a simple subtraction of the tare mass from the loaded filter mass. Each speciation laboratory routinely provides clean PRE-weighed air filters to the supported field sites. At the field site, an approved sampling device must be used to deposit the $PM_{2.5}$ onto the collection filter. The loaded filter is returned to the originating laboratory where the gravimetric analysis is completed by POST-weighing the filter. After the gravimetric measurements are complete, the Teflon® filter is examined further using XRF to determine the elemental composition of the filter deposit. Usually XRF is the final analysis of the Teflon® filter after which the filter is placed into an archive for storage, but in some cases the filter is subjected to one more [final] analysis to determine the ions present in the filter deposit. If the Teflon® filter is examined for ions, it must be extracted, and the extract is subsequently analyzed using ion chromatography.

Most of the speciation laboratories provide clean Nylon® filters to the field sites. It is usually the Nylon® filter that is used to capture $PM_{2.5}$ for subsequent IC analysis. After the loaded filter is returned to the laboratory, the IC analysis typically proceeds by first extracting the filter using an appropriate solvent. The extract must be analyzed using an IC instrument that is optimized to determine the ions of interest. Target anions and target cations must be analyzed on separate IC instruments.

The laboratories also provide clean quartz filters to the supported field sites. The quartz filter is used to capture $PM_{2.5}$ for subsequent carbon analysis. A thermal/optical analysis (TOA) is performed at the laboratory to determine the carbon present on the quartz filter. A carefully measured portion of the quartz filter is placed into a special oven equipped to shine a laser at the sample. The TOA technique requires heating the quartz filter material to release captured $PM_{2.5}$. Carbon components released from the filter are catalytically converted to methane and measured by a flame ionization detector (FID) positioned at the end of the sample train. A thermogram produced by the analysis contains signals from the FID and from the laser. Interpretation of the thermogram provides results for the organic carbon (OC) and the elemental carbon (EC) the sum of which represents the total carbon (TC) present in the sample. Three slightly different TOA methods were used to analyze samples during this study. A more detailed description of each TOA method will be provided later in this report.

Gravimetric Analysis

Ten new filters and two metallic transfer weights were supplied by NAREL to each laboratory for this study. These samples were placed into individual Petri slides and shipped by overnight mail to the receiving lab with instructions to PRE-weigh each filter and metallic weight using the local standard procedures. After tare measurements were completed at the receiving lab, the filters and metallic weights were returned to Montgomery and immediately placed into the weighing chamber at NAREL for equilibration and determination of a stable tare mass. Shortly after NAREL's tare measurements were complete, some of the filters were loaded with $PM_{2.5}$ captured from the Montgomery air. Collocated Met One SuperSASS air samplers were used to load seven of the filters in each sample set according to the sampling schedule presented in table 2.

Table 2. Sampling Schedule for Gravimetric PT Filters

Filter ID	Serial Number	Sample Start	Event Duration	Receiving Lab
T08-12640	T8085601	17-Dec-08	28-hour	CARB
T08-12641	T8085772	17-Dec-08	28-hour	CARB
T08-12642	T8085603	18-Dec-08	56-hour	CARB
T08-12643	T8085604	18-Dec-08	56-hour	CARB
T08-12644	T8085605	21-Dec-08	42-hour	CARB
T08-12645	T8085606	21-Dec-08	42-hour	CARB
T08-12646	T8085607	23-Dec-08	24-hour	CARB
T08-12650	T8085611	17-Dec-08	28-hour	DRI
T08-12651	T8085612	17-Dec-08	28-hour	DRI
T08-12652	T8085613	18-Dec-08	56-hour	DRI
T08-12653	T8085614	18-Dec-08	56-hour	DRI
T08-12654	T8085615	21-Dec-08	42-hour	DRI
T08-12655	T8085616	21-Dec-08	42-hour	DRI
T08-12656	T8085617	23-Dec-08	24-hour	DRI
T08-12660	T8085621	17-Dec-08	28-hour	ODEQ
T08-12661	T8085622	17-Dec-08	28-hour	ODEQ
T08-12662	T8085623	18-Dec-08	56-hour	ODEQ

Filter ID	Serial Number	Sample Start	Event Duration	Receiving Lab
T08-12663	T8085624	18-Dec-08	56-hour	ODEQ
T08-12664	T8085625	21-Dec-08	42-hour	ODEQ
T08-12665	T8085626	21-Dec-08	42-hour	ODEQ
T08-12666	T8085627	23-Dec-08	24-hour	ODEQ
T08-12670	T8085631	17-Dec-08	28-hour	RTI
T08-12671	T8085632	17-Dec-08	28-hour	RTI
T08-12672	T8085633	18-Dec-08	56-hour	RTI
T08-12673	T8085634	18-Dec-08	56-hour	RTI
T08-12674	T8085635	21-Dec-08	42-hour	RTI
T08-12675	T8085636	21-Dec-08	42-hour	RTI
T08-12676	T8085637	23-Dec-08	24-hour	RTI
T08-12680	T8085641	17-Dec-08	28-hour	AQMD
T08-12681	T8085642	17-Dec-08	28-hour	AQMD
T08-12682	T8085643	18-Dec-08	56-hour	AQMD
T08-12683	T8085644	18-Dec-08	56-hour	AQMD
T08-12684	T8085645	21-Dec-08	42-hour	AQMD
T08-12685	T8085646	21-Dec-08	42-hour	AQMD
T08-12686	T8085647	23-Dec-08	24-hour	AQMD
T08-12690	none	17-Dec-08	28-hour	UCD
T08-12691	none	17-Dec-08	28-hour	UCD
T08-12692	none	18-Dec-08	56-hour	UCD
T08-12693	none	18-Dec-08	56-hour	UCD
T08-12694	none	21-Dec-08	42-hour	UCD
T08-12695	none	21-Dec-08	42-hour	UCD
T08-12696	none	23-Dec-08	24-hour	UCD

**** The 25-mm filters supplied to UCD did not have serial numbers***.

Table 2 shows forty-two filters that were loaded during four separate collection events. A sufficient number of replicates were prepared during each event such that each lab could be provided with an almost identical set of loaded filters. For example, twelve replicates were created during a 28-hour collection event that started on December 17, and two of these replicates were submitted to each lab for analysis. Similarly, twelve replicates were created during a 56-hour collection event that started on December 18, and two of these replicates were submitted to each lab for analysis. Table 2 does not list all of the filters that were PRE-weighed at the participating labs. Three of the ten filters that were PRE-weighed at each lab were not scheduled for loading because they were used as filter blanks for this study.

Following sample collection, the filters and the metallic weights were returned to the weighing chamber at NAREL and POST-weighed multiple times over the course of several days to demonstrate a stable final mass. Finally, the filters and metallic weights were placed into small Igloo® coolers with ice substitute and shipped back to the participating labs for POST-weighing. It is worth mentioning that the metallic weights were included in this study because they are usually less susceptible to weighing errors due to factors such as electrical static and volatility of filter constituents.

Gravimetric Results

The results from this study are summarized in figure 1. The critical information needed by the program is the mass of $PM_{2.5}$ deposited onto the surface of a collection filter, and therefore, $PM_{2.5}$ capture is plotted in figure 1 for the seven loaded filters, three travel blanks, and two metallic weights.

Figure 1

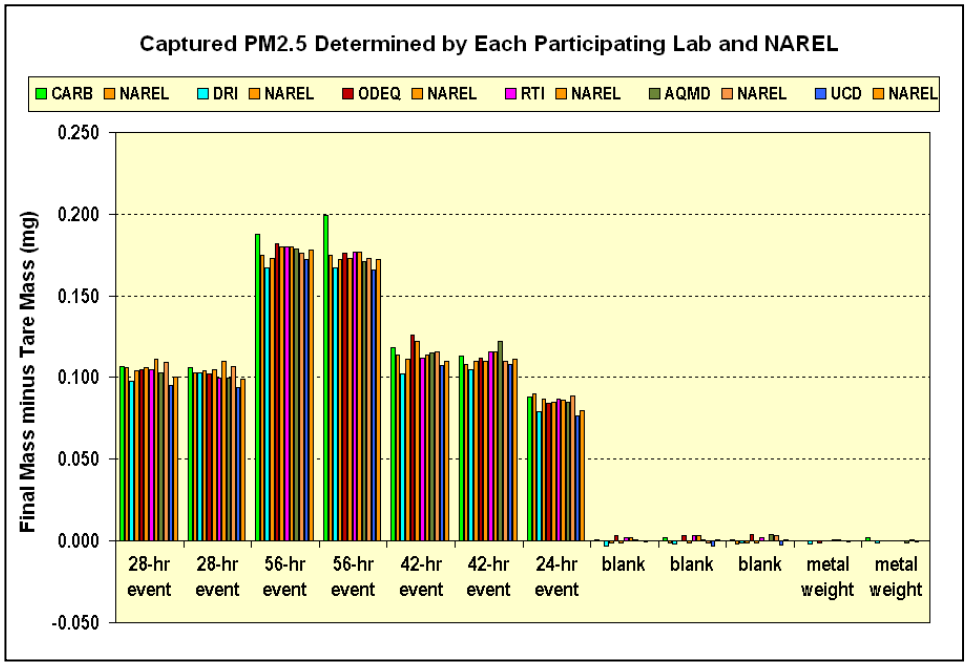
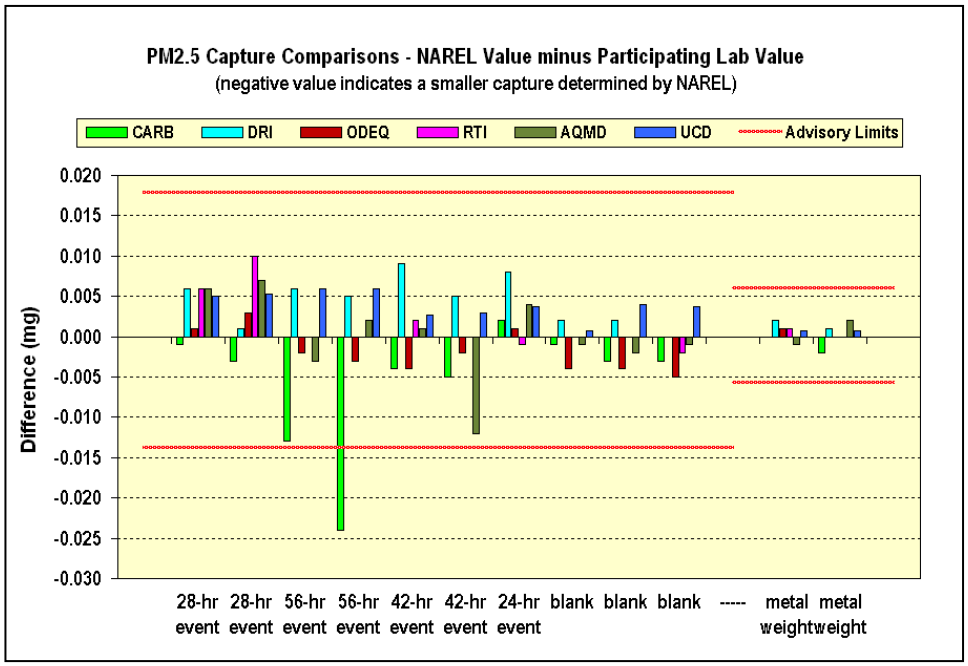


Figure 2 presents the inter-laboratory differences along with advisory limits. Inter-laboratory differences were calculated by subtracting the $PM_{2.5}$ capture value determined at each speciation lab from the capture value determined at NAREL. Notice that a negative bar on the figure 2 graph represents a smaller $PM_{2.5}$ capture value determined at NAREL. The 3-sigma advisory limits were derived from all of the gravimetric PT studies administered by NAREL during the past several years.

Figure 2



For most samples good agreement is observed between the capture value determined at NAREL and the capture value reported by the test lab. However, one of the 56-hour filters analyzed at CARB appears to be an outlier. This sample exceeded the 3-sigma advisory limits shown in figure 2.

The appearance of an outlier prompted investigation at NAREL. The outlier was a 56-hour filter sample identified as T08-12643 (see table 2). The raw data from this sample has been summarized along a time line in table 3. The tare mass reported by CARB was only two micrograms smaller than the tare mass reported by NAREL, but the POST-mass was 22 micrograms larger than the POST-mass reported by NAREL. The raw data shows us that the discrepancy associated with this sample was a large difference in the POST-mass reported by both labs. Table 3 also shows us that on March 16 and April 17 NAREL performed two extra POST-mass determinations after the analysis had officially ended at both labs. The extra POST-measurements performed at NAREL show a gradual decline in filter mass from the Post-mass reported by CARB. If we accept that all measurements shown in table 3 are valid, what would make the filter mass change in this manner? Could moisture be responsible?

Table 3. Summary of Raw Data for Sample T08-12643

Date	Events and Comments	Filter Mass (mg)
01-Dec-08	Filter inspected at NAREL	145.605
03-Dec-08	Filter shipped to CARB by express mail	-----
09-Dec-08	***Tare mass of record*** reported by CARB	**145.600**
11-Dec-08	Filter returned to NAREL	-----
15-Dec-08	***Tare mass of record*** reported by NAREL	**145.602**
18-Dec-08	56-hour collection event started	-----
06-Jan-09	First POST-weighing at NAREL	145.781
13-Jan-09	***POST-mass of record*** reported by NAREL	**145.777**
14-Jan-09	Filter shipped to CARB by express mail	-----
30-Jan-09	***POST-mass of record*** reported by CARB	**145.799**
13-Mar-09	Filter returned to NAREL	-----
16-Mar-09	Extra POST-weighing performed at NAREL	145.789
17-Apr-09	Extra POST-weighing performed at NAREL	145.775

The raw data reported from all laboratories have been tabulated for easy viewing. At the end of this report, Table 11 contains the tare weight, the final loaded weight, and the calculated $PM_{2.5}$ capture for each sample. Table 11 also contains the calculated inter-laboratory difference for measuring the $PM_{2.5}$ capture which is graphed in figure 2.

All of the participating labs have an SOP for measuring the gravimetric mass of $PM_{2.5}$ filter samples. Most of the SOP's are currently available on the web for easy viewing (see reference 1 through 5).

IC Analysis

This study included the analysis of selected ions using three slightly different IC methods. Six labs analyzed a set of Nylon® filters using the CSN method, two labs analyzed a set of Teflon® filters using the CSN method, and finally two labs analyzed a set of Nylon® filters using the IMPROVE method. To avoid confusion about the methods identified here, it should be stated that the CSN method was previously referred to as the Speciation Trends Network (STN) method. CSN is used in this report to be consistent with the language used in recent EPA contracts that support the chemical speciation network which includes approximately 200 field sites.

NAREL provided each lab with a set of at least six filters for each method tested. Each sample set contained two blank filters and four filters that were loaded with $PM_{2.5}$ collected from the Montgomery air. Collocated Met One SuperSASS air samplers were used to load filters and create replicates in each sample set according the sampling schedule presented in table 4.

Table 4. Sampling Schedule for Ion Chromatography PT Filters

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
N08-12313	Nylon®	23-Jan-08	152-hour	CARB	CSN
N08-12314	Nylon®	23-Jan-08	152-hour	CARB	CSN
N08-12432	Nylon®	12-May-08	144-hour	CARB	CSN
N08-12433	Nylon®	12-May-08	144-hour	CARB	CSN
N08-12315	Nylon®	23-Jan-08	152-hour	DRI	CSN
N08-12316	Nylon®	23-Jan-08	152-hour	DRI	CSN
N08-12434	Nylon®	12-May-08	144-hour	DRI	CSN
N08-12435	Nylon®	12-May-08	144-hour	DRI	CSN
N08-12497	Nylon®	18-Jul-08	144-hour	DRI (extra set)	CSN
N08-12498	Nylon®	18-Jul-08	144-hour	DRI (extra set)	CSN
N08-12502	Nylon®	24-Jul-08	156-hour	DRI (extra set)	CSN
N08-12503	Nylon®	24-Jul-08	156-hour	DRI (extra set)	CSN
N08-12317	Nylon®	23-Jan-08	152-hour	ODEQ	CSN
N08-12318	Nylon®	23-Jan-08	152-hour	ODEQ	CSN
N08-12436	Nylon®	12-May-08	144-hour	ODEQ	CSN
N08-12437	Nylon®	12-May-08	144-hour	ODEQ	CSN
N08-12319	Nylon®	23-Jan-08	152-hour	RTI	CSN
N08-12320	Nylon®	23-Jan-08	152-hour	RTI	CSN
N08-12438	Nylon®	12-May-08	144-hour	RTI	CSN
N08-12439	Nylon®	12-May-08	144-hour	RTI	CSN
N08-12323	Nylon®	23-Jan-08	152-hour	AQMD	CSN
N08-12442	Nylon®	12-May-08	144-hour	AQMD	CSN
N08-12501	Nylon®	18-Jul-08	144-hour	AQMD	CSN
N08-12506	Nylon®	24-Jul-08	156-hour	AQMD	CSN
N08-12321	Nylon®	23-Jan-08	152-hour	NAREL	CSN
N08-12322	Nylon®	23-Jan-08	152-hour	NAREL	CSN
N08-12440	Nylon®	12-May-08	144-hour	NAREL	CSN
N08-12441	Nylon®	12-May-08	144-hour	NAREL	CSN
N08-12499	Nylon®	18-Jul-08	144-hour	NAREL (extra set)	CSN
N08-12500	Nylon®	18-Jul-08	144-hour	NAREL (extra set)	CSN

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
N08-12504	Nylon®	24-Jul-08	156-hour	NAREL (extra set)	CSN
N08-12505	Nylon®	24-Jul-08	156-hour	NAREL (extra set)	CSN
T08-12487	Teflon®	18-Jul-08	144-hour	DRI	CSN
T08-12488	Teflon®	18-Jul-08	144-hour	DRI	CSN
T08-12492	Teflon®	24-Jul-08	156-hour	DRI	CSN
T08-12493	Teflon®	24-Jul-08	156-hour	DRI	CSN
T08-12489	Teflon®	18-Jul-08	144-hour	NAREL	CSN
T08-12490	Teflon®	18-Jul-08	144-hour	NAREL	CSN
T08-12494	Teflon®	24-Jul-08	156-hour	NAREL	CSN
T08-12495	Teflon®	24-Jul-08	156-hour	NAREL	CSN
N08-12328	Nylon®	30-Jan-08	128-hour	RTI	IMPROVE
N08-12329	Nylon®	30-Jan-08	128-hour	RTI	IMPROVE
N08-12447	Nylon®	19-May-08	144-hour	RTI	IMPROVE
N08-12448	Nylon®	19-May-08	144-hour	RTI	IMPROVE
N08-12330	Nylon®	30-Jan-08	128-hour	NAREL	IMPROVE
N08-12331	Nylon®	30-Jan-08	128-hour	NAREL	IMPROVE
N08-12449	Nylon®	19-May-08	144-hour	NAREL	IMPROVE
N08-12450	Nylon®	19-May-08	144-hour	NAREL	IMPROVE

Table 4 shows forty-eight filters that were loaded during six separate collection events. Several replicates were prepared during each event, creating a pool of replicates which were available for distribution among the participating labs. Careful inspection of table 4 will show that two replicates from each event were usually distributed to each participating lab for analysis. An exception was made for the AQMD laboratory which received only one replicate from each sampling event. This exception was necessary because AQMD's request to participate in this study came late in the planning process. The collection times used for this study were significantly longer than the usual twenty-four hours to boost the amount of $PM_{2.5}$ collected and raise the level of most analytes to above the detection threshold. Table 4 does not list the filter blanks that were provided to each lab.

Filter sets were provided to the participating labs with instructions to use the local standard procedures, as closely as possible, for the extraction and the IC analysis. No information was given to the labs about the history of the individual filters. The results were reported for each sample based upon the amount of analyte present on the filter (µg/filter). All of the participating labs have an SOP for analyzing $PM_{2.5}$ filter samples by IC. Most of the SOP's are currently available on the web for easy viewing (see reference 6 through 16).

IC Results

Results from the analysis of thirty-two Nylon® filters using the CSN method are presented as bar graphs in figures 3 through 6. Figures 3 and 4 show results from eleven replicates sampled on January 23 and eleven replicates sampled on May 12.

Nitrate, sulfate, and ammonium were the most abundant analytes captured from the Montgomery air, and these mid-level ions are plotted together in figure 3. Each cluster of bars in the graph is labeled with the ion reported, but the individual samples within each cluster are not identified. It is important to understand that the replicate samples within each cluster were consistently arranged, from left to right, in the same order. Reasonably good agreement can be seen in figure 3 for all of the mid-level ions.

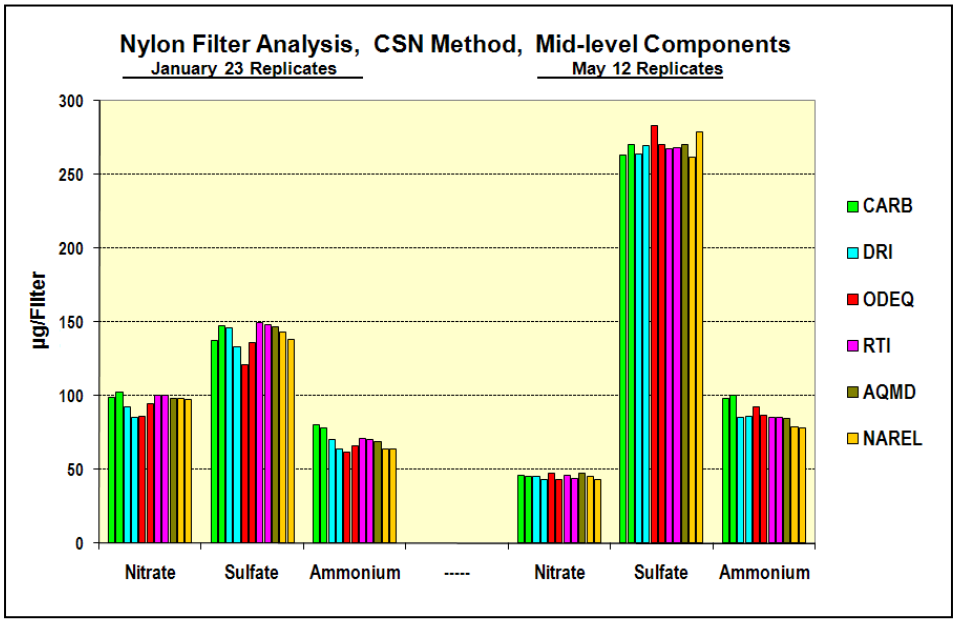
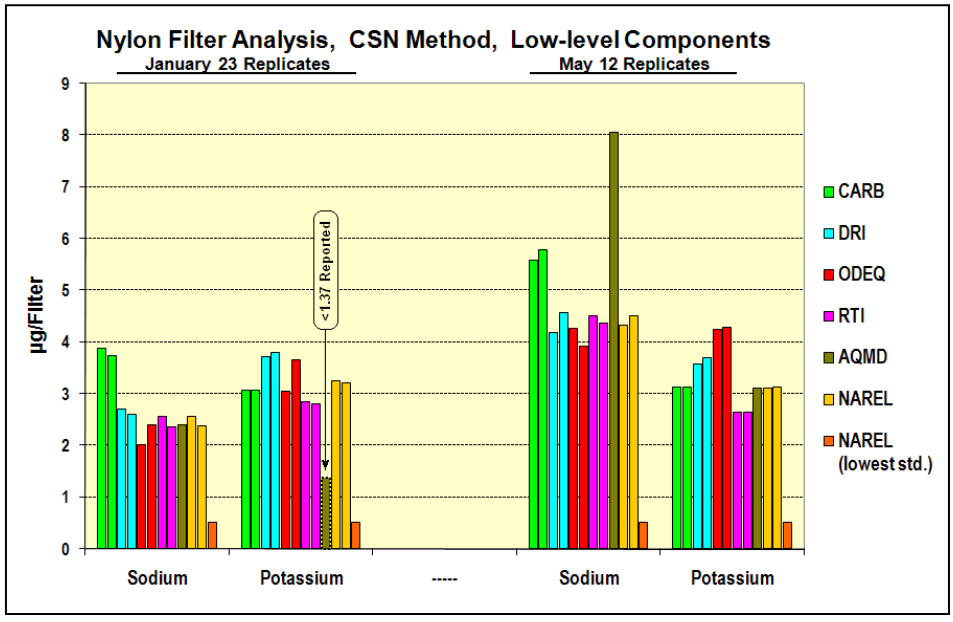


Figure 3

Sodium and potassium were present in the air at relatively low levels, and these ions are plotted in figure 4. Since figure 4 shows the low-level components, an extra bar has been added that represents the lowest calibration standard analyzed at NAREL. The lowest calibration standard is a good estimate of the practical quantification limit for the analysis. Please note that potassium was not reported as a discrete value by AQMD for its January 23 replicate. It was reported at <1.37 µg/filter as reflected by the annotation on the graph. The sodium reported by AQMD for the May 12 replicates is noticeably the highest value reported. Also worth noting, the sodium values reported by CARB consistently show a slightly high bias compared to the other labs.

Figure 4



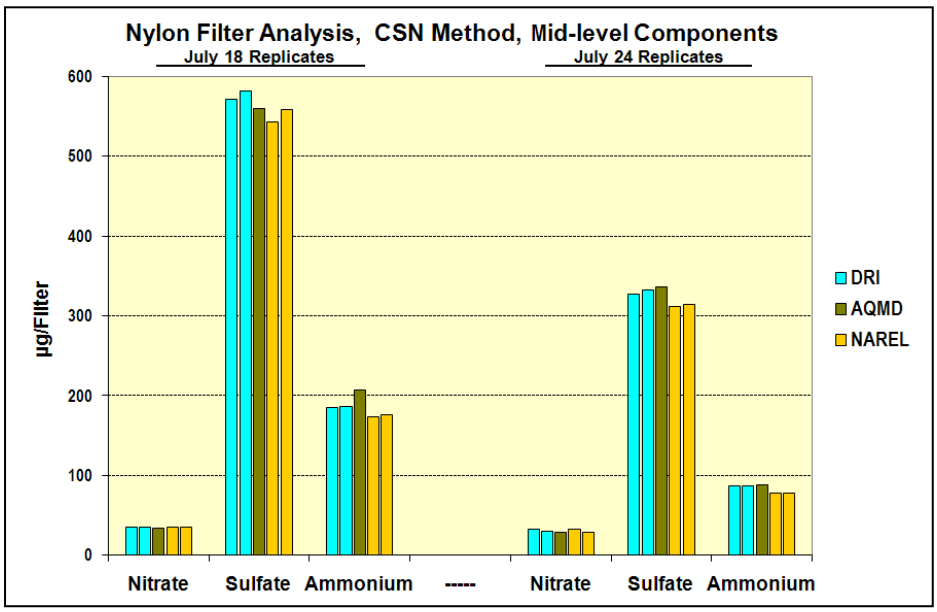
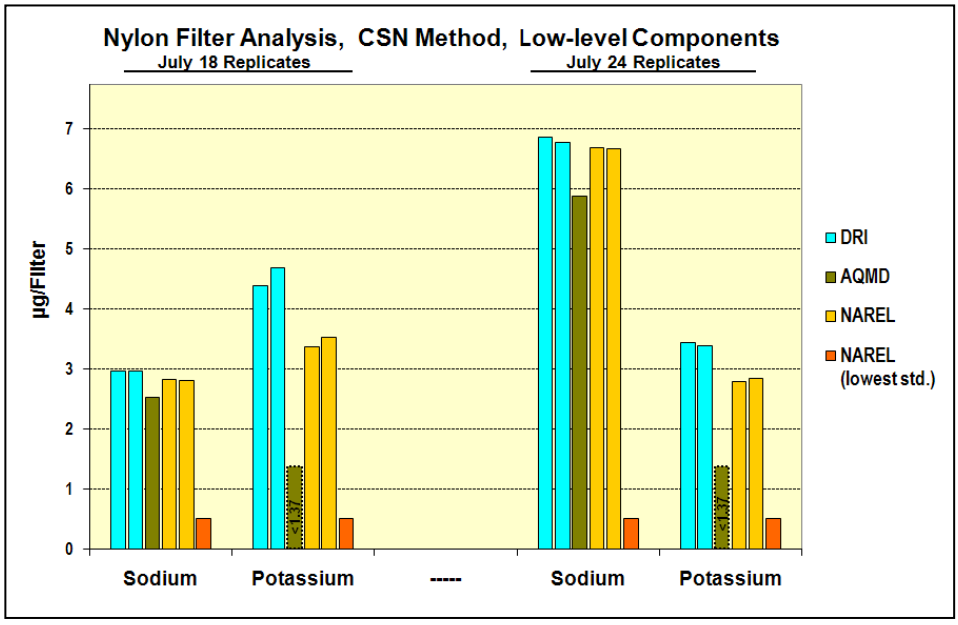


Figure 5

Figures 5 and 6 show more results for Nylon® filters using the CSN method. Results are presented from three labs that analyzed five replicates sampled on July 18 and five replicates sampled on July 24. Results from the mid-level ions are presented in figure 5, and results from the low-level ions are presented in figure 6.

Reasonably good agreement is observed for the three mid-level ions shown in figure 5. Results from the low-level ions are presented in figure 6 along with an extra bar that represents the lowest calibration standard analyzed at NAREL. The potassium results reported from AQMD provide the most noticeable feature of figure 6. Please note that both of the potassium results from AQMD were not reported as discrete values but were reported at <1.37 µg/filter as shown in the graph.

Figure 6



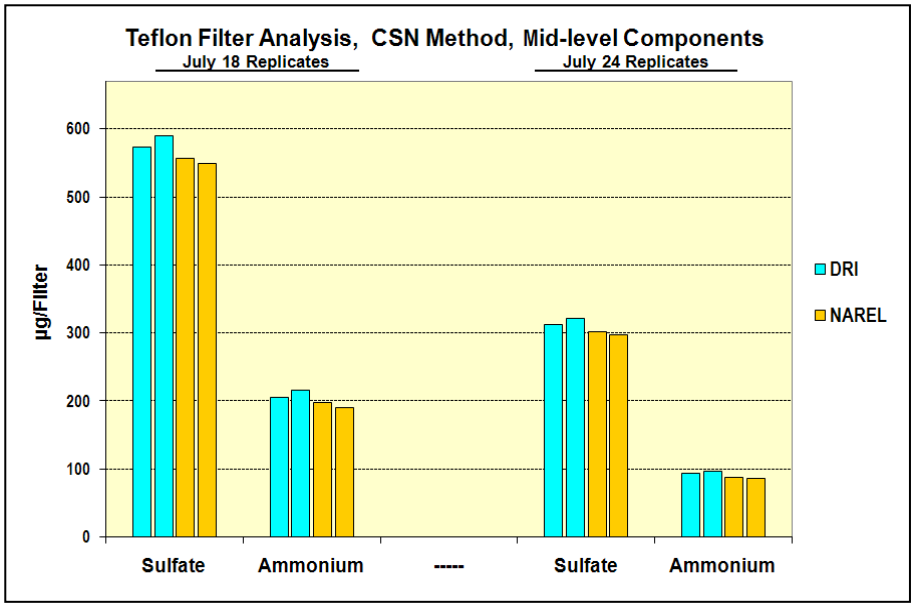
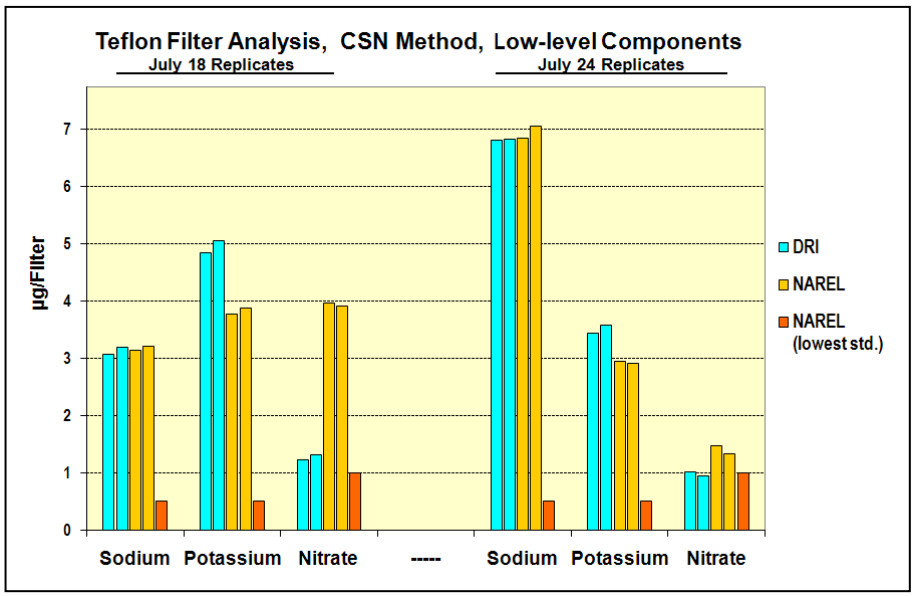


Figure 7

According to table 4, both Nylon® and Teflon® filters were loaded during the July 18 and July 24 sampling events. Results from the Nylon® filters were presented previously in figures 5 and 6. Results from the Teflon® filters are presented here in figures 7 and 8. Notice that nitrate is not included as a mid-level ion in figure 7. This is not surprising since the lower nitrate values reported from the Teflon® filters are due to a known sampling artifact. The nitrate values shown in figure 5 from the Nylon® filters are ten to thirty times higher than the low-level nitrate values from the Teflon® filters shown in figure 8. Yet the Nylon® results for sulfate and ammonium shown in figure 5 are about the same as the results from Teflon® filters shown in figure 7.

Figures 7 and 8 show good precision for replicates analyzed at the same lab and also reasonably good agreement between labs except for nitrate results from the July 18 replicates.

Figure 8



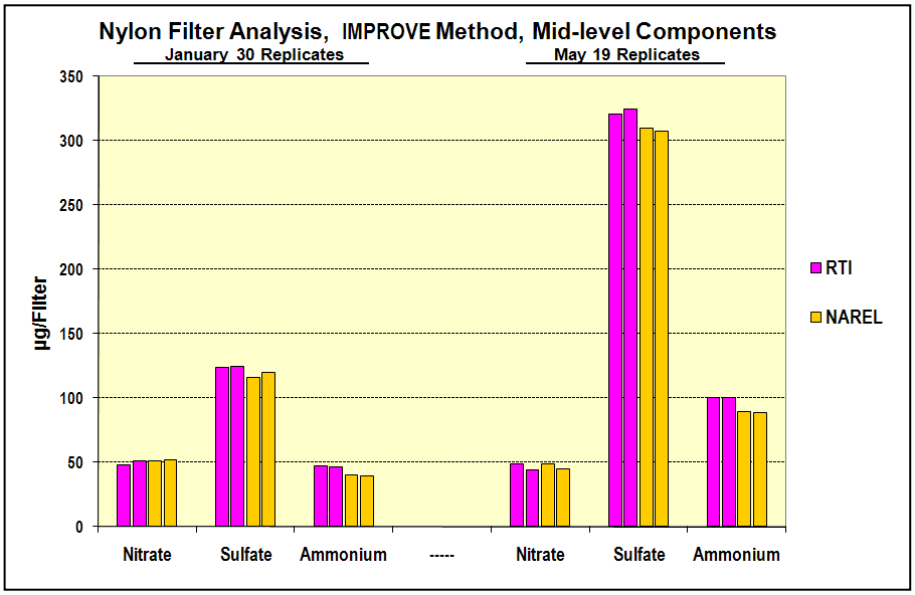
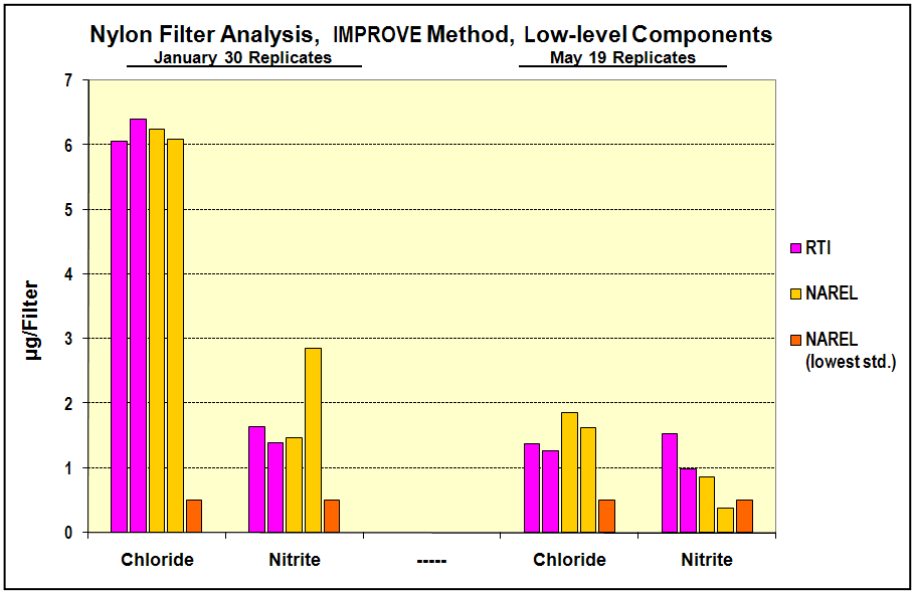


Figure 9

Table 4 shows eight filters that were recovered from the January 30 and May 19 sampling events and scheduled for analysis using the IMPROVE method. Half of the replicates were retained at NAREL and half were submitted to RTI for analysis. Nylon filters are routinely analyzed at RTI using the IMPROVE method which is slightly different from the CSN method with respect to the extraction procedure and the list of reported ions.

Once again the mid-level components and the low-level components are presented in separate graphs. The mid-level ions are shown in figure 9. Two new low-level ions are shown in figure 10. Chloride and nitrite are routinely determined using the IMPROVE method, even though they are not reported for the CSN method. Note also that potassium and sodium are not reported for the IMPROVE method. Reasonably good agreement is observed for all of the ions except nitrite. The variability observed in the nitrite results may be due to contamination which is frequently observed in blanks. Blanks were provided to all of the labs for this study, and the results for blanks are available in table 12 at the end of this report along with results from all of the loaded filters.

Figure 10



Carbon Analysis

This study included the Thermal-Optical Analysis (TOA) of quartz fiber filters to determine the amount of carbon present in captured $PM_{2.5}$. NAREL provided each participating laboratory with a set of six 47-mm filters. Each sample set contained two blank filters and four filters that were loaded with $PM_{2.5}$ collected from the Montgomery air. Collocated Met One SuperSASS air samplers were used to load filters and create replicates in each sample set according to the sampling schedule presented in table 5.

Table 5. Sampling Schedule for TOA Carbon PT Filters

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method(s)
Q08-12335	quartz	29-Aug-07	176-hour	CARB	IMPROVE_A
Q08-12336	quartz	29-Aug-07	176-hour	CARB	IMPROVE_A
Q08-12454	quartz	27-May-07	144-hour	CARB	IMPROVE_A
Q08-12455	quartz	27-May-07	144-hour	CARB	IMPROVE_A
Q08-12337	quartz	29-Aug-07	176-hour	DRI	IMPROVE_A and CSN
Q08-12338	quartz	29-Aug-07	176-hour	DRI	IMPROVE_A and CSN
Q08-12456	quartz	27-May-07	144-hour	DRI	IMPROVE_A and CSN
Q08-12457	quartz	27-May-07	144-hour	DRI	IMPROVE_A and CSN
Q08-12339	quartz	29-Aug-07	176-hour	RTI	IMPROVE_A and CSN
Q08-12340	quartz	29-Aug-07	176-hour	RTI	IMPROVE_A and CSN
Q08-12458	quartz	27-May-07	144-hour	RTI	IMPROVE_A and CSN
Q08-12459	quartz	27-May-07	144-hour	RTI	IMPROVE_A and CSN
Q08-12343	quartz	29-Aug-07	176-hour	AQMD	IMPROVE
Q08-12344	quartz	29-Aug-07	176-hour	AQMD	IMPROVE
Q08-12462	quartz	27-May-07	144-hour	AQMD	IMPROVE
Q08-12463	quartz	27-May-07	144-hour	AQMD	IMPROVE
Q08-12341	quartz	29-Aug-07	176-hour	NAREL	IMPROVE_A and CSN
Q08-12342	quartz	29-Aug-07	176-hour	NAREL	IMPROVE_A and CSN
Q08-12460	quartz	27-May-07	144-hour	NAREL	IMPROVE_A and CSN
Q08-12461	quartz	27-May-07	144-hour	NAREL	IMPROVE_A and CSN

Table 5 shows twenty filters that were loaded during two separate collection events. A sufficient number of replicates were prepared during each event such that each participating lab was provided with an almost identical set of loaded filters. Ten replicates were created during the 176-hour summer event that started on August 29, and two of these replicates were submitted to each lab for analysis. Likewise, ten replicates were created during the 144-hour spring event that started on May 27, and two of these replicates were submitted to each lab for analysis. The collection times used for this study were significantly longer than the normal 24-hours to boost the amount of elemental carbon deposited on the filter. Table 5 does not list the two filter blanks that were provided to each participating lab.

A filter set was provided to each lab with instructions to use local standard procedures, as closely as possible, for the analysis. No information was given to the participating labs about the history of the individual filters. ODEQ did not participate in this part of the study because their quartz filters are shipped to DRI for analysis. The DRI and RTI labs are set up to analyze a large volume of samples and routinely operate several TOA instruments. Both DRI and RTI were able to analyze each filter several times using more than one instrument and also using more than one TOA method. The results that were originally reported to NAREL based upon the amount of carbon per filter (µg C/filter) have been converted to amount of carbon per square centimeter of deposit area (µg C/cm^2) for this report. This conversion was performed after it was realized that all lab did not use the same value for the filter deposit area. Most labs used 11.8 cm^2 for the deposit area, but RTI and AQMD used 12.25 and 12.0 respectively. Raw data were also supplied to NAREL so that some of the thermograms are included in this report.

According to table 5, three different TOA methods were used to report results: the IMPROVE method, the IMPROVE_A method, and the CSN method. To avoid confusion, it should be stated again that the CSN method was previously referred to as the Speciation Trends Network (STN) method. CSN is used in this report to be consistent with the language used in recent EPA contracts that support the chemical speciation network which includes approximately 200 field sites.

It may be useful to briefly explain the major differences between the IMPROVE, the IMPROVE_A, and the CSN methods. Table 6 shows the temperature protocol that is used by each method.

Table 6. Comparison of Temperature Protocols for Two TOA Methods

IMPROVE Method TOR Analysis	IMPROVE_A Method TOR Analysis	CSN Method TOT Analysis	Carrier Gas	Carbon Fraction*
heater off (90s)	heater off (90s)	heater off (90s)	He Purge	-----
120°C (150-580s)	140°C (150-580s)	310°C (60s)	He	OC1
250°C (150-580s)	280°C (150-580s)	480°C (60s)	He	OC2
450°C (150-580s)	480°C (150-580s)	615°C (60s)	He	OC3
550°C (150-580s)	580°C (150-580s)	900°C (90s)	He	OC4
-----	-----	heater off (40s)**	He	
550°C (150-580s)	580°C (150-580s)	600°C (35s)	He/O_2	EC1
700°C (150-580s)	740°C (150-580s)	675°C (45s)	He/O_2	EC2
800°C (150-580s)	840°C (150-580s)	750°C (45s)	He/O_2	EC3
-----	-----	825°C (45s)	He/O_2	
-----	-----	920°C (120s)	He/O_2	
heater off (150s)**	heater off (200s)**	heater off (110s)**	He/O_2 + IS	

**** The Carbon fractions are not consistently defined among the different methods. See text for explanation.***
***** The "heater off" times are approximate and may have varied slightly among instruments during this study.***

Beyond the thermal protocols listed in table 6, each TOA method is further defined by the way optical measurements are made and utilized to calculate carbon fractions. For example, the optical measurements are used to distinguish the elemental carbon (EC) from the organic carbon (OC) present in the sample. In fact we shall see, all of the carbon fractions have a functional definition that depends upon the method of analysis.

All of the instruments used for this study are equipped with a small tubular quartz oven and a laser/diode system. The sample analysis begins by placing a carefully measured [punched] segment of the filter sample into the oven directly in the path of the laser. A purge gas removes air from the oven and surrounds the sample with a stream of pure helium before the heating and data acquisition begin. Light from the laser will interact with the sample during the analysis. A diode detector can be positioned to measure the light transmitted through the sample, and this configuration is needed for a TOT (thermal optical transmittance) analysis. A diode can also be positioned to measure the reflected light, and this configuration is needed for a TOR (thermal optical reflectance) analysis. As the sample segment is heated and the pure helium phase of the analysis proceeds, some of the organic carbon may char to form a darker pyrolized carbon (PyrolC). All of the methods in this study use either TOT or TOR to evaluate the PyrolC. Three different instruments were used for this study. The older Sunset [single mode] instruments are equipped with only one diode detector configured for the TOT analysis. The DRI Model 2001 instruments and the Sunset Dual Mode instruments are newer designs capable of measuring the transmitted and the reflected light simultaneously. These newer instruments provide more optical information since each instrument is equipped with two diode detectors giving the user a choice of the TOT or the TOR analysis. Table 7 shows specifically how the different instruments were used for analyzing the samples in this study.

Table 7. Summary of Report Packages for the TOA Analyses					
Temperature Protocol	**Optical Analysis**	**Instrument Model**	**Specific Instrument Reporting**	**Parameters Reported**	**Report Package Count**
IMPROVE	TOR	DRI Model 2001	AQMD Instr. #1	OC, EC, TC	1
IMPROVE_A	TOR	DRI Model 2001	CARB Instr. #1	OC, EC, TC, OCsub, ECsub	2
			DRI Instr. #6, #7, #9	OC, EC, TC, OCsub, ECsub	3
			DRI Instr. #6, #8, #7, #11	OC, EC, TC, OCsub, ECsub	4
			RTI Instr. #1	OC, EC, TC, OCsub, ECsub	5
		Sunset (dual-mode)	RTI Instr. F	OC, EC, TC, OCsub, ECsub	6
			NAREL Instr. #2	OC, EC, TC, OCsub, ECsub	7
CSN	TOT	DRI Model 2001	DRI Instr. #8, #9	OC, EC, TC, OCsub, ECsub	8
			DRI Instr. #9, #12	OC, EC, TC, OCsub, ECsub	9
		Sunset (single-mode)	RTI Instr. R	OC, EC, TC, OCsub	10
			RTI Instr. T	OC, EC, TC, OCsub	11
			NAREL Instr. #1	OC, EC, TC, OCsub	12

All of the instruments in this study operate by heating a punched segment of the sample in the presence of a controlled carrier gas. Any carbonaceous material released from the quartz filter segment is swept through a series of zones that rapidly convert the released carbon to methane which is measured by a Flame Ionization Detector (FID) positioned at the end of the sample train. During the first [non-oxidizing] stage of the analysis, the carrier gas is pure helium. Oxygen is added to the carrier during the second stage of the analysis which is designed to remove any remaining carbonaceous material from the quartz residue. Most of the OC is released during the first stage of the analysis, but the EC and any PyrolC that may have formed are more difficult to volatilize, and they are expected to release during the second stage of the analysis. A known mass of methane is injected through the oven at the end of the analysis to serve as an Internal Standard (IS). Signals from the FID and from the laser may be plotted along a time axis to construct a thermogram. An example thermogram is shown in figure 11.

Figure 11

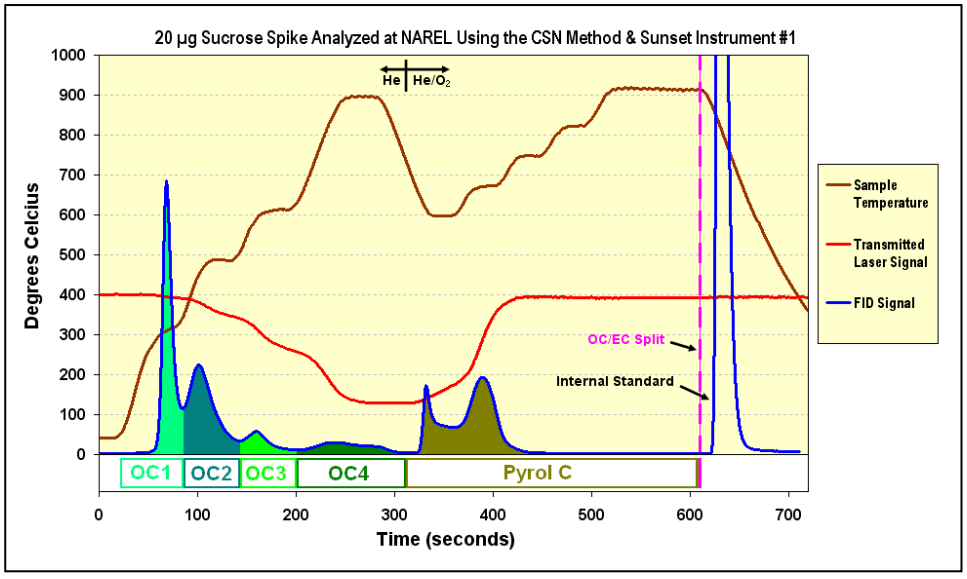


Figure 11 is a thermogram of a sucrose spike which was analyzed at NAREL as a routine calibration check sample. The sucrose spike contains no EC but has a strong tendency to char and form PyrolC.

After the raw data acquisition is complete, the thermogram must be evaluated to determine those carbon fractions that will be reported for the sample. All of the participating labs report the Total Carbon (TC) as the sum of the OC and the EC fractions: TC = OC + EC. Other carbon fractions may be calculated such as the OC subfractions: OC = OC1 + OC2 + OC3 + OC4 + PyrolC. Figure 11 shows an example of OC subfractions that were calculated by a Sunset instrument. EC subfractions may be calculated as well. For example, three EC subfractions have been reported for IMPROVE samples for many years. To better understand how the EC subfractions are calculated, we should look back at table 6 to notice that the IMPROVE_A method heats the sample at three different temperatures during the final [oxidizing] stage of the analysis. EC1 is defined by the method as that carbon released from the sample at 580 ºC after oxygen has been added to the carrier gas. And similarly, EC2 and EC3 represent the carbon released at 740 ºC and 840 ºC respectively (see table 6). It should be obvious from these examples that the heating requirements and the precision of the method will likely affect the amount of carbon assigned to each subfraction.

Clearly, all of the carbon fractions are defined by the method. The method controls the instrument during data acquisition and also controls the calculation of results from the raw data. Let us take a closer look at how results are calculated from the raw data. A "split point" must be established in each thermogram that separates the OC and the EC. The laser signal must be examined as part of determining the split point. If any of the original OC chars during the first stage of the analysis, the laser signal will decrease from its initial value, and will not recover until later in the run. The point at which the recovering laser signal reaches its initial value is usually the split point. Some samples do not form char, however, and the laser signal does not decrease and fall below its initial value. In this case, the OC/EC split is usually assigned to that point at which the oxygen valve opens for the second phase of the analysis to begin. All of the instruments follow these general rules.

EPA has been aware for several years that different TOA methods give different results for the carbon fractions and subfractions. Consequently EPA has decided to migrate to a single TOA carbon method. The three-year implementation plan includes switching to a new air monitor, the URG 3000N, installed at the CSN field sites. The URG-3000N is similar to the air monitors used for the IMPROVE network. The IMPROVE_A TOR method will replace the CSN TOT method at those field sites that receive a URG-3000N monitor. Currently, DRI is contracted to analyze samples requiring the IMPROVE_A analysis. More information regarding the implementation is available at the following web site.

http://www.epa.gov/ttn/amtic/specurg3000.html

All of the results presented in this report have been identified with the instrument that performed the analysis as well as the thermal protocol and optical configuration that was used. All of the participating labs have an SOP for the TOA method(s) used at their laboratory. Many SOP's are currently available on the web (see reference 17 through 21).

Carbon Results

Results from the analysis of replicate quartz filters using either the IMPROVE or the IMPROVE_A method are presented below as bar graphs. Notice that the height of each bar within a graph represents the total carbon reported for the filter, and each bar in the graph is labeled with the instrument number, the lab, and the last three digits of the sample number.

Figure 12

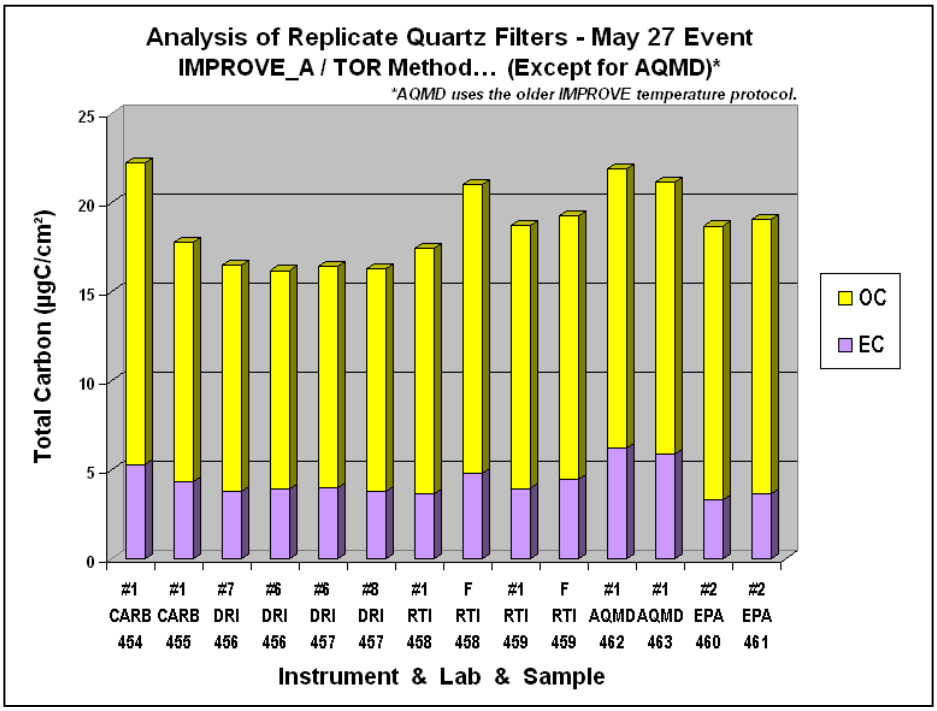


Figure 12 shows results from replicates that were created on May 27, and figure 13 shows the results from replicates created on August 29. The bar segments show the OC and EC components of the total carbon but do not show the more detailed fractions. Notice that each filter submitted to DRI and RTI was analyzed twice using different instruments.

Figure 13

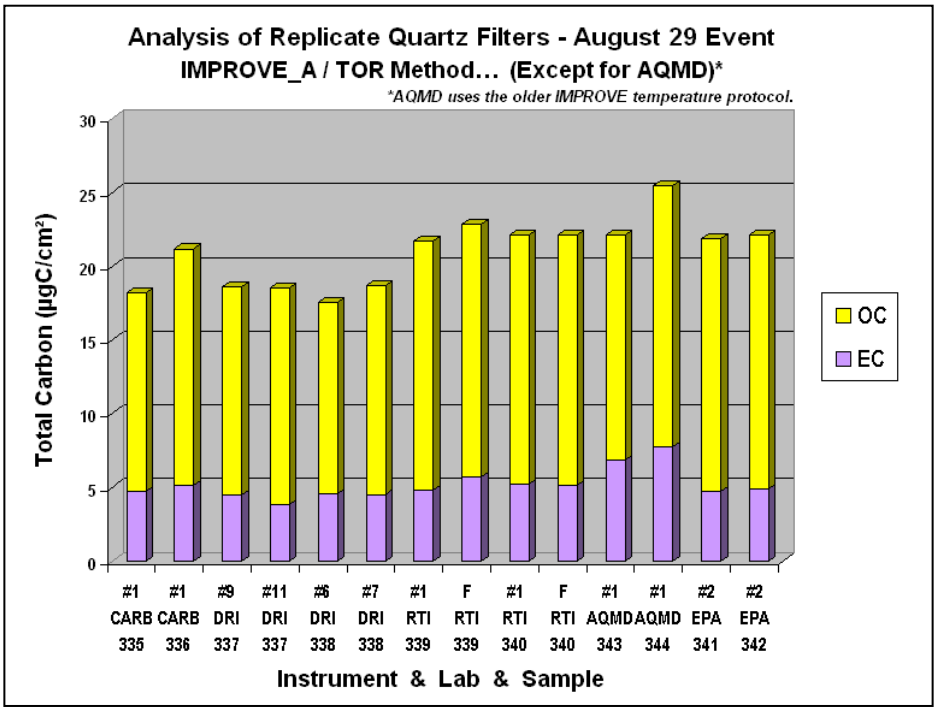
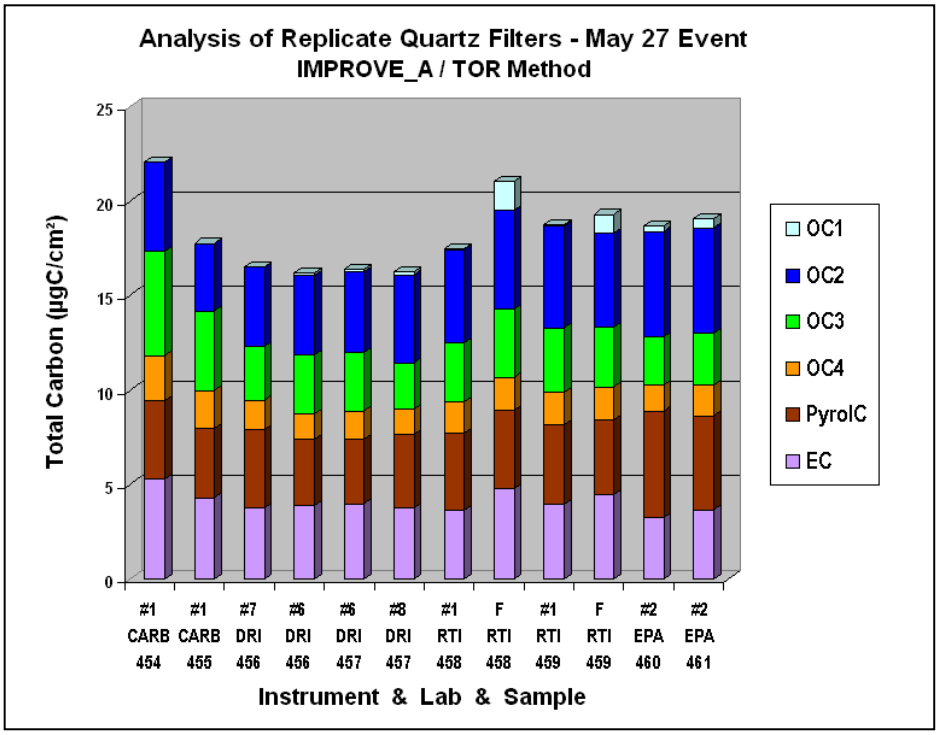


Figure 14



The results are presented again in figures 14 and 15 with more detail, and this time the OC subfractions are revealed. Results from AQMD are missing because AQMD did not use the IMPROVE_A temperature protocol and also did not report the subfractions. Even though all of the instruments in figures 14 and 15 used the same temperature protocol, there is noticeable variability for total carbon and also for the carbon fractions. Thermograms for many of the May 27 replicates will be presented later in this report so it will be possible to examine the raw data that produced these results.

Figure 15

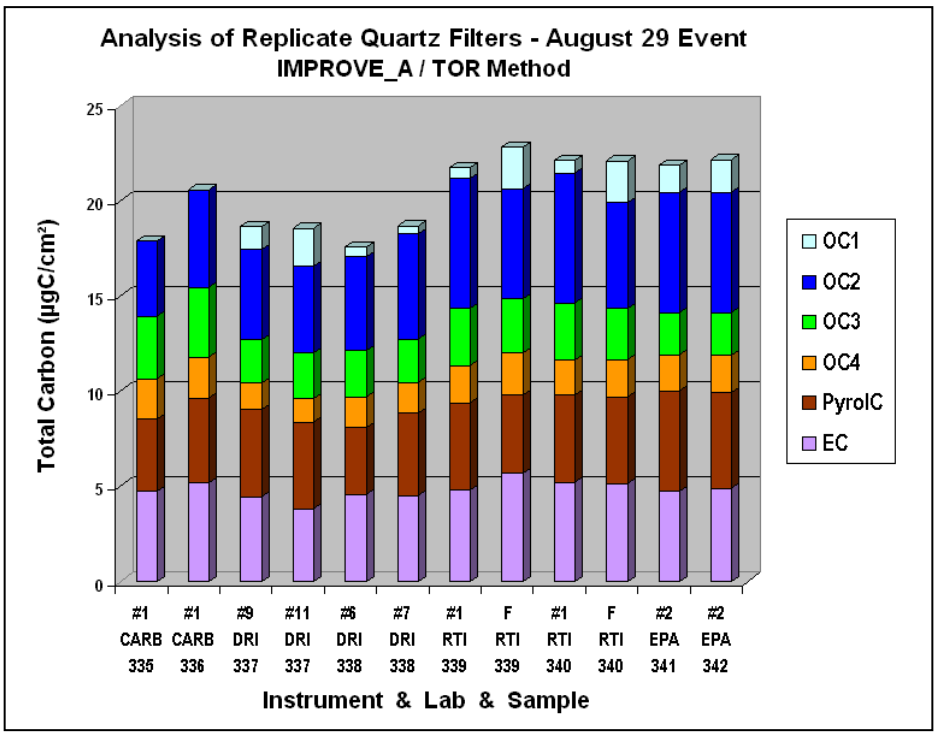
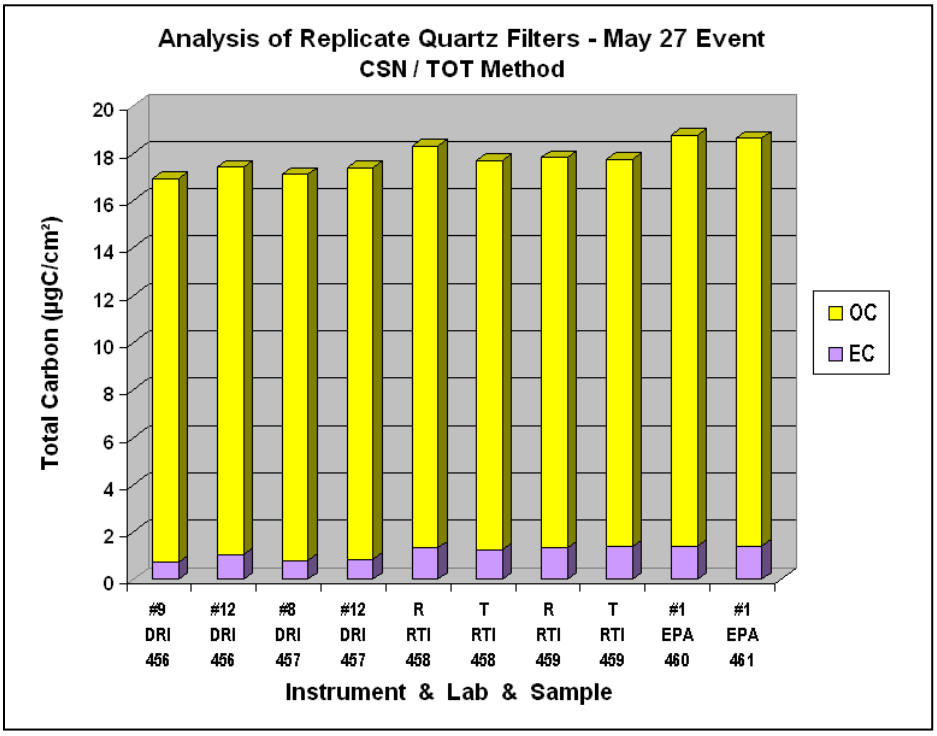


Figure 16



According to table 5 three labs were able to report results from more than one TOA method. Figures 16 and 17 show CSN TOT results from the May 27 and the August 29 replicates respectively. It is interesting to compare these results with the IMPROVE_A TOR results shown previously in figures 12 and 13. These results show better inter-laboratory agreement for total carbon. The most significant difference observed is the smaller EC produced by the CSN TOT method.

Figure 17

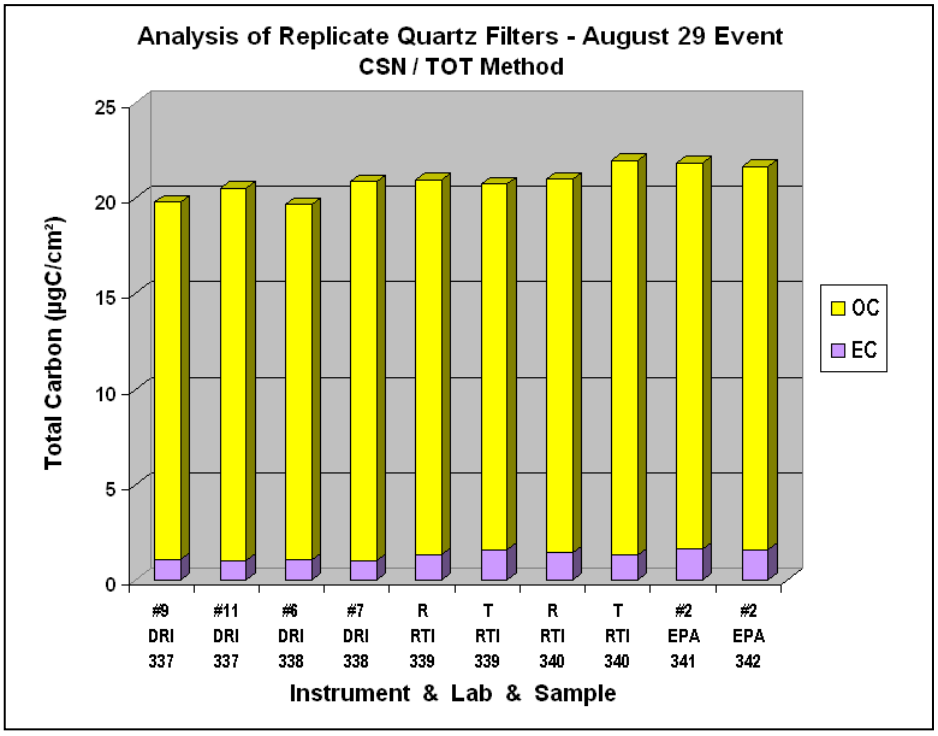
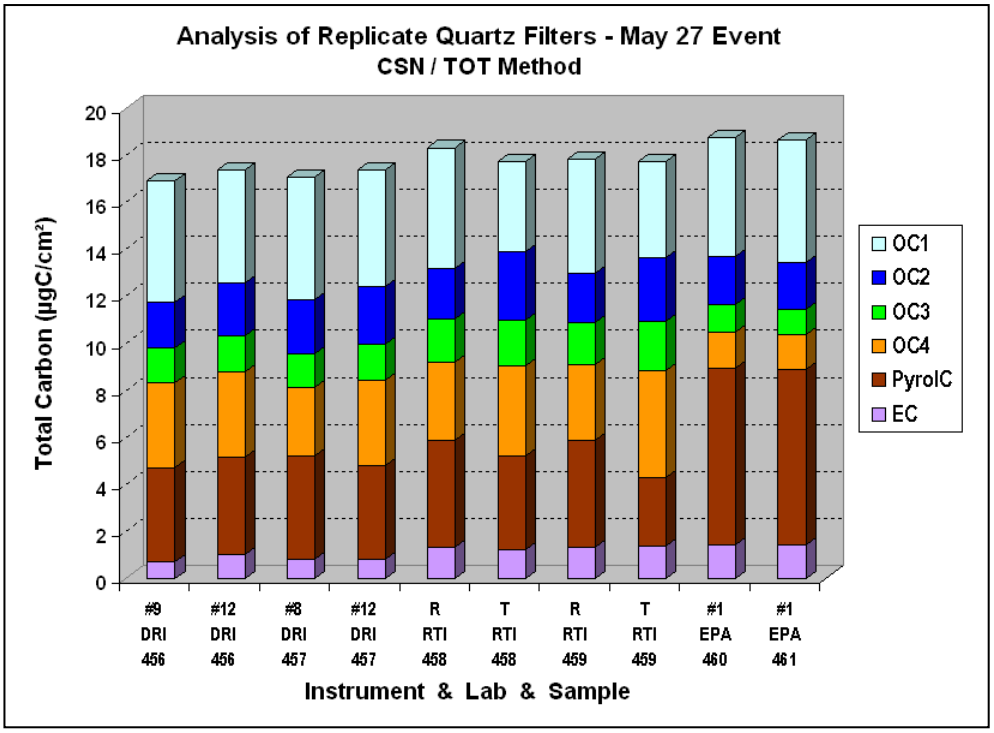
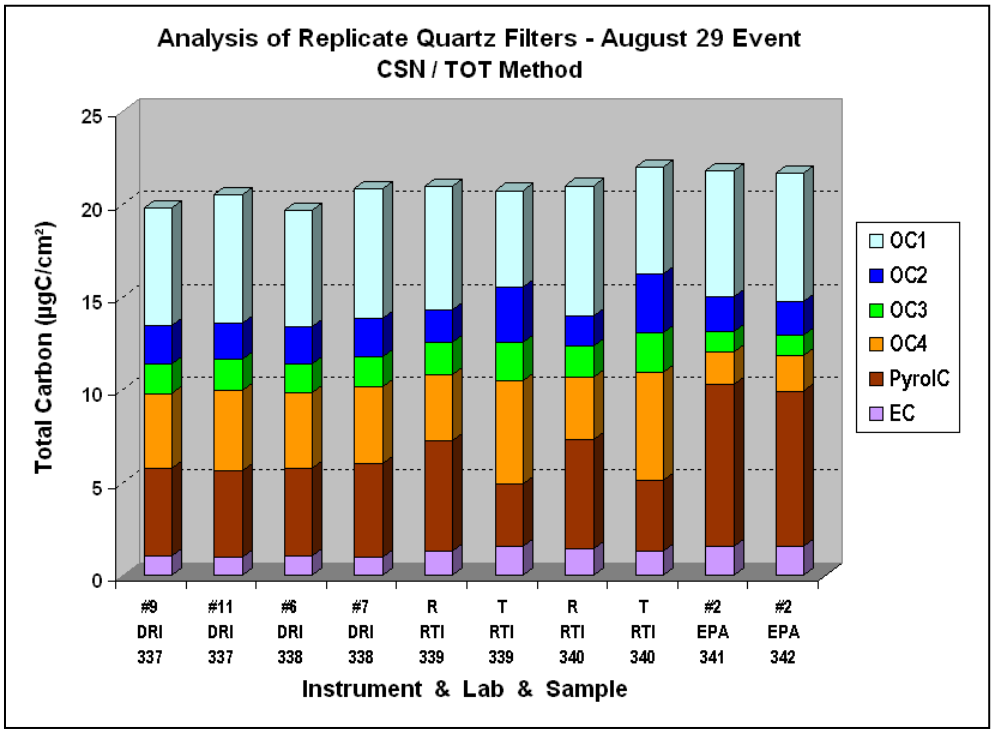


Figure 18



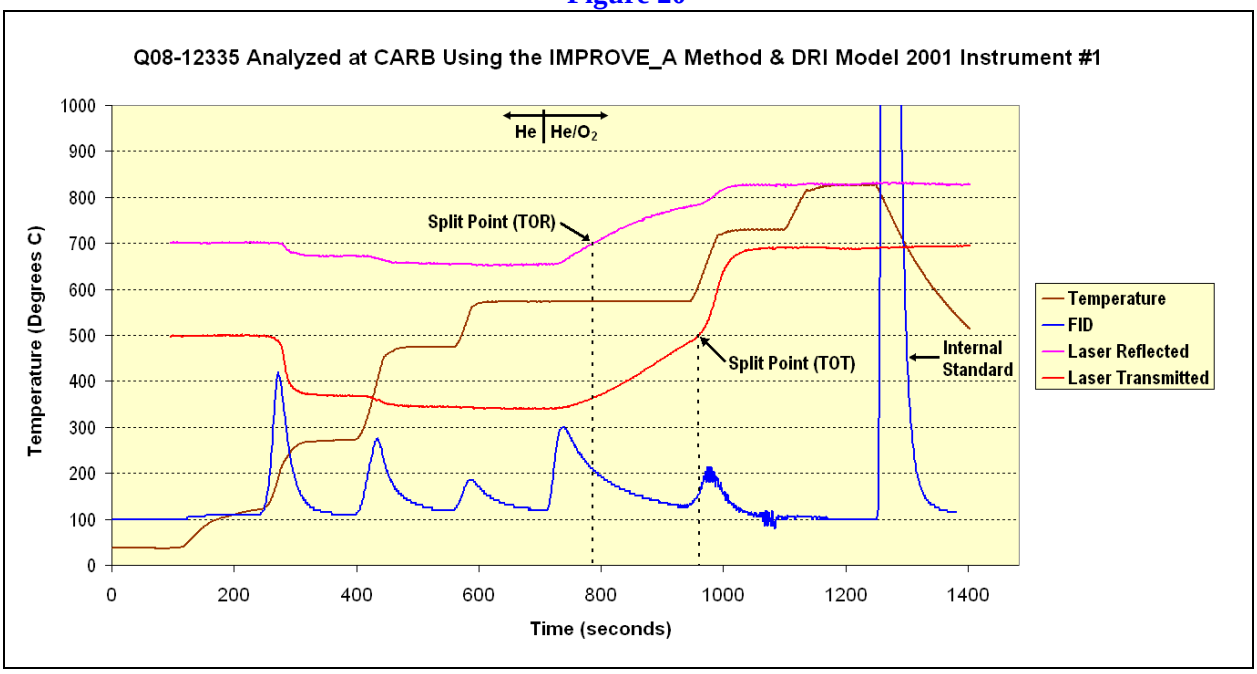
Figures 18 and 19 show the CSN TOT results again with more detail. Reasonably good inter-laboratory agreement is observed for the OC1, OC2 and OC3 subfractions. Worse agreement is observed for OC4 and PyrolC. The thermograms for half of the samples shown in figure 18 will be presented later in this report so it will be possible to examine the raw data that produced these results.

Figure 19



This report includes several thermograms from the August 29 filter replicates. The thermograms were constructed from specific raw data requested from each laboratory. Figure 20 shows the analysis of sample Q08-12335 performed at CARB using the IMPROVE_A method and DRI Model 2001 instrument #1. The only unusual feature observed in figure 20 is the noisy FID signal at about 1000 seconds into the run.

Figure 20



Figures 21 and 22 are thermograms of sample Q08-12337 analyzed twice at DRI using the IMPROVE_A method and also using two different Model 2001 instruments. There is an interesting sharp dip in DRI's laser reflected signal at about 340 seconds which was not present in CARB's thermogram.

Figure 21

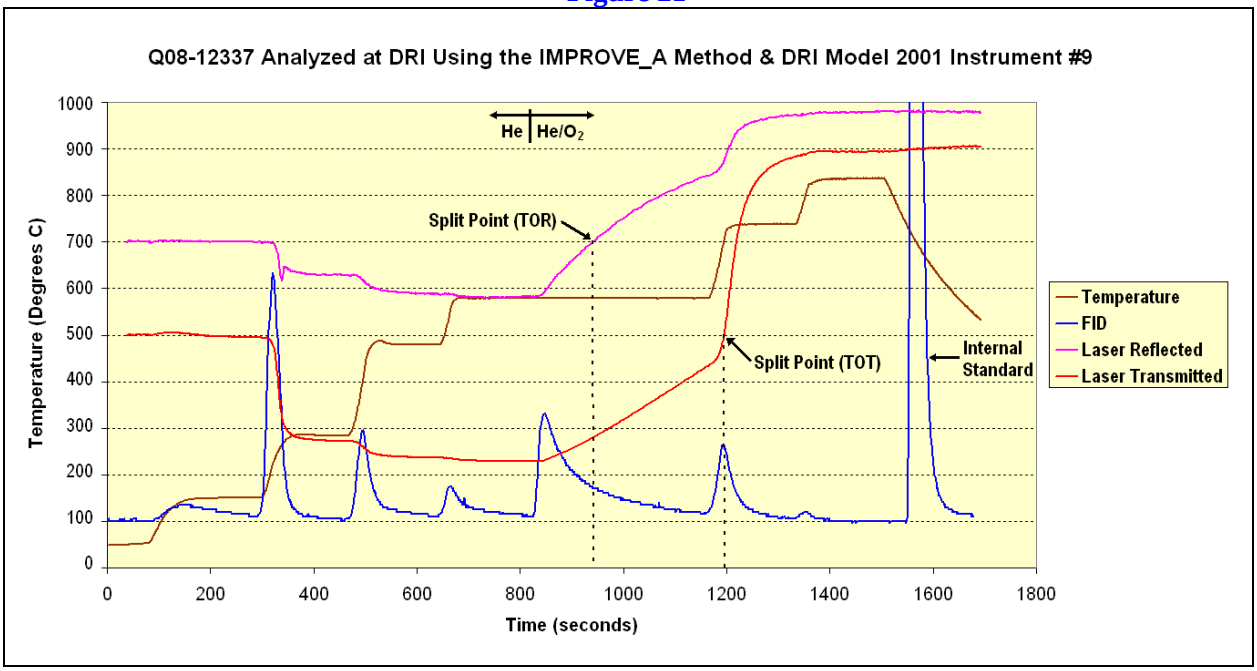
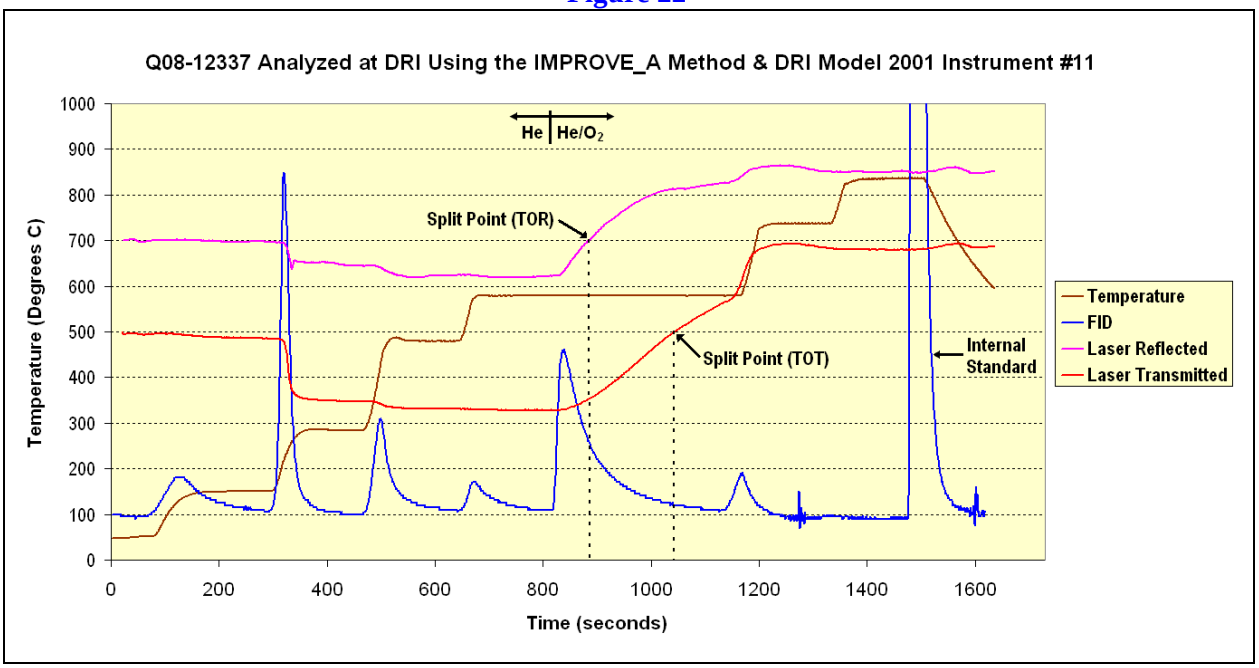


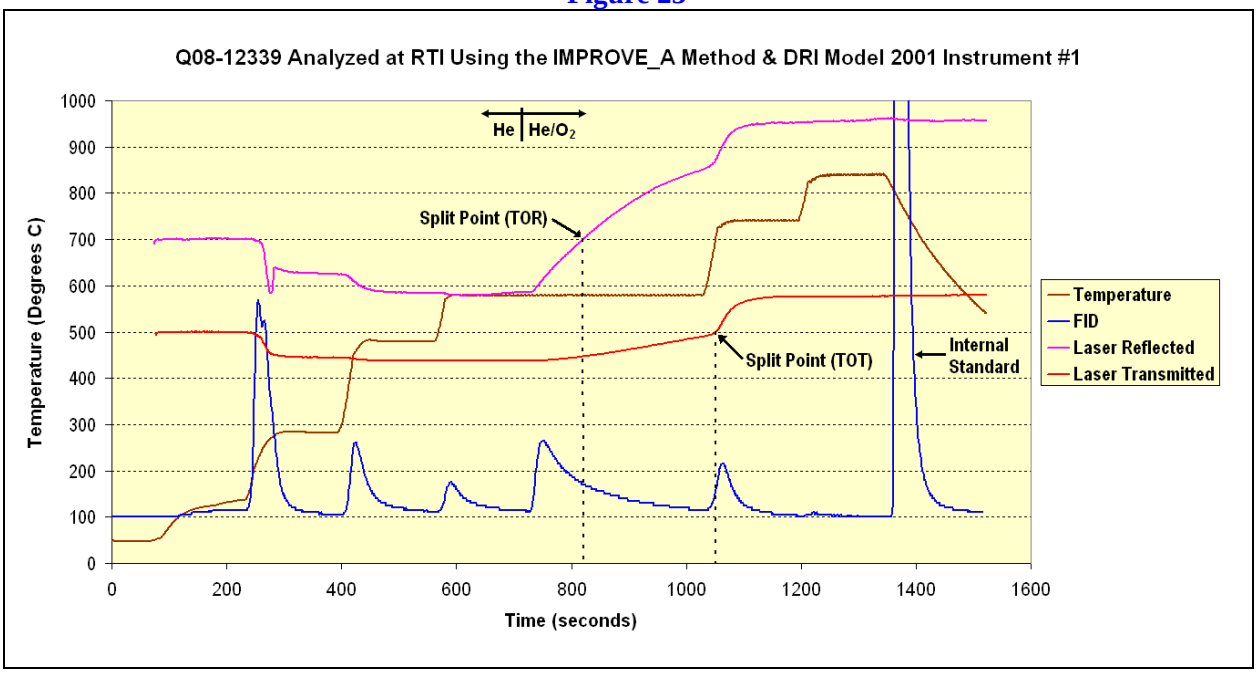
Figure 22 shows noise in the FID signal at about 1280 seconds and again at about 1600 seconds. This type of high frequency noise may be caused by a weak electrical connection or a small pneumatic leak near the jet tip of the FID.

Figure 22



Figures 23 and 24 are thermograms of sample Q08-12339 analyzed twice at RTI using the IMPROVE_A method for both analyses, but using different instrument designs. The analysis shown in figure 23 was performed using a DRI Model 2001 instrument. Note a sharp dip in the laser reflected signal at about 280 seconds.

Figure 23



The thermogram from the second analysis shown in figure 24 looks similar to the first analysis even though the second analysis was performed using a Sunset dual-mode instrument. The OC1 peak in figure 24 is noticeably larger than the OC1 peak in figure 23, and this observation is supported by the results shown previously as a bar graph in figure 15.

Figure 24

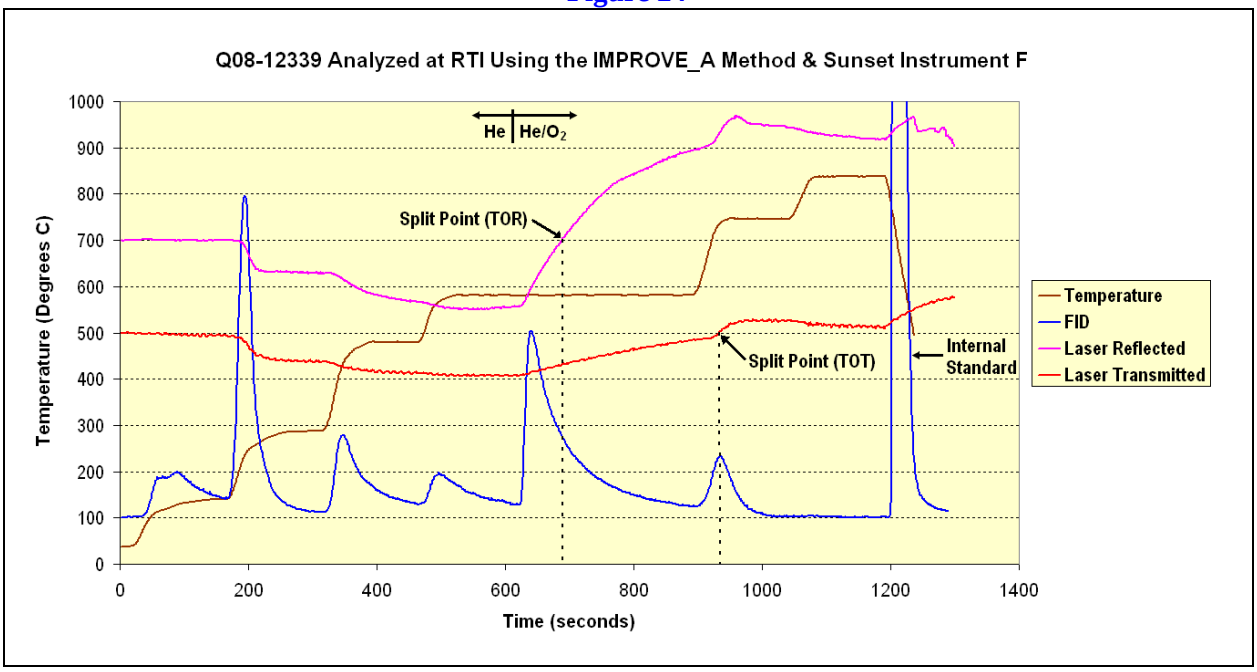


Figure 25 shows the analysis of sample Q08-12341 performed at NAREL using the IMPROVE_A method and a Sunset dual-mode instrument.

Figure 25

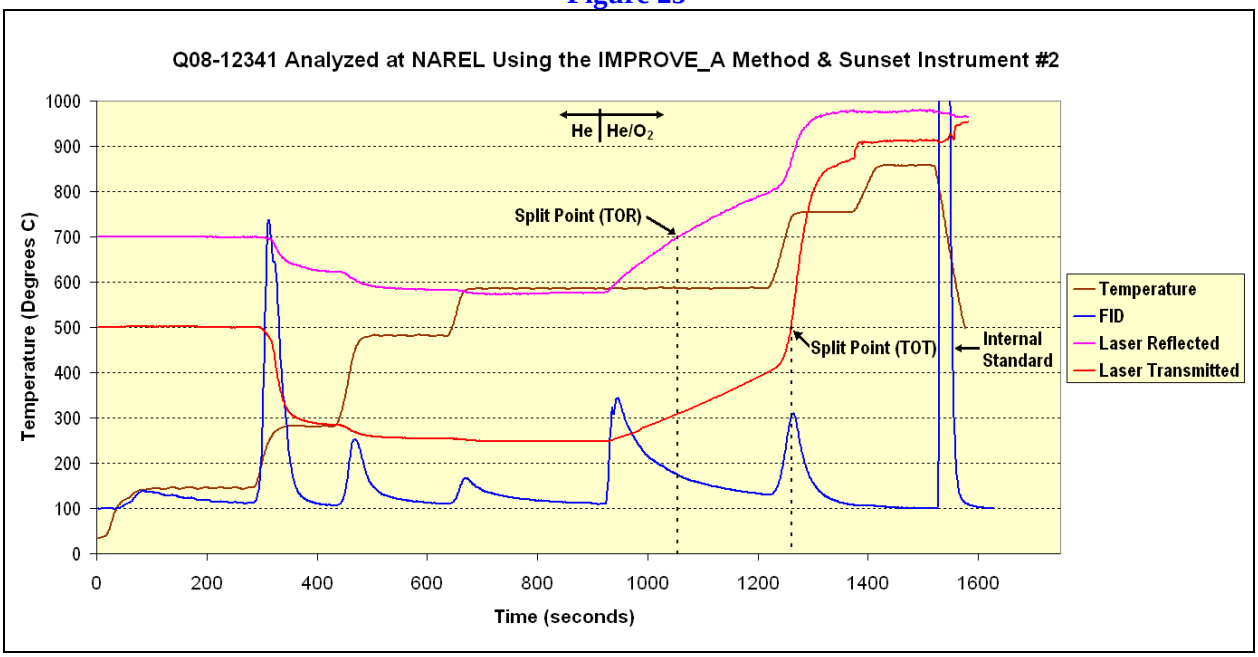
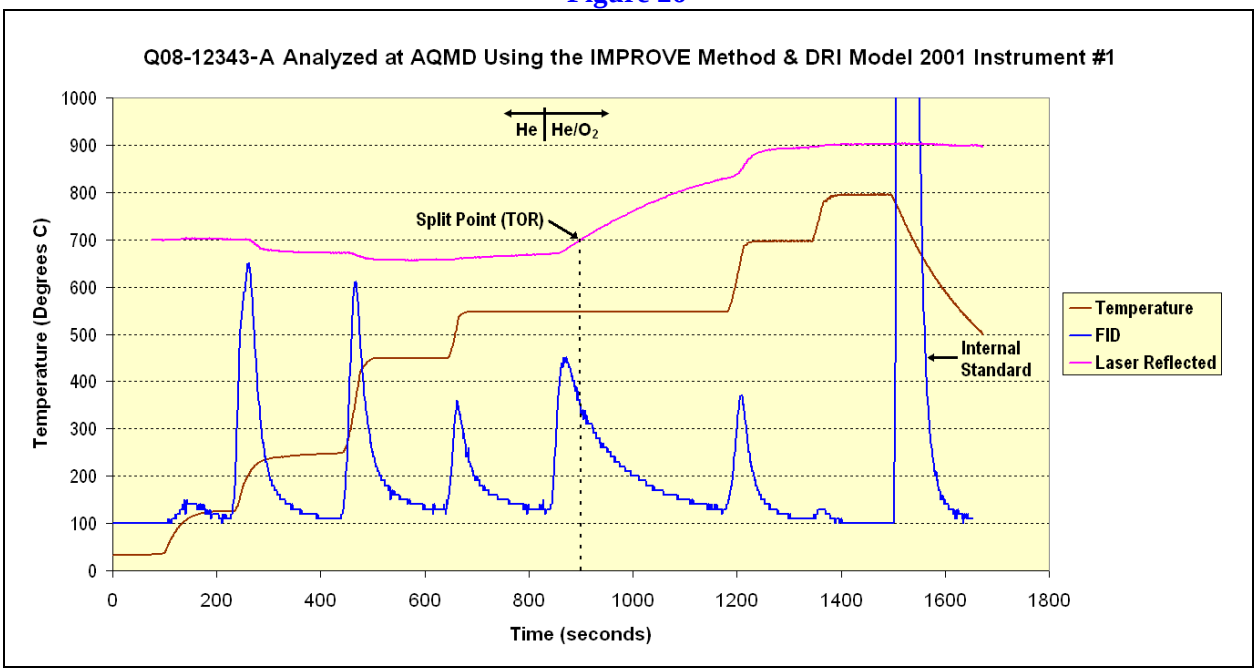


Figure 26 shows the analysis of sample Q08-12343-A that was performed at AQMD. AQMD is the only lab that used the IMPROVE temperature protocol for this study. The IMPROVE_A protocol was adopted for IMPROVE samples in 2005 at the same time that the DRI Model 2001 instruments replaced the aging OGC instruments. AQMD is also the only lab that did not report carbon subfractions even though, as seen in figure 26, it is possible to calculate the subfractions from the raw data. The laser transmitted signal is not presented in figure 26 because there was a problem with the signal to noise ratio. Since the transmitted signal was not used to determine the reported results, this signal was omitted from the plot for clarity.

Figure 26



This is a good time to explain the unusual sample identification, Q08-12343-A, that appears in figure 26. The letter "A" was added to the original sample number as a suffix because the original sample submitted to AQMD for this study was actually two filters, stuck together. A staff member at AQMD was the first to discover this problem, and after separating the two filters, "A" and "B" characters were added to the original sample name to generate unique identification of each filter. Both filters were analyzed and reported separately as Q08-12343-A and Q08-12343-B. After receiving the results at NAREL, it was obvious what had caused the problem. Two clean filters had been accidentally installed into one filter holder cassette at NAREL, and that cassette had been used for the ambient air sampling that started on August 27, 2007 (see table 5 for the sampling schedule). It was obvious that sample Q08-12343-A had been the front filter and Q08-12343-B had been the rear filter. The results from the front filter are important for this study, and therefore the thermogram in figure 26 is from the front filter. Furthermore, the results shown in figure 13 as a bar graph are also from the front filter.

Figures 27 through 31 are thermograms from various instruments using the CSN temperature protocol. Once again, all of these thermograms are from August 29 replicates that were previously analyzed using the IMPROVE_ A method.

Figures 27 and 28 are thermograms of sample Q08-12337 analyzed two more times at DRI using the CSN method and also using Model 2001 instruments. These two thermograms are very similar, even down to the sharp dip in the laser reflected signal at about 160 seconds into the run. The results for these two runs were also very similar as shown previously in the bar graph of figure 19.

Figure 27

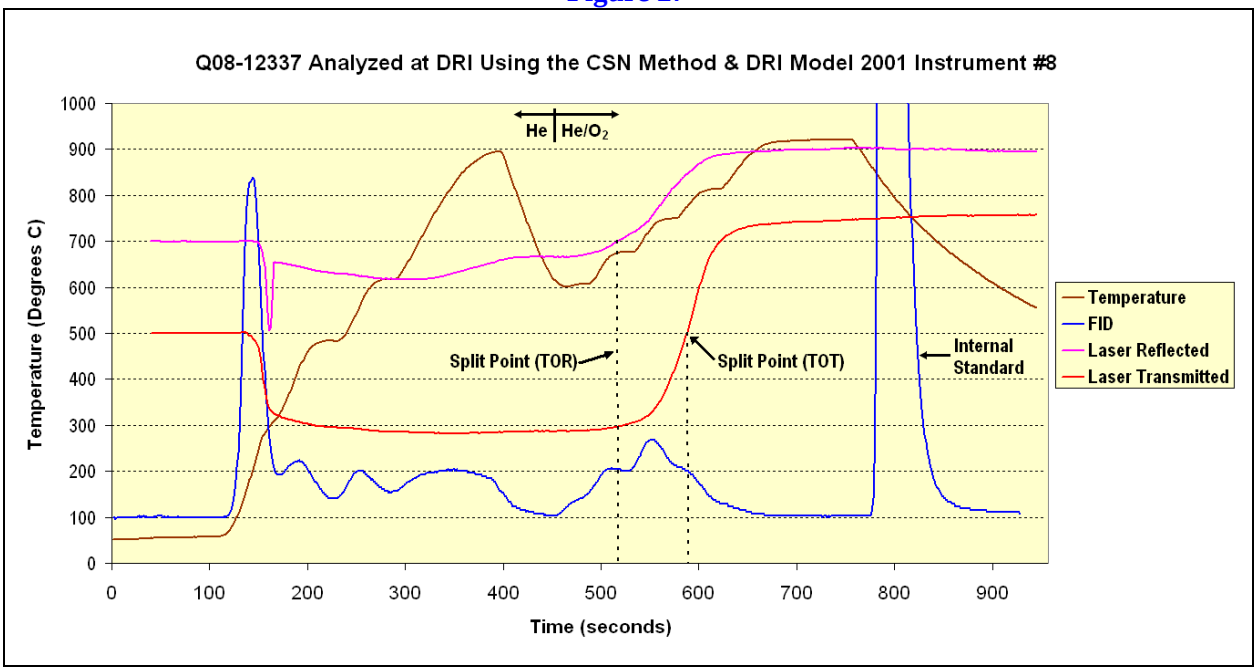
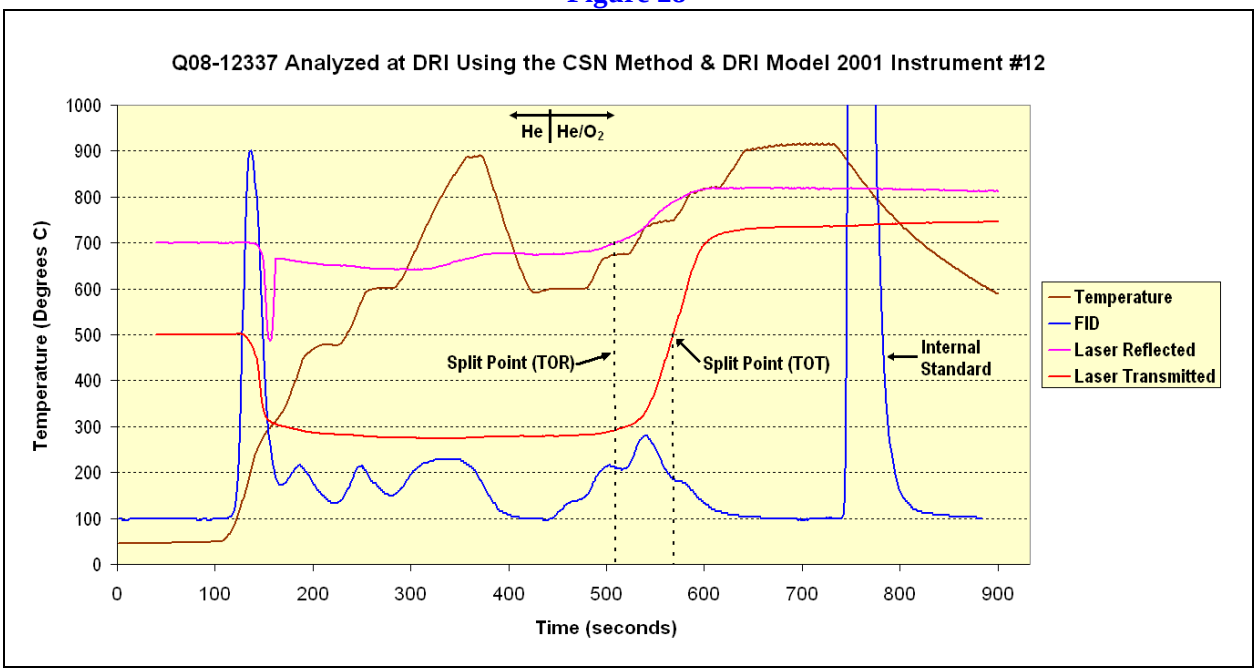


Figure 28



Figures 29 and 30 are thermograms of sample Q08-12339 analyzed two more times at RTI using the CSN method and also using Sunset single-mode instruments. These two thermograms are also similar. However, when figure 19 is used to compare results from instrument R and instrument T, a consistent bias between these instruments is observed for some of the OC subfractions. For example, figure 19 shows poor agreement for OC2, OC4, and PyrolC from these two instruments, even though there is good agreement for the total carbon, total OC, and total EC.

Figure 29

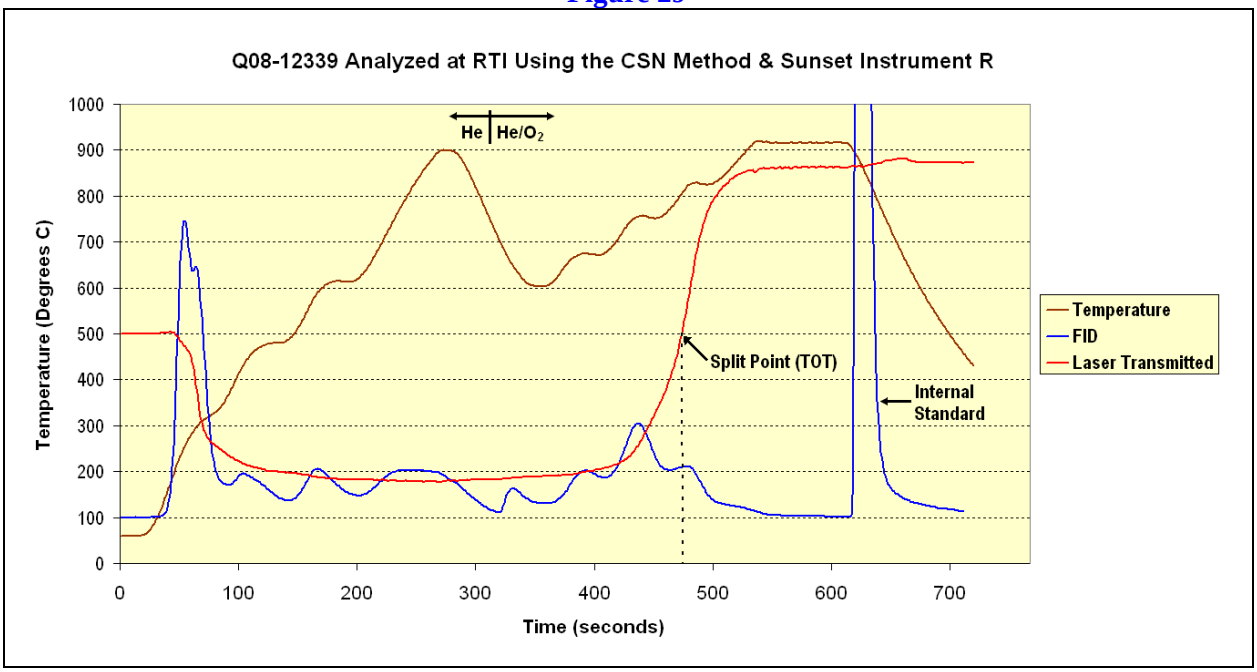


Figure 30

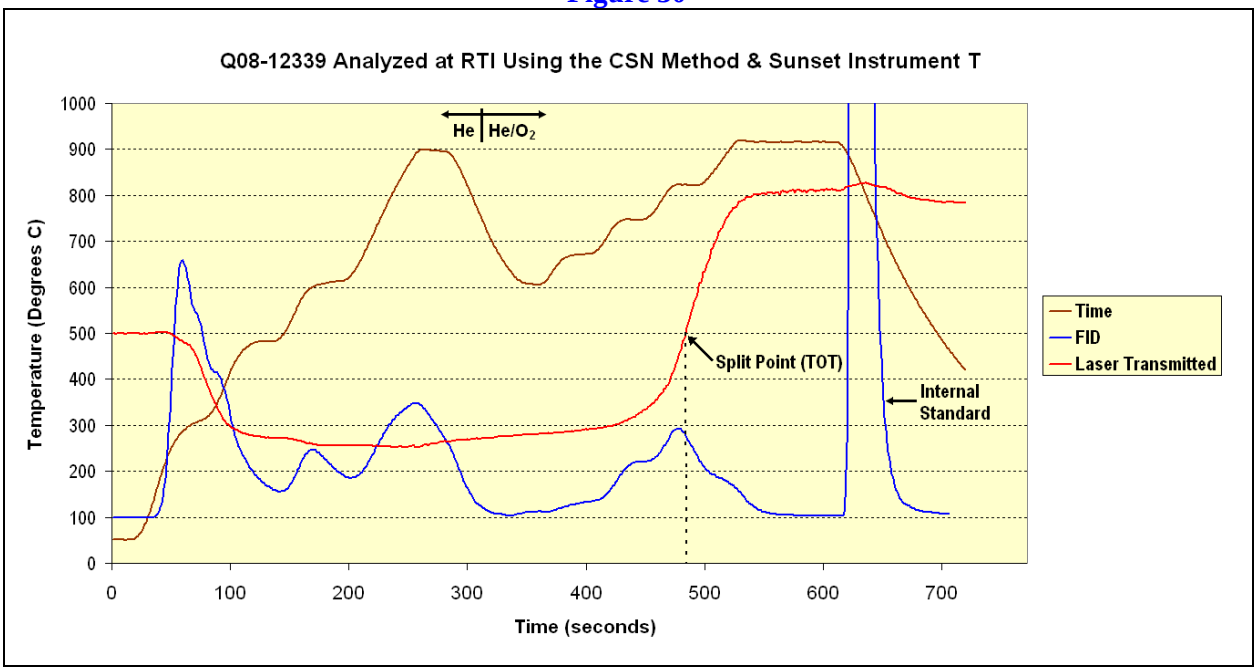
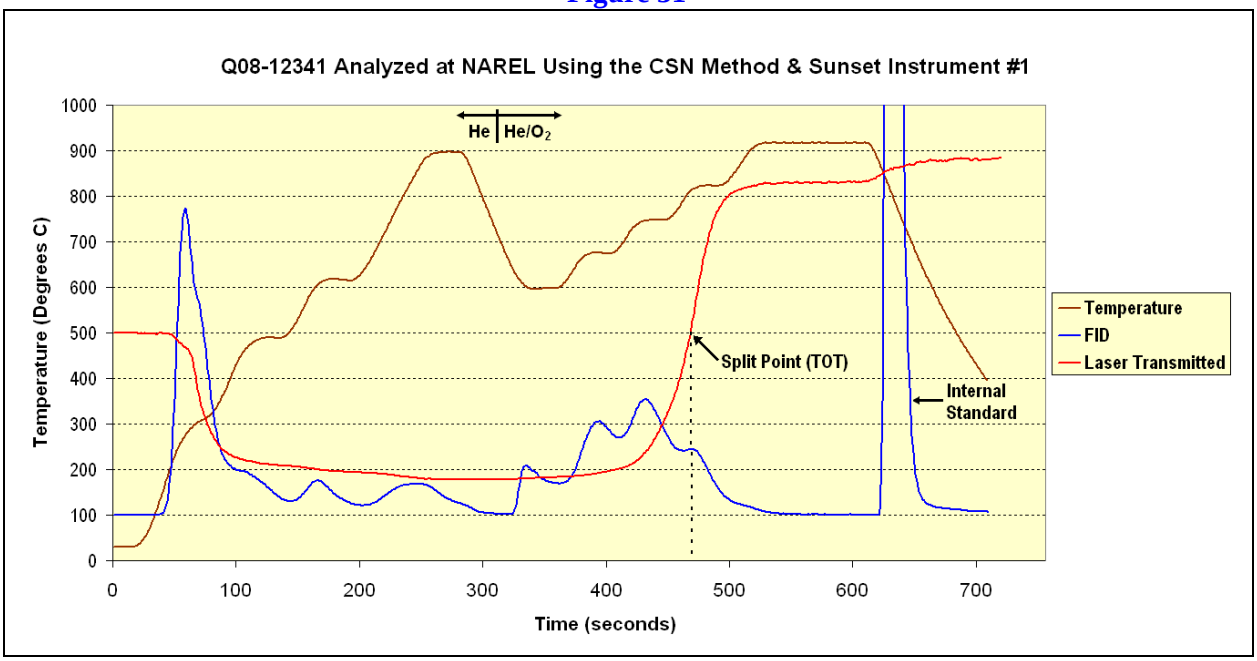


Figure 31 is the last thermogram presented in this report. It shows the analysis of sample Q08-12341 analyzed again at NAREL using a Sunset single-mode instrument and the CSN method. Note that the OC4 peak, observed in figure 31 at approximately 200 to 300 seconds, is small compared to other labs. Further note that the PyrolC, observed between the introduction of He/O_2 and the TOT split point, is large compared to other labs. These observations are confirmed by examining the bar graph in figure 19. It is unclear what may have caused the low OC4 and high PyrolC from NAREL's analysis.

Figure 31



Twelve thermograms have been presented, and each one represents the analysis of a stable residue that remained on the filter from a single collection event. Results from all of the quartz filters are presented in table 13 at the end of this report. This table includes the uncertainty of measurement when it was available. Table 13 also contains results from the blank filters that were part of each set of PT samples.

XRF analysis

NAREL provided each participating laboratory with a set of six 47-mm filters or eight 25-mm filters for elemental analysis using energy dispersive XRF. Each sample set contained two representative blank filters and the remaining filters were loaded with $PM_{2.5}$ collected from the Montgomery air. Collocated Met One SuperSASS air samplers were used to load filters and create replicates in each sample set according to the sampling schedule presented in table 8. Please note that during each sampling event replicates were prepared using both 47-mm and 25-mm filters.

Table 8. Sampling Schedule for XRF PT Filters

Filter ID	Filter Size	Sample Start	Event Duration	Test Lab	Reference Lab
T08-12382	47-mm Teflon®	04/24/08	80-hr Event	CARB	RTI
T08-12388	47-mm Teflon®	04/28/08	112-hr Event	CARB	RTI
T08-12397	47-mm Teflon®	05/05/08	100-hr Event	CARB	RTI
T08-12398	47-mm Teflon®	05/05/08	100-hr Event	CARB	RTI
T08-12405	47-mm Teflon®	blank	-----	CARB	RTI
T08-12406	47-mm Teflon®	blank	-----	CARB	RTI
T08-12383	47-mm Teflon®	04/24/08	80-hr Event	DRI	RTI
T08-12389	47-mm Teflon®	04/28/08	112-hr Event	DRI	RTI
T08-12390	47-mm Teflon®	04/28/08	112-hr Event	DRI	RTI
T08-12399	47-mm Teflon®	05/05/08	100-hr Event	DRI	RTI
T08-12407	47-mm Teflon®	blank	-----	DRI	RTI
T08-12408	47-mm Teflon®	blank	-----	DRI	RTI
T08-12384	47-mm Teflon®	04/24/08	80-hr Event	ODEQ	RTI
T08-12391	47-mm Teflon®	04/28/08	112-hr Event	ODEQ	RTI
T08-12400	47-mm Teflon®	05/05/08	100-hr Event	ODEQ	RTI
T08-12401	47-mm Teflon®	05/05/08	100-hr Event	ODEQ	RTI
T08-12409	47-mm Teflon®	blank	-----	ODEQ	RTI
T08-12410	47-mm Teflon®	blank	-----	ODEQ	RTI
T08-12385	47-mm Teflon®	04/24/08	80-hr Event	AQMD	RTI
T08-12392	47-mm Teflon®	04/28/08	112-hr Event	AQMD	RTI
T08-12393	47-mm Teflon®	04/28/08	112-hr Event	AQMD	RTI
T08-12402	47-mm Teflon®	05/05/08	100-hr Event	AQMD	RTI
T08-12411	47-mm Teflon®	blank	-----	AQMD	RTI
T08-12412	47-mm Teflon®	blank	-----	AQMD	RTI
T08-12386	47-mm Teflon®	04/24/08	80-hr Event	UCD	RTI
T08-12395	47-mm Teflon®	04/28/08	112-hr Event	UCD	RTI
T08-12396	47-mm Teflon®	04/28/08	112-hr Event	UCD	RTI
T08-12403	47-mm Teflon®	05/05/08	100-hr Event	UCD	RTI
T08-12413	47-mm Teflon®	blank	-----	UCD	RTI
T08-12414	47-mm Teflon®	blank	-----	UCD	RTI
T08-12415	25-mm Teflon®	04/24/08	80-hr Event	DRI	UCD
T08-12417	25-mm Teflon®	04/24/08	80-hr Event	DRI	UCD
T08-12421	25-mm Teflon®	04/28/08	112-hr Event	DRI	UCD
T08-12422	25-mm Teflon®	04/28/08	112-hr Event	DRI	UCD
T08-12424	25-mm Teflon®	05/05/08	100-hr Event	DRI	UCD
T08-12431	25-mm Teflon®	05/05/08	100-hr Event	DRI	UCD
T08-12427	25-mm Teflon®	blank	-----	DRI	UCD
T08-12428	25-mm Teflon®	blank	-----	DRI	UCD
T08-12418	25-mm Teflon®	04/24/08	80-hr Event	RTI	UCD
T08-12419	25-mm Teflon®	04/24/08	80-hr Event	RTI	UCD
T08-12420	25-mm Teflon®	04/24/08	80-hr Event	RTI	UCD

Table 8. Sampling Schedule for XRF PT Filters

Filter ID	Filter Size	Sample Start	Event Duration	Test Lab	Reference Lab
T08-12423	25-mm Teflon®	04/28/08	112-hr Event	RTI	UCD
T08-12425	25-mm Teflon®	05/05/08	100-hr Event	RTI	UCD
T08-12426	25-mm Teflon®	05/05/08	100-hr Event	RTI	UCD
T08-12429	25-mm Teflon®	blank	-----	RTI	UCD
T08-12430	25-mm Teflon®	blank	-----	RTI	UCD

The quality of the replicates described in table 8 was first tested at NAREL by measuring the gravimetric mass of $PM_{2.5}$ captured by each exposed filter. Table 9 shows the mass of $PM_{2.5}$ deposited onto each filter, the average deposit for each sampling event, and the relative deviation of deposit for each filter.

Table 9. Gravimetric Mass Analysis of the Exposed XRF Filters

Sampling Event	Filter Size	Filter ID	Test Lab	Ref. Lab	Filter Deposit (µg)	Average Deposit (µg)	Relative Deviation of Deposit
80-Hour Event Starting on 04/24/08	47-mm	T08-12382	CARB	RTI	334	320.8	4%
		T08-12383	DRI	RTI	313	320.8	-2%
		T08-12384	ODEQ	RTI	325	320.8	1%
		T08-12385	AQMD	RTI	322	320.8	0%
		T08-12386	UCD	RTI	324	320.8	1%
	25-mm	T08-12415	DRI	UCD	329	320.8	3%
		T08-12417	DRI	UCD	315	320.8	-2%
		T08-12418	RTI	UCD	316	320.8	-1%
		T08-12419	RTI	UCD	316	320.8	-1%
		T08-12420	RTI	UCD	314	320.8	-2%
112-Hour Event Starting on 04/28/08	47-mm	T08-12388	CARB	RTI	681	680.5	0%
		T08-12389	DRI	RTI	677	680.5	-1%
		T08-12390	DRI	RTI	692	680.5	2%
		T08-12391	ODEQ	RTI	682	680.5	0%
		T08-12392	AQMD	RTI	686	680.5	1%
		T08-12393	AQMD	RTI	697	680.5	2%
		T08-12395	UCD	RTI	688	680.5	1%
		T08-12396	UCD	RTI	671	680.5	-1%
	25-mm	T08-12421	DRI	UCD	674	680.5	-1%
		T08-12422	DRI	UCD	664	680.5	-2%
		T08-12423	RTI	UCD	673	680.5	-1%
100-Hour Event Starting on 05/05/08	47-mm	T08-12397	CARB	RTI	548	547.0	0%
		T08-12398	CARB	RTI	563	547.0	3%
		T08-12399	DRI	RTI	547	547.0	0%
		T08-12400	ODEQ	RTI	545	547.0	0%
		T08-12401	ODEQ	RTI	554	547.0	1%
		T08-12402	AQMD	RTI	547	547.0	0%
		T08-12403	UCD	RTI	554	547.0	1%
	25-mm	T08-12424	DRI	UCD	544	547.0	-1%
		T08-12431	DRI	UCD	534	547.0	-2%
		T08-12425	RTI	UCD	538	547.0	-2%
		T08-12426	RTI	UCD	543	547.0	-1%

Furthermore it was decided that all of the filters should be analyzed at a single [reference] laboratory so that the quality of replicates could be further examined before they were redistributed to the other labs. Consequently all of the 47-mm filters were first analyzed at RTI, and all of the 25-mm filters were first analyzed at UCD before they were returned to NAREL for redistribution to the remaining XRF labs.

This report includes results from the reference labs as well as the subsequent results from test labs. Therefore analytical results from two different labs are presented for every filter. Each lab received exposed filters and at least two representative blank filters as described previously in table 8. NAREL requested each lab to report results as micrograms of the element per filter (µg/filter) and supply the uncertainty of measurement along with each result. Some results were reported in units of mass per area (e.g. µg/cm^2), and in those cases, results were multiplied by the total area of the deposit to produce the final results that appear in this report. It is interesting to note that all labs did not use a consistent deposit area for a given filter size. Most labs used 11.3 cm^2 for the deposit area of a 47-mm filter, but DRI and AQMD used 11.6 cm^2 and 12.0 cm^2 respectively. For those labs that analyzed 25-mm filters, UCD used 3.53 cm^2 for the deposit area, but DRI and RTI used 3.44 cm^2. This small source of inter-laboratory bias would be eliminated if all labs agreed to use a consistent deposit area for each filter size.

A request was made for each lab to provide specific information that will help us better understand how the analytical results were produced. A questionnaire was prepared and distributed to each lab. The questionnaire was designed to document those instrument conditions that were used to produce the XRF spectra. The information provided by each lab may be viewed in tables 16 through 22 at the end of this report.

All of the participating labs have an SOP for their XRF analysis. Some of the SOP's are currently available on the web for easy viewing (see reference 22 through 27).

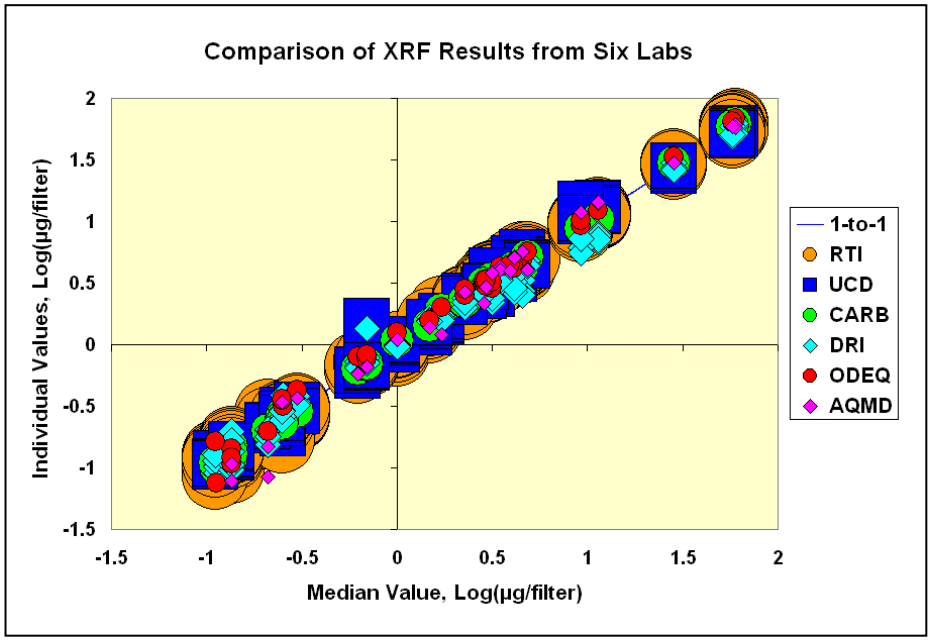
XRF Results

All labs participating in this study were able to report results from a set of 47-mm filters with RTI serving as the reference lab. Furthermore, for the first time since NAREL has been supporting this annual study, 25-mm filters were submitted for XRF analysis to those labs having the capability. DRI and RTI reported results from the 25-mm filters with UCD serving as the reference lab.

Each laboratory reported a set of elements that was part of its routine operation, and therefore, all labs did not report the same consistent set of elements. For example, UCD consistently reported a set of twenty-four elements that are routinely reported for the IMPROVE program. RTI reported a set of forty-eight elements for the 47-mm filters and thirty-three elements for the 25-mm filters. A decision was made for this report to include only those elements that were reported by the reference labs. Accordingly, this report includes results for forty-eight elements reported from the 47-mm filters and twenty-four elements reported from 25-mm filters.

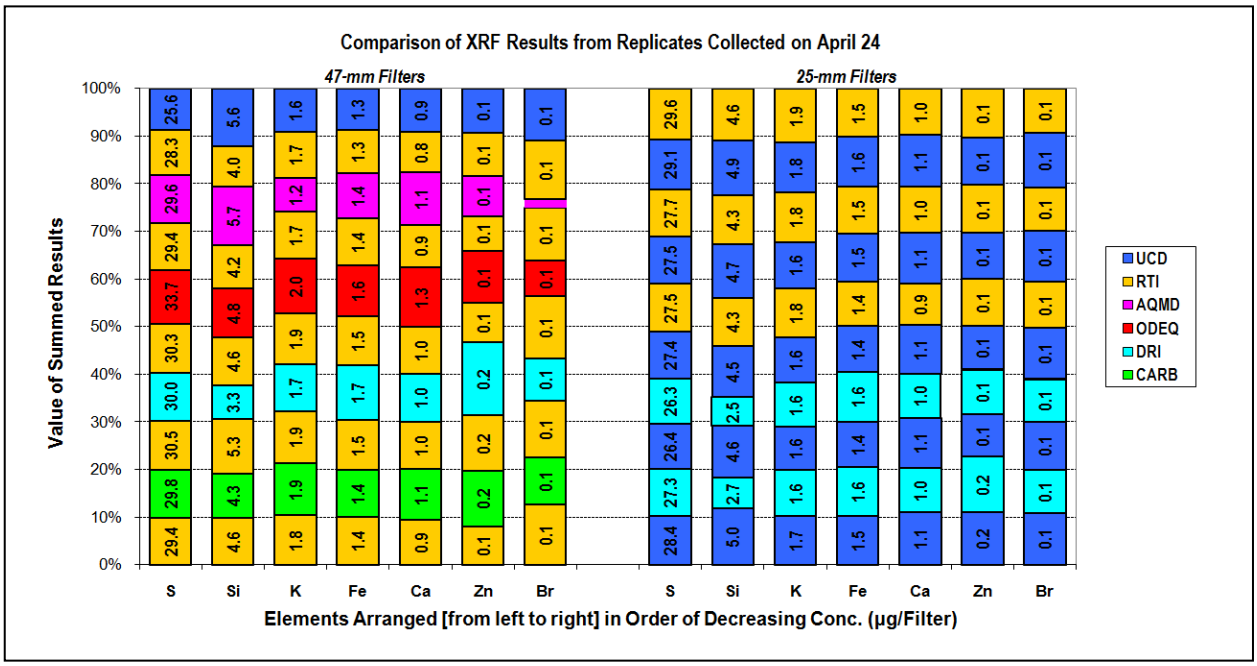
All of the XRF results that were significantly above the reported uncertainties have been compared to the median values by constructing a scatter plot shown in figure 32. A log-log plot was constructed with the median values forming a straight line of unity slope. The corresponding results from all of the labs were superimposed on the median line. Most of the results were very near the median indicating good agreement among the participating labs. Even though figure 32 gives a quick visual impression of many results that cover a wide range of concentrations, this scatter plot does not identify the element plotted or the sample.

Figure 32



The more significant results are presented again as stacked-bar graphs in figures 33, 34, and 35. Results from the 47-mm filters are shown on the left side of the figure, and results from the 25-mm filters are shown on the right side. Each bar segment represents an individual value reported by one of the labs. You will notice that every other segment of each bar in the graph represents a value determined by the reference lab. By presenting results in this manner, it is possible to show the test lab result immediately above the reference lab result with both labs having analyzed the same filter. Elements are identified along the horizontal axis, and the elements are arranged from left to right in order of decreasing concentration. The vertical axis of each bar graph is a linear scale, and each bar is normalized to the sum of the bar segments. Each bar segment is color coded to identify the lab and labeled to show the reported concentration value. The most noticeable result in figure 33 is the bromine reported by AQMD. Bromine was reported as "not detected", but it is plotted in figure 33 at half of AQMD's lower limit of detection.

Figure 33



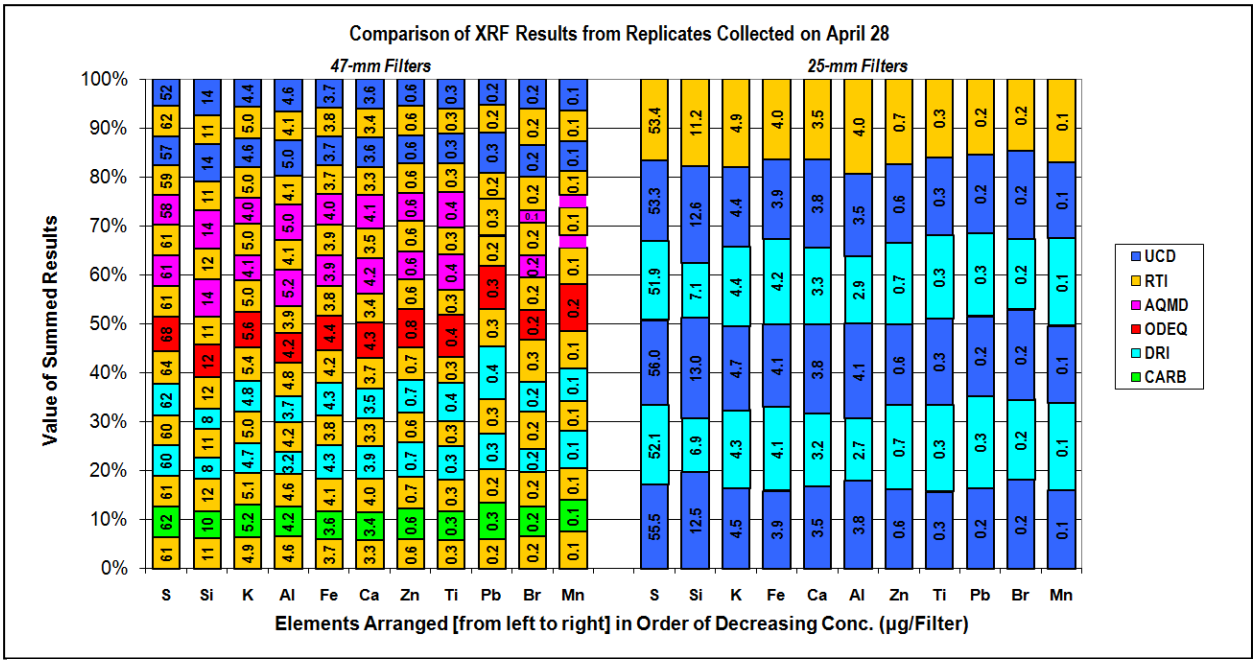
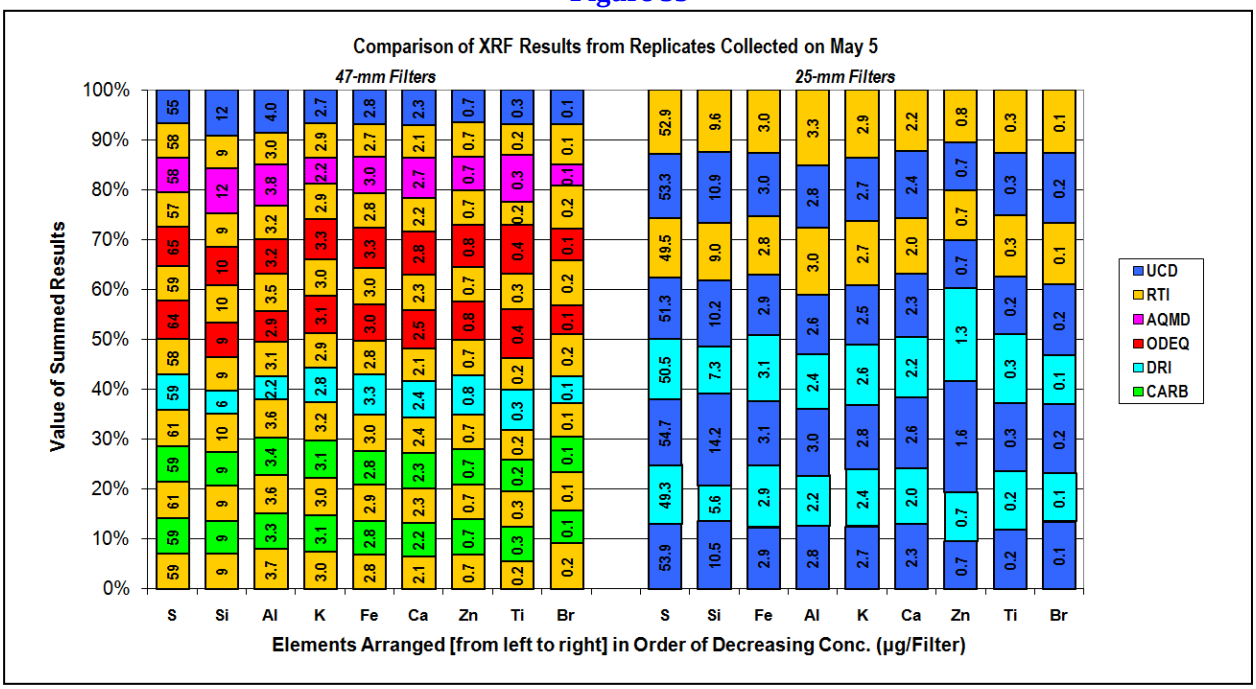


Figure 34

AQMD also reported "not detected" for the Pb, and Mn in figure 34, but again, half the lower limit of detection was plotted in the figure.

The normalized stacked-bar graphs presented in figures 33 through 35 show at a glance the level of agreement among the different labs for several elements. Each bar in the graph would have equal segments if all of the results were in perfect agreement. Again, the only results shown in the graphs are those that are significantly above the reported uncertainty. Those significant results can be identified in tables 14 and 15 by looking for a calculated median.

Figure 35



Figures 36 through 46 present another view of the XRF results which allows us to examine the uncertainty reported by each lab. Notice that the error bars represent a 3-sigma uncertainty which was used to select those results previously presented in figures 32 through 35. Each figure shows results for a single element identified in the title of the graph. The horizontal axis of the graph is labeled to associate each result with a sampling event and filter size. Each pair of bars within the graph represents a single filter, and the bars are color coded to identify the reporting laboratory. Please note that error bars are not presented for the AQMD results. AQMD reported values for the lower limit of detection, but did not report uncertainties that are appropriate for figures 36 through 46.

Results for sulfur are presented in figure 36. It was the most abundant element reported by all of the labs, and reasonably good agreement is observed among all of the labs. Figure 37 shows results from silicon, and some discrepancies are observed. For example, silicon results from DRI are consistently lower than results from the reference lab. Also a trend is becoming obvious for the smaller uncertainties reported by DRI.

Results for potassium, iron, and calcium are presented in figures 38 through 40, and no comment is needed for these results.

Figure 36

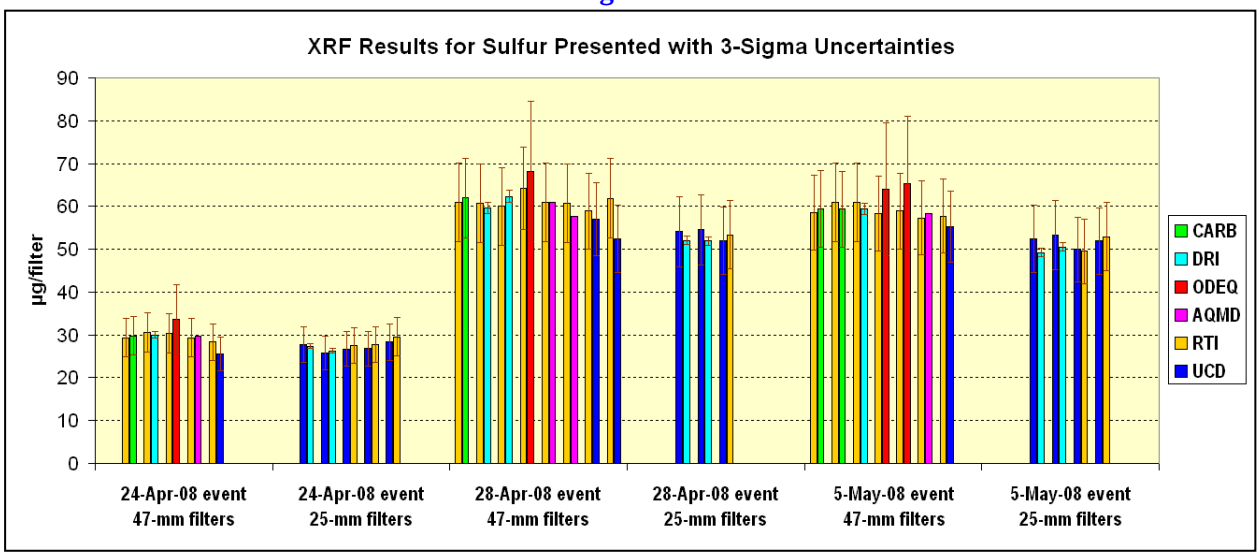


Figure 37

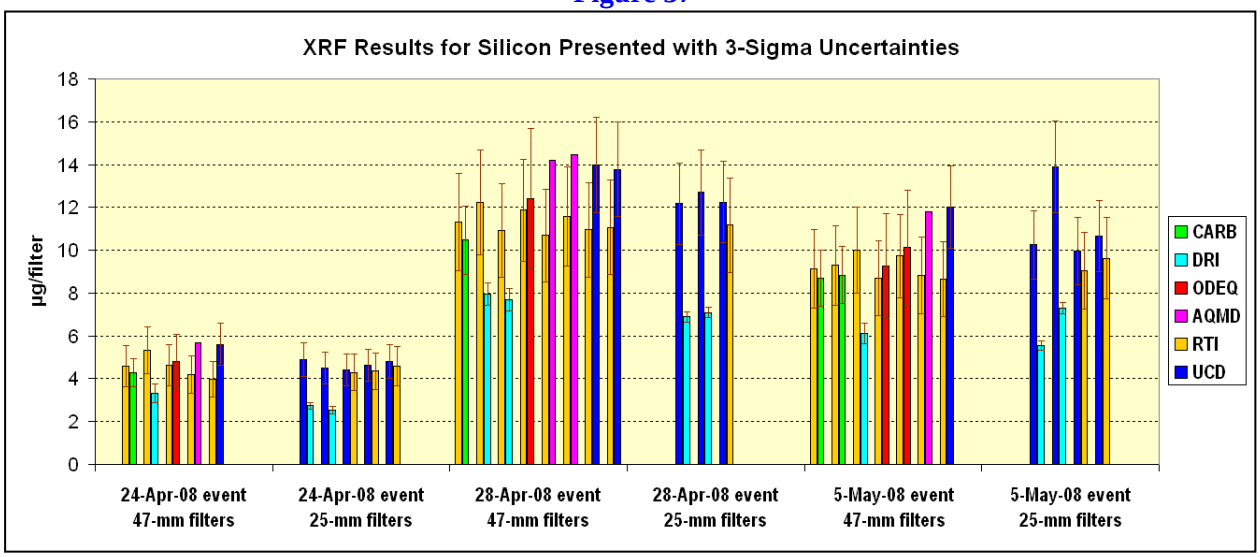


Figure 38

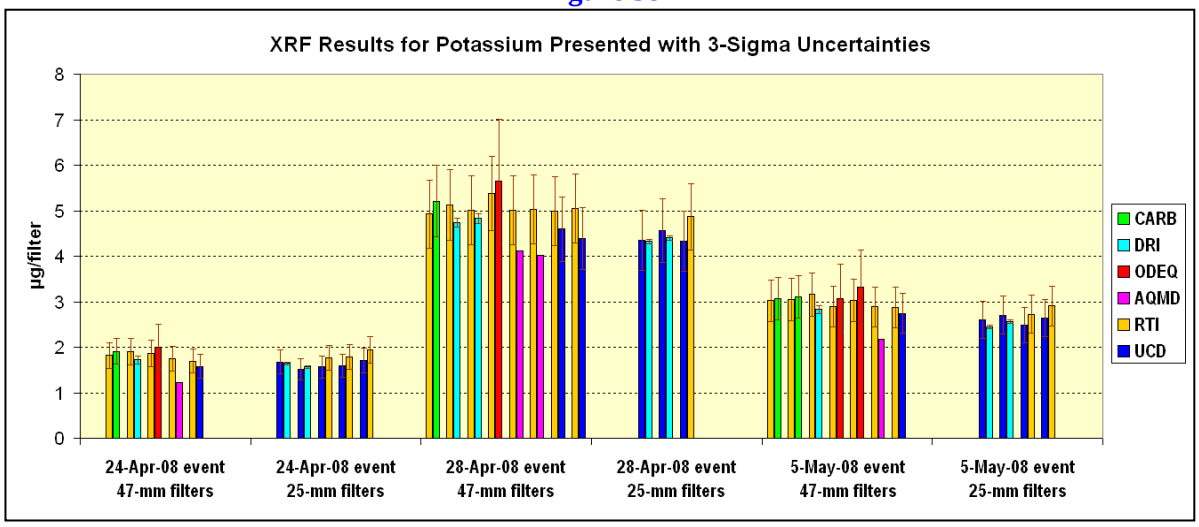


Figure 39

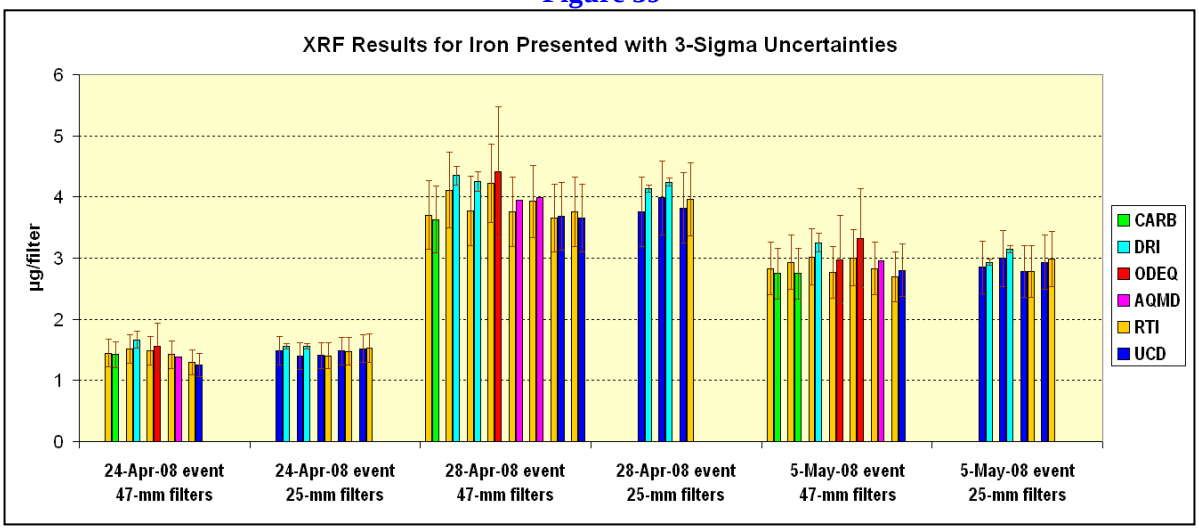


Figure 40

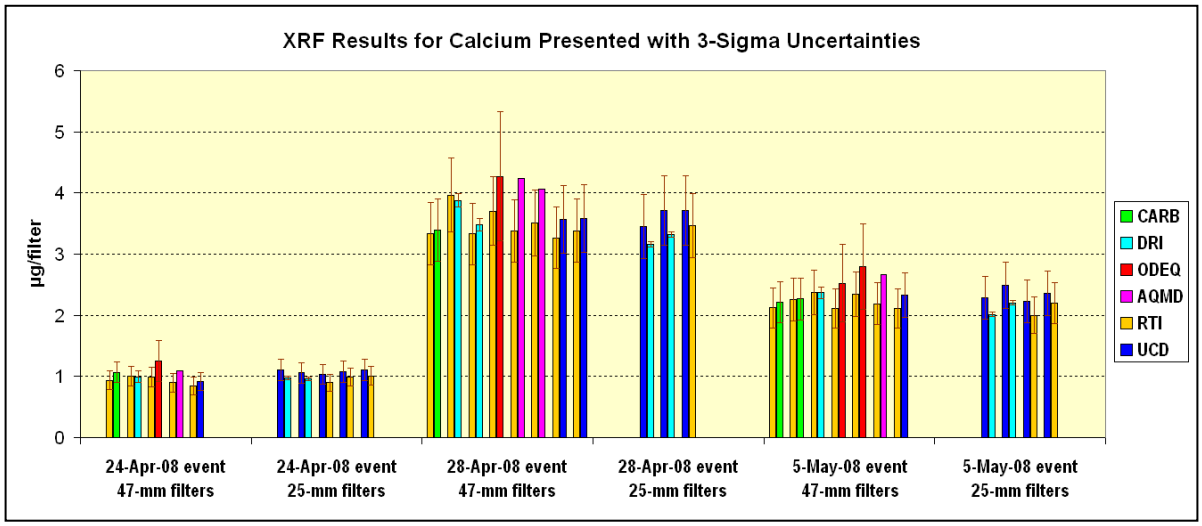
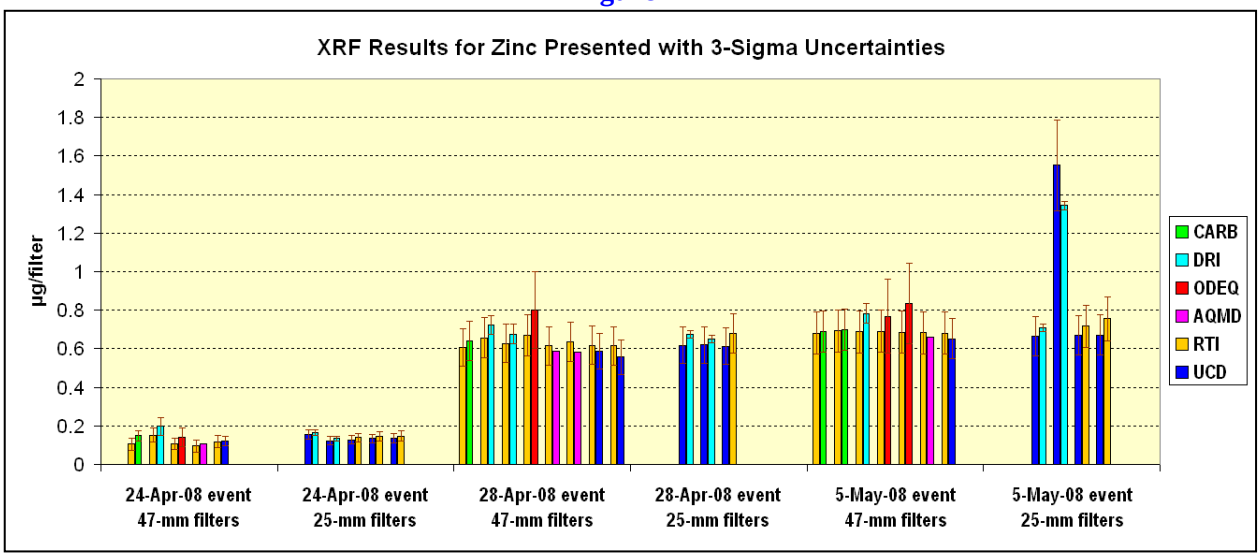


Figure 41



An unusually high zinc concentration is shown in figure 41 for one of the four 25-mm replicates sampled during the May 5 event. Filter sample T08-12431, was apparently contaminated with zinc at some point before it was analyzed at UCD and later at DRI. Both labs reported elevated zinc for this replicate although other elements were not elevated. This accidental trace contamination serves to remind us that having more than one lab analyze each filter was a good idea for this study.

Aluminum was "not detected" by UCD for one of the five 25-mm replicates sampled during the April 24 event. This "not detected" result is responsible for the missing bar in figure 42. All of the remaining bar graphs in figures 42 through 46 will contain one or more missing bars, and each missing bar is due to a result that was below the limit of detection at the reporting laboratory.

Figure 42

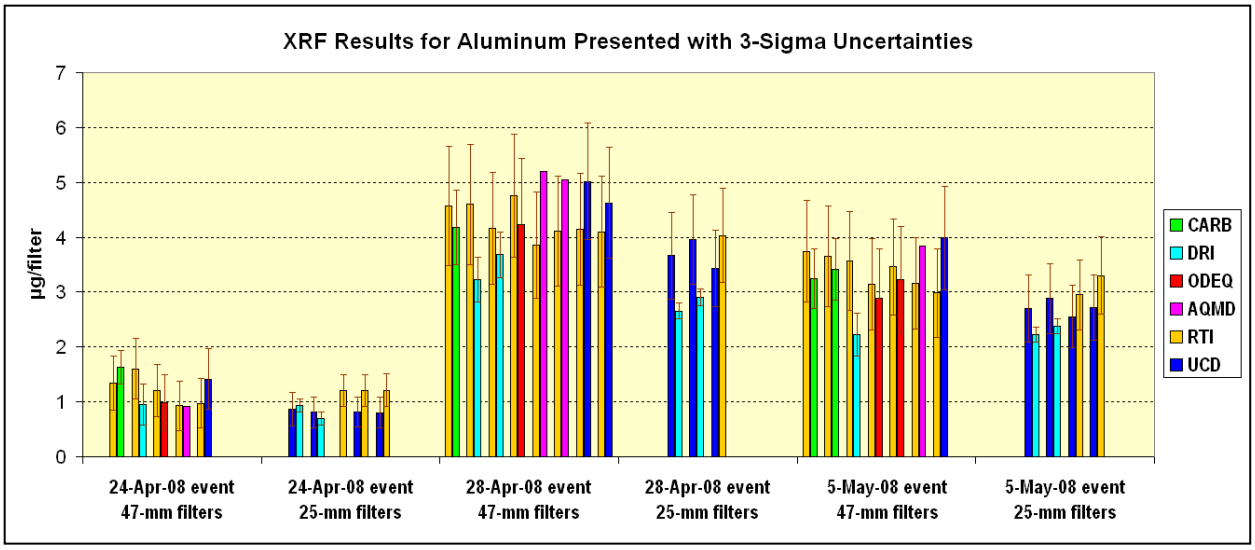


Figure 43

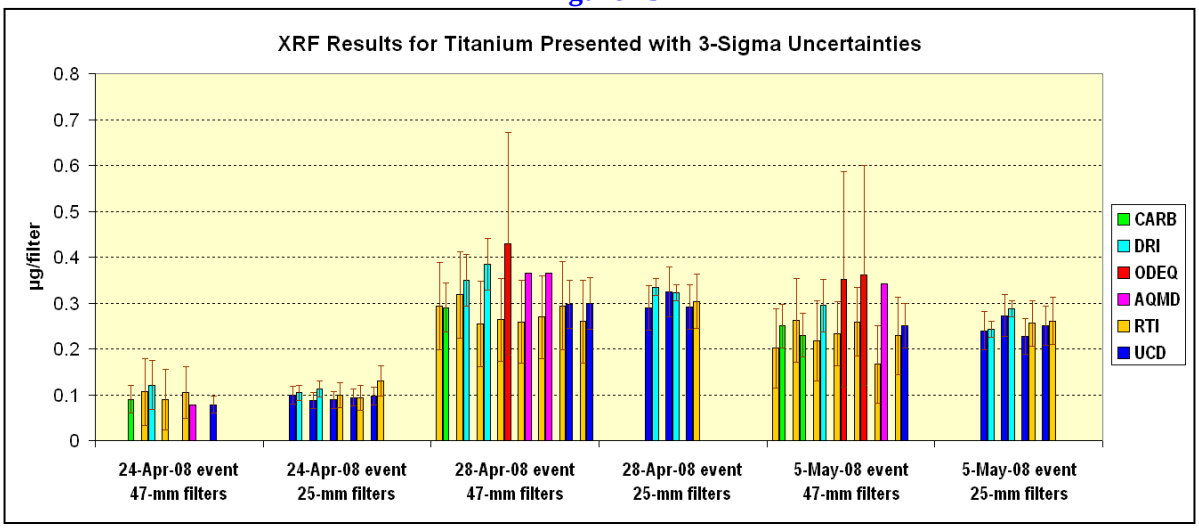


Figure 44

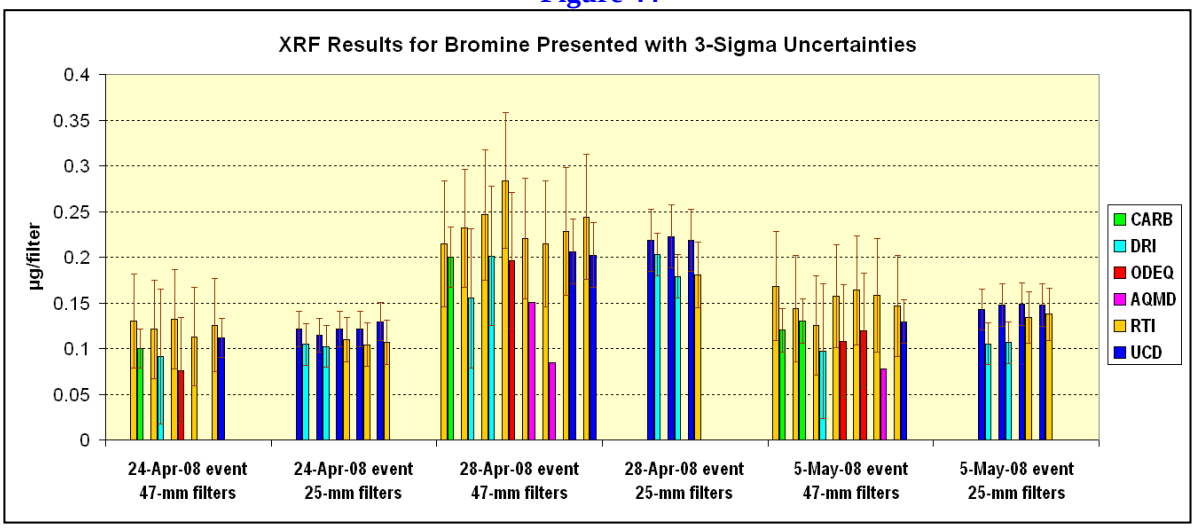


Figure 45

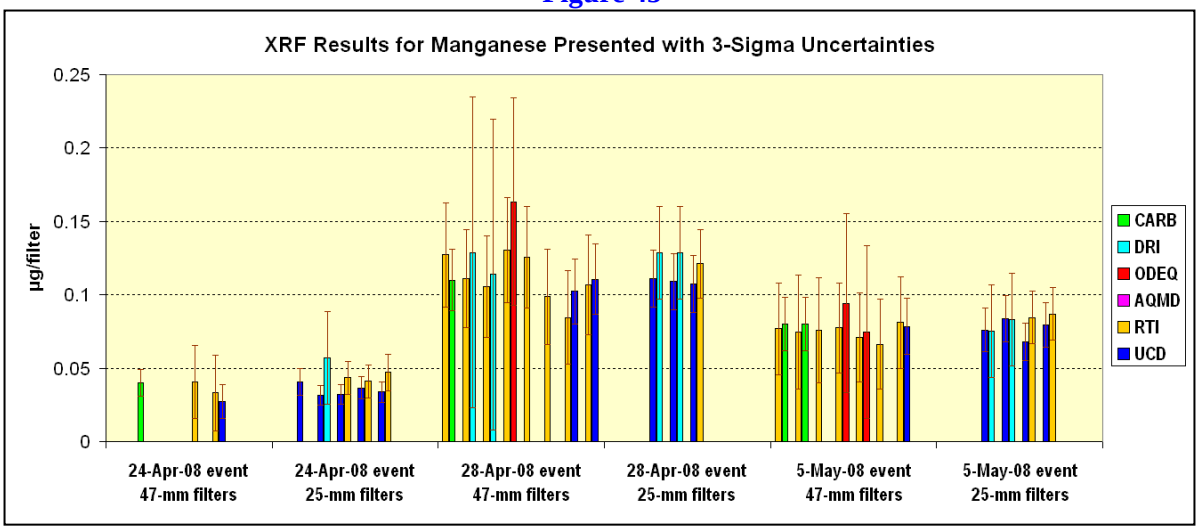


Figure 46

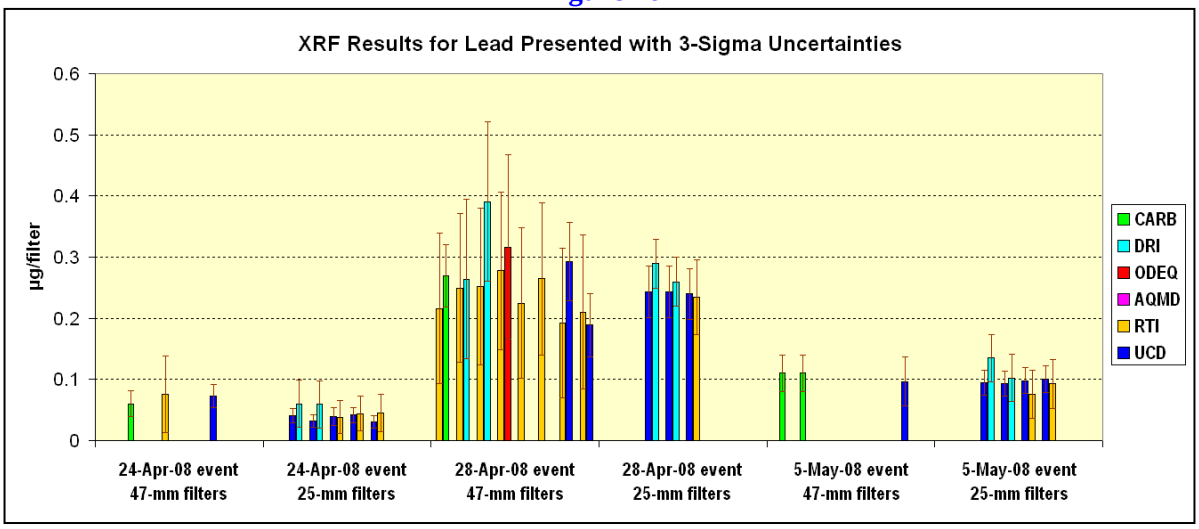


Table 10a is a summary of results for several elements grouped by sample type. Each statistical value in the table was derived from the results of twenty-one elements reported from each lab after having analyzed all of the replicates submitted of both filter sizes. Some of the results in table 10a are negative values. It is not unusual for a lab to report a small negative concentration when the element is either absent from the sample or present at a level near the detection limit.

Table 10a. Summary of XRF Results for Twenty-one Elements (µg/filter)

	RTI Results	UCD Results	CARB Results	DRI Results	ODEQ Results	AQMD Results
Number of Apr 24 Replicates Analyzed	8	6	1	3	1	1
Mean	1.897	1.801	1.957	1.786	2.108	1.975
Max	30.499	29.054	29.800	30.032	33.667	29.616
Min	0.0000	0.0000	0.0000	0.0000	-0.2889	0.0000
Std. Dev.	6.188	5.858	6.464	5.944	7.322	6.457
Count	168	126	21	63	21	21
Number of Apr 28 Replicates Analyzed	9	5	1	4	1	2
Mean	4.311	4.094	4.350	3.971	4.763	4.484
Max	64.241	57.008	61.980	62.322	68.118	60.876
Min	0.0000	0.0000	0.0000	0.0000	-0.7005	0.0000
Std. Dev.	12.832	11.807	13.461	12.030	14.844	12.845
Count	189	105	21	84	21	42
Number of May 5 Replicates Analyzed	9	5	2	3	2	1
Mean	3.793	3.711	3.881	3.491	4.126	4.043
Max	61.009	55.279	59.380	59.416	65.261	58.428
Min	0.0000	0.0000	0.0000	0.0000	-0.9113	0.0000
Std. Dev.	12.192	11.526	12.722	11.327	13.891	12.742
Count	189	105	42	63	42	21
Number of Blank Filters Analyzed	12	6	2	4	2	2
Mean	0.001	0.016	0.001	0.005	-0.001	0.027
Max	0.037	0.578	0.060	0.079	0.059	0.474
Min	0.0000	0.0000	0.0000	0.0000	-0.0693	0.0000
Std. Dev.	0.004	0.067	0.009	0.011	0.021	0.100
Count	252	126	42	84	42	42

Table 10b. Summary of XRF Uncertainties for Twenty-one Elements (µg/filter)

	RTI Uncert.	UCD Uncert.	CARB Uncert.	DRI Uncert.	ODEQ Uncert.	AQMD Uncert.
Number of Apr 24 Replicates Analyzed	8	6	1	3	1	1
Mean	0.111	0.096	0.151	0.029	0.209	-----
Max	1.532	1.464	1.490	0.268	2.711	-----
Min	0.0015	0.0000	0.0030	0.0004	0.0101	-----
Std. Dev.	0.310	0.296	0.390	0.050	0.582	-----
Count	168	126	14	63	21	0
Number of Apr 28 Replicates Analyzed	9	5	1	4	1	2
Mean	0.243	0.213	0.258	0.044	0.440	-----
Max	3.223	2.867	3.100	0.459	5.475	-----
Min	0.0021	0.0000	0.0030	0.0004	0.0106	-----
Std. Dev.	0.646	0.594	0.723	0.087	1.184	-----
Count	189	105	18	84	21	0
Number of May 5 Replicates Analyzed	9	5	2	3	2	1
Mean	0.214	0.193	0.204	0.038	0.388	-----
Max	3.060	2.781	2.970	0.442	5.246	-----
Min	0.0019	0.0000	0.0030	0.0004	0.0101	-----
Std. Dev.	0.613	0.580	0.634	0.080	1.107	-----
Count	189	105	42	63	42	0
Number of Blank Filters Analyzed	12	6	2	4	2	2
Mean	0.015	0.005	0.023	0.024	0.035	-----
Max	0.101	0.210	0.023	0.134	0.140	-----
Min	0.0011	0.0000	0.0230	0.0004	0.0098	-----
Std. Dev.	0.019	0.022	-----	0.030	0.031	-----
Count	252	126	1	84	42	0

Table 10b is a summary of the reported uncertainties grouped by sample type. Both tables are structured to offer the same information matrix so that each statistical value in table 10a can be identified with the corresponding uncertainty value in table 10b. For example, the mean of 168 results reported by RTI for the April 24 replicates was 1.897 µg/filter, and the mean uncertainty for the same set of results was 0.111 µg/filter. It may be helpful to identify those elements that are summarized in tables 10a and 10b. Since all of the labs did not report the same set of elements, a decision was made to calculate the statistical parameters based upon the largest subset of twenty-one elements that were reported by all of the labs for every filter. The statistical values in tables 10a and 10b were based upon results and uncertainties reported for the following elements: Al, Si, P, S, Cl, K, Ca, Ti, V, Cr, Mn, Fe, Ni, Cu, Zn, As, Se, Br, Rb, Sr, and Pb.

Visual evidence was observed earlier in figures 36 through 46 that the uncertainties reported by DRI were smaller than uncertainties reported by other labs, and now table 10b confirms the observation, at least for the samples that were not filter blanks. The largest single uncertainty in table 10b was reported from the ODEQ lab. It was the uncertainty associated with sulfur reported for one of the April 28 replicates (i.e. 68.12 ±5.48 µg/filter reported sulfur). This largest single uncertainty represented 8 % of the sulfur concentration that was reported.

Regarding the summary of uncertainties presented in table 10b, a few comments are appropriate. As stated previously, AQMD did not report uncertainties that were appropriate for the bar graphs presented earlier although lower limit of detection values were reported. CARB did report uncertainties for the detected elements but did not report uncertainties for the undetected elements. UCD reported the uncertainty for a

detected element, but reported a zero uncertainty for each undetected element. All of the participating labs reported a Method Detection Limit (MDL) for the elements reported.

A complete listing of the XRF results is included at the end of this report. Results from the 47-mm filters are presented in table 14, and results from the 25-mm filters are presented in table 15. Both tables include the analytical result, uncertainty, and the MDL reported by each lab. The tables also include a median value for those more significant results presented earlier in figures 32 through 35.

Conclusions

This study was designed to evaluate the analytical performance of several $PM_{2.5}$ speciation labs. The approach was similar to the study conducted in 2007 (see reference 28). Each test lab analyzed a similar set of blind PT filters that contained hidden replicates and blanks, and the results reported from all of the labs have been compared. The scope of the study included four analytical techniques, and multiple methods were reported for the IC, TOA carbon, and XRF. The EPA lab was able to report results for all of the methods used during this study except for XRF. RTI and UCD were good choices to serve as a reference lab for the XRF determinations.

Six test labs analyzed a set of PT samples for gravimetric mass, and only one result was outside the 3-sigma advisory limits established by NAREL. Raw data were examined to identify the source of error responsible for the outlier, and it was determined that the problem was associated with POST-weighing of the filter. However, the exact cause of the problem could not be determined. With this exception, all of the results reported from the participating labs showed good agreement with the gravimetric results reported from NAREL.

Six different labs reported IC results from at least one set of PT samples, and three different methods were tested. Both Nylon® and Teflon® filters were analyzed for selected ions during this study. A detection limit issue regarding potassium was observed for the AQMD lab. Also one of the filters submitted to AQMD may have been accidentally contaminated with a low-level of sodium. Otherwise no significant problems were observed in the IC results from this study.

Five labs analyzed a set of quartz PT filters, and three of the labs analyzed each filter multiple times in order to report results using more that one TOA method. All of the labs, except CARB and AQMD, reported results from more than one instrument. A total of twelve data packages were reported with TOA carbon results. Each lab received an almost identical set of filters, and every set of filters contained hidden replicates and blanks. The results from this study are useful to evaluate performance at several different levels. Precision can be evaluated within one lab and among different labs. Three different methods were reported, and results were reported from three different models of instrumentation. Care must be exercised to make valid comparisons! Extra text was included in this report to help support and explain the comparisons that have been made.

Precision is normally very good for the total carbon (TC) when results are compared among labs, among methods, and even among instruments. However, some troublesome TC values were reported for this study. Five of six values reported by AQMD were above average, and this includes the two blank filters. It is reasonable to assume that high blank values may have caused high values for the exposed filters. Two values from CARB were above average by just the right amount to suggest sample mix-up. But if filters were accidentally switched, did it happen at CARB or at NAREL? Other explanations are also possible. Sample Q08-12458 was analyzed at RTI four times, but one of the determinations was significantly above average with no obvious explanation. Was it due to poor homogeneity of the filter deposit? Again, other explanations are also possible.

Carbon fractions are affected by the choice of method. For example, EC values reported from the CSN/TOT method were less than one third of the EC values reported from the IMPROVE_A/TOR method regardless of lab and model of instrumentation. Results from this study show good precision within the same method for the major carbon fractions, OC and EC, regardless of which instrument performed the

analysis. The smaller carbon fractions, such as OC1, EC1, and PyrolC, are referred to as subfractions in this report. As expected, some of the subfractions show the worst precision even within the same method and within the same model of instrument.

This is the first study supported by NAREL that includes both 25-mm and 47-mm filters for XRF analysis. By sampling and analyzing two different filter media, a new level of investigation was possible. This study was able to compare results from different laboratories and also from different filter media. The 25-mm filters are routinely used in the IMPROVE program, and these filters not only provide a smaller deposit area, but also have a much thinner Teflon® membrane compared to the 47-mm filters. Six XRF labs participated in this study. By design, the results reported from several test labs were compared to the results from a single reference lab. All thirty of the 47-mm filters used in this study were first analyzed at RTI before they were redistributed as blind sample sets to the other test labs. Similarly, all sixteen of the 25-mm filters were first analyzed at UCD before they were redistributed to DRI and RTI as blind PT samples. Having a single reference lab analyze all of the samples provides valuable information about the quality of filter replicates that goes beyond weighing all of the filters to determine mass captured. Having good replicates was an important element of the study.

This report identifies a variety of instruments that were used to produce the XRF results (see tables 16 through 22). Different instruments create different raw data spectra (reference 29) and furthermore, different labs use different data reduction algorithms. Several factors were different for the two filter media that include the following.

- different filter face velocity during sampling
- different thickness of deposit that may affect signal attenuation
- different thickness of filter membrane that affects the background spectrum
- different sensitivity for the elements with calibration standards based upon $\mu g/cm^2$

Even with these considerations, there was reasonably good agreement among labs, especially for the more abundant elements. Bar graphs have been presented that also show good comparability of results between the two different filter media.

EPA appreciates the exceptional contributions from DRI, RTI, and UCD. These three labs made it possible to include 25-mm filters in this study. It should be stated that DRI and RTI do not routinely analyze 25-mm filters, and 47-mm filters are not routinely analyzed at UCD. These labs made extra effort to report results from both filter media. The RTI and UCD labs were also willing to serve as reference labs.

References

1. CARB July 30, 2002. Standard Operating Procedure for the Determination of PM2.5 Mass in Ambient Air by Gravimetric Analysis, SOP MLD055, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD055_fin.pdf
2. DRI March 2002. Standard Operating Procedure Gravimetric Analysis, DRI SOP #2-114.2, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV.
3. ODEQ June 27, 2003. Standard Operating Procedure for Gravimetric Analysis of Particulate Collected with R&P Partisol Samplers and MetOne SASS Samplers, Laboratory Division, State of Oregon Department of Environmental Quality, Portland, OR. [currently available on the web] http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0027SOP.pdf
4. RTI August 14, 2003. Standard Operating Procedure for PM2.5 Gravimetric Analysis, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/gravmssop.pdf

5. NAREL August 17, 2004. Standard Operating Procedure, Mass Measurements for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_mass.pdf

6. CARB June 18, 2002. Standard Operating Procedure for the Analysis of Anions and Cations in PM2.5 Speciation Samples by Ion Chromatography, SOP MLD064, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD064_fin.pdf

7. DRI March 2002. Standard Operating Procedure, Anion Analysis of Filter Extracts and Precipitation Samples by Ion Chromatography DRI SOP #2-203.5, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV.

8. DRI March 2002. Standard Operating Procedure, Cation Analysis of Filter Extracts and Precipitation Samples by Ion Chromatography DRI SOP #2-208.1, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV.

9. ODEQ December 22, 2003. Standard Operating Procedure for Ion Chromatography Analysis of Ambient Air Particulate Matter, Laboratory Division, State of Oregon Department of Environmental Quality, Portland, OR. [currently available on the web] http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0029SOP.pdf

10. RTI August 14, 2003. Standard Operating Procedure for PM2.5 Anion Analysis, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/anionsop.pdf

11. RTI August 14, 2003. Standard Operating Procedure for PM2.5 Cation Analysis, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/cationsop.pdf

12. RTI October 26, 2005. Standard Operating Procedure for National Park Service Filter Preparation, Extraction, and Anion Analysis, .Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://vista.cira.colostate.edu/improve/Publications/SOPs/RTI_SOPs/RTI_IonSOP102605.pdf

13. AQMD 2009. Standard Operating Procedure for the Determination of Inorganic Anions by Ion Chromatography, SOP0003, South Coast Air Quality Management District, Diamond Bar, CA.

14. AQMD 2009. Standard Operating Procedure for the Determination of Cations in PM2.5 Filter Samples, SOP0002, South Coast Air Quality Management District, Diamond Bar, CA.

15. NAREL November 6, 2000. Standard Operating Procedure, Anion Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_anion.pdf

16. NAREL July 31, 2000. Standard Operating Procedure, Cation Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_cation.pdf

17. CARB June 15, 2007. Standard Operating Procedure for Organic and Elemental Carbon Analysis of Exposed Quartz Microfiber Filters, SOP MLD065, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD065_fin.pdf

18. DRI November 2005. DRI Standard Operating Procedure, Thermal/Optical Carbon Analysis (TOR/TOT) of Aerosol Filter Samples - Method IMPROVE_A, Division of Atmospheric Sciences, Desert Research Institute, Reno, NV. [currently available on the web] http://vista.cira.colostate.edu/improve/Publications/SOPs/DRI_SOPs/2005/2-216r1_IMPROVEA_20051115.pdf

19. RTI August 15, 2003. Standard Operating Procedure for the Determination of Organic, Elemental, and Total Carbon in Particulate Matter Using a Thermal/Optical Transmittance Carbon Analyzer, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/ocecsop.pdf

20. AQMD 2009. Standard Operating Procedure for Organic/Elemental Carbon Analysis of PM2.5 and PM10 Filter Samples, SOP0001, South Coast Air Quality Management District, Diamond Bar, CA.

21. NAREL November 1, 2002. Standard Operating Procedure, Carbon Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_carbon.pdf

22. CARB January 31, 2006. Standard Operating Procedure for the Determination of Elemental Concentrations in Ambient Air by Energy Dispersive X-Ray Fluorescent (EDXRF) Spectrometry, SOP MLD034, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD034_fin.pdf

23. DRI October 2004. Standard Operating Procedure X-ray Fluorescence (XRF) Analysis of Aerosol Filter Samples (PANalytical Epsilon5), DRI SOP #2-209.1, Division of Atmospheric Sciences Desert Research Institute, Reno, NV.

24. ODEQ June 24, 2003. Standard Operating Procedure, Elemental Analysis of Air Particulate by Energy Dispersive X-Ray Fluorescence (EDXRF), Laboratory Division, State of Oregon Department of Environmental Quality, Portland, OR. [currently available on the web] http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0025SOP.pdf

25. RTI January 20, 2004. Standard Operating Procedure for the X-Ray Fluorescence Analysis of PM2.5 Deposits on Teflon Filters, Environmental & Industrial Measurements Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/xrfsop.pdf

26. AQMD 2009. Standard Operating Procedure for the Analysis ofOM2.5 Filter Samples by Energy Dispersive X-Ray Fluorescence Spectrometry, SOP0004, South Coast Air Quality Management District, Diamond Bar, CA.

27. UCD 2005 to present. Introducing the Report Series on XRF QA/QC, Crocker Nuclear Laboratory, University of California, Davis, CA. [currently available on the web] http://vista.cira.colostate.edu/improve/Data/QA_QC/QAQC_UCD.htm

28. EPA/NAREL, November 24, 2008. Technical Memorandum: Experimental Inter-comparison of Speciation Laboratories, U.S. Environmental Protection Agency. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/MultilabSpeciationPEReport.pdf

29. EPA/NAREL, March 5, 2007. Technical Memorandum: Experimental Inter-comparison of Speciation Laboratories, U.S. Environmental Protection Agency. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/Multilab-Speciation-PE-2006.pdf

Table 11. Gravimetric Mass PT Results

Sample ID	Sample Description	Tare Mass		Final Mass		Captured $PM_{2.5}$		Inter-Lab Difference* of Captured $PM_{2.5}$ (mg)	Name of the Test Lab
		Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)		
T08-12640	28-hr event 12/17/08	138.663	138.663	138.770	138.769	0.107	0.106	-0.001	CARB
T08-12641	28-hr event 12/17/08	143.891	143.890	143.997	143.993	0.106	0.103	-0.003	CARB
T08-12642	56-hr event 12/18/08	145.429	145.428	145.617	145.603	0.188	0.175	-0.013	CARB
T08-12643	56-hr event 12/18/08	145.600	145.602	145.799	145.777	0.199	0.175	-0.024	CARB
T08-12644	42-hr event 12/21/08	145.971	145.973	146.089	146.087	0.118	0.114	-0.004	CARB
T08-12645	42-hr event 12/21/08	145.773	145.775	145.886	145.883	0.113	0.108	-0.005	CARB
T08-12646	24-hr event 12/23/08	145.943	145.941	146.031	146.031	0.088	0.090	0.002	CARB
T08-12647	blank	142.375	142.374	142.376	142.374	0.001	0.000	-0.001	CARB
T08-12648	blank	142.570	142.570	142.572	142.569	0.002	-0.001	-0.003	CARB
T08-12649	blank	142.617	142.618	142.618	142.616	0.001	-0.002	-0.003	CARB
MW08-12700	metallic transfer weight	190.085	190.085	190.085	190.085	0.000	0.000	0.000	CARB
MW08-12701	metallic transfer weight	87.548	87.550	87.550	87.550	0.002	0.000	-0.002	CARB
T08-12650	28-hr event 12/17/08	144.567	144.552	144.665	144.656	0.098	0.104	0.006	DRI
T08-12651	28-hr event 12/17/08	143.836	143.820	143.939	143.924	0.103	0.104	0.001	DRI
T08-12652	56-hr event 12/18/08	142.226	142.208	142.393	142.381	0.167	0.173	0.006	DRI
T08-12653	56-hr event 12/18/08	144.006	143.987	144.173	144.159	0.167	0.172	0.005	DRI
T08-12654	42-hr event 12/21/08	143.637	143.617	143.739	143.728	0.102	0.111	0.009	DRI
T08-12655	42-hr event 12/21/08	142.355	142.336	142.460	142.446	0.105	0.110	0.005	DRI
T08-12656	24-hr event 12/23/08	140.873	140.854	140.952	140.941	0.079	0.087	0.008	DRI
T08-12657	blank	143.830	143.811	143.827	143.810	-0.003	-0.001	0.002	DRI
T08-12658	blank	142.241	142.222	142.239	142.222	-0.002	0.000	0.002	DRI
T08-12659	blank	143.521	143.504	143.520	143.503	-0.001	-0.001	0.000	DRI
MW08-12702	metallic transfer weight	173.336	173.344	173.334	173.344	-0.002	0.000	0.002	DRI
MW08-12703	metallic transfer weight	95.847	95.852	95.846	95.852	-0.001	0.000	0.001	DRI
T08-12660	28-hr event 12/17/08	145.030	145.039	145.135	145.145	0.105	0.106	0.001	ODEQ
T08-12661	28-hr event 12/17/08	143.998	144.004	144.100	144.109	0.102	0.105	0.003	ODEQ

Table 11. Gravimetric Mass PT Results

Sample ID	Sample Description	Tare Mass		Final Mass		Captured $PM_{2.5}$		Inter-Lab Difference* of Captured $PM_{2.5}$ (mg)	Name of the Test Lab
		Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)		
T08-12662	56-hr event 12/18/08	143.820	143.825	144.002	144.005	0.182	0.180	-0.002	ODEQ
T08-12663	56-hr event 12/18/08	145.714	145.717	145.890	145.890	0.176	0.173	-0.003	ODEQ
T08-12664	42-hr event 12/21/08	138.478	138.485	138.604	138.607	0.126	0.122	-0.004	ODEQ
T08-12665	42-hr event 12/21/08	136.530	136.536	136.642	136.646	0.112	0.110	-0.002	ODEQ
T08-12666	24-hr event 12/23/08	137.507	137.513	137.591	137.598	0.084	0.085	0.001	ODEQ
T08-12667	blank	143.032	143.039	143.035	143.038	0.003	-0.001	-0.004	ODEQ
T08-12668	blank	142.892	142.898	142.895	142.897	0.003	-0.001	-0.004	ODEQ
T08-12669	blank	143.281	143.287	143.285	143.286	0.004	-0.001	-0.005	ODEQ
MW08-12704	metallic transfer weight	171.479	171.480	171.478	171.480	-0.001	0.000	0.001	ODEQ
MW08-12705	metallic transfer weight	99.715	99.716	99.715	99.716	0.000	0.000	0.000	ODEQ
T08-12670	28-hr event 12/17/08	139.793	139.797	139.898	139.908	0.105	0.111	0.006	RTI
T08-12671	28-hr event 12/17/08	142.072	142.074	142.172	142.184	0.100	0.110	0.010	RTI
T08-12672	56-hr event 12/18/08	138.696	138.699	138.876	138.879	0.180	0.180	0.000	RTI
T08-12673	56-hr event 12/18/08	140.942	140.947	141.119	141.124	0.177	0.177	0.000	RTI
T08-12674	42-hr event 12/21/08	139.454	139.457	139.566	139.571	0.112	0.114	0.002	RTI
T08-12675	42-hr event 12/21/08	140.229	140.232	140.345	140.348	0.116	0.116	0.000	RTI
T08-12676	24-hr event 12/23/08	139.085	139.088	139.172	139.174	0.087	0.086	-0.001	RTI
T08-12677	blank	143.430	143.431	143.432	143.433	0.002	0.002	0.000	RTI
T08-12678	blank	140.169	140.171	140.172	140.174	0.003	0.003	0.000	RTI
T08-12679	blank	141.014	141.019	141.016	141.019	0.002	0.000	-0.002	RTI
MW08-12706	metallic transfer weight	180.868	180.868	180.868	180.869	0.000	0.001	0.001	RTI
MW08-12707	metallic transfer weight	91.559	91.559	91.559	91.559	0.000	0.000	0.000	RTI
T08-12680	28-hr event 12/17/08	142.903	142.904	143.006	143.013	0.103	0.109	0.006	AQMD
T08-12681	28-hr event 12/17/08	139.763	139.763	139.863	139.870	0.100	0.107	0.007	AQMD
T08-12682	56-hr event 12/18/08	140.082	140.082	140.261	140.258	0.179	0.176	-0.003	AQMD
T08-12683	56-hr event 12/18/08	140.355	140.352	140.526	140.525	0.171	0.173	0.002	AQMD

Table 11. Gravimetric Mass PT Results

Sample ID	Sample Description	Tare Mass		Final Mass		Captured $PM_{2.5}$		Inter-Lab Difference* of Captured $PM_{2.5}$ (mg)	Name of the Test Lab
		Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)	Test Lab (mg)	NAREL (mg)		
T08-12684	42-hr event 12/21/08	138.892	138.894	139.007	139.010	0.115	0.116	0.001	AQMD
T08-12685	42-hr event 12/21/08	137.862	137.865	137.984	137.975	0.122	0.110	-0.012	AQMD
T08-12686	24-hr event 12/23/08	139.409	139.410	139.494	139.499	0.085	0.089	0.004	AQMD
T08-12687	blank	138.458	138.459	138.459	138.459	0.001	0.000	-0.001	AQMD
T08-12688	blank	137.323	137.324	137.324	137.323	0.001	-0.001	-0.002	AQMD
T08-12689	blank	138.722	138.722	138.726	138.725	0.004	0.003	-0.001	AQMD
MW08-12708	metallic transfer weight	191.058	191.061	191.059	191.061	0.001	0.000	-0.001	AQMD
MW08-12709	metallic transfer weight	96.353	96.352	96.352	96.353	-0.001	0.001	0.002	AQMD
T08-12690	28-hr event 12/17/08	43.898	43.900	43.993	44.000	0.095	0.100	0.005	UCD
T08-12691	28-hr event 12/17/08	47.201	47.203	47.295	47.302	0.094	0.099	0.005	UCD
T08-12692	56-hr event 12/18/08	47.183	47.184	47.355	47.362	0.172	0.178	0.006	UCD
T08-12693	56-hr event 12/18/08	42.998	43.000	43.164	43.172	0.166	0.172	0.006	UCD
T08-12694	42-hr event 12/21/08	46.052	46.055	46.159	46.165	0.107	0.110	0.003	UCD
T08-12695	42-hr event 12/21/08	46.336	46.340	46.444	46.451	0.108	0.111	0.003	UCD
T08-12696	24-hr event 12/23/08	47.537	47.541	47.613	47.621	0.076	0.080	0.004	UCD
T08-12697	blank	48.584	48.587	48.583	48.587	-0.001	0.000	0.001	UCD
T08-12698	blank	45.698	45.701	45.695	45.702	-0.003	0.001	0.004	UCD
T08-12699	blank	48.228	48.232	48.225	48.233	-0.003	0.001	0.004	UCD
MW08-12710	metallic transfer weight	57.883	57.884	57.882	57.884	-0.001	0.000	0.001	UCD
MW08-12711	metallic transfer weight	42.147	42.147	42.146	42.147	-0.001	0.000	0.001	UCD

**** Negative values indicate a smaller capture determined by NAREL.***

Table 12. Ion Chromatography PT Results

Sample ID	Filter Medium	Sample Description	Lab	Method	Concentration (µg/filter)						
					Chloride	Nitrate	Nitrite	Sulfate	Ammonium	Potassium	Sodium
N08-12313	Nylon®	152-hr Event 01/23/08	CARB	CSN	-----	98.63	-----	137.03	79.83	3.06	3.88
N08-12314	Nylon®	152-hr Event 01/23/08	CARB	CSN	-----	102.17	-----	147.09	77.63	3.07	3.72
N08-12315	Nylon®	152-hr Event 01/23/08	DRI	CSN	-----	92.42	-----	145.82	69.85	3.70	2.69
N08-12316	Nylon®	152-hr Event 01/23/08	DRI	CSN	-----	84.65	-----	132.74	63.83	3.79	2.60
N08-12317	Nylon®	152-hr Event 01/23/08	ODEQ	CSN	-----	85.7	-----	121	61.6	3.05	<3.6
N08-12318	Nylon®	152-hr Event 01/23/08	ODEQ	CSN	-----	94.1	-----	136	65.5	3.65	<3.6
N08-12319	Nylon®	152-hr Event 01/23/08	RTI	CSN	-----	100.16	-----	149.25	70.65	2.84	2.55
N08-12320	Nylon®	152-hr Event 01/23/08	RTI	CSN	-----	99.97	-----	147.89	69.75	2.80	2.34
N08-12323	Nylon®	152-hr Event 01/23/08	AQMD	CSN	-----	97.50	-----	146.40	68.67	<1.37	2.39
N08-12321	Nylon®	152-hr Event 01/23/08	NAREL	CSN	-----	97.61	-----	142.97	63.31	3.24	2.56
N08-12322	Nylon®	152-hr Event 01/23/08	NAREL	CSN	-----	97.48	-----	137.80	63.58	3.20	2.37
N08-12432	Nylon®	144-hr Event 05/12/08	CARB	CSN	-----	45.77	-----	263.07	97.62	3.13	5.57
N08-12433	Nylon®	144-hr Event 05/12/08	CARB	CSN	-----	44.78	-----	269.66	99.92	3.13	5.78
N08-12434	Nylon®	144-hr Event 05/12/08	DRI	CSN	-----	45.08	-----	263.70	84.85	3.57	4.18
N08-12435	Nylon®	144-hr Event 05/12/08	DRI	CSN	-----	43.11	-----	269.39	86.05	3.69	4.57
N08-12436	Nylon®	144-hr Event 05/12/08	ODEQ	CSN	-----	47.2	-----	283	92.2	4.24	4.25
N08-12437	Nylon®	144-hr Event 05/12/08	ODEQ	CSN	-----	42.7	-----	270	86.5	4.28	3.92
N08-12438	Nylon®	144-hr Event 05/12/08	RTI	CSN	-----	45.54	-----	267.25	84.72	2.64	4.50
N08-12439	Nylon®	144-hr Event 05/12/08	RTI	CSN	-----	43.22	-----	267.51	84.79	2.63	4.36
N08-12442	Nylon®	144-hr Event 05/12/08	AQMD	CSN	-----	47.10	-----	270.00	84.35	3.11	8.04
N08-12440	Nylon®	144-hr Event 05/12/08	NAREL	CSN	-----	45.07	-----	261.68	78.29	3.11	4.31
N08-12441	Nylon®	144-hr Event 05/12/08	NAREL	CSN	-----	42.97	-----	278.75	77.94	3.12	4.51
N08-12712	Nylon®	filter blank	CARB	CSN	-----	<0.5	-----	<1.75	<0.5	<1.25	<0.75
N08-12713	Nylon®	filter blank	CARB	CSN	-----	<0.5	-----	<1.75	<0.5	<1.25	<0.75
N08-12714	Nylon®	filter blank	DRI	CSN	-----	0.45	-----	0.40	0.02	0.00	0.25
N08-12715	Nylon®	filter blank	DRI	CSN	-----	0.45	-----	0.31	0.00	0.00	0.25
N08-12716	Nylon®	filter blank	ODEQ	CSN	-----	<1.4	-----	<1.4	<0.72	<1.1	<3.6
N08-12717	Nylon®	filter blank	ODEQ	CSN	-----	<1.4	-----	<1.4	<0.72	<1.1	<3.6
N08-12718	Nylon®	filter blank	RTI	CSN	-----	1.06	-----	0.00	0.00	0.00	0.00
N08-12719	Nylon®	filter blank	RTI	CSN	-----	0.81	-----	0.00	0.00	0.00	0.00

Table 12. Ion Chromatography PT Results

Sample ID	Filter Medium	Sample Description	Lab	Method	Concentration (µg/filter)						
					Chloride	Nitrate	Nitrite	Sulfate	Ammonium	Potassium	Sodium
N08-12720	Nylon®	filter blank	AQMD	CSN	-----	<0.89	-----	<1.66	<1.5	<1.37	<0.36
N08-12721	Nylon®	filter blank	AQMD	CSN	-----	<0.89	-----	<1.66	<1.5	<1.37	<0.36
N08-12722	Nylon®	filter blank	NAREL	CSN	-----	<1	-----	<1	<1	<0.5	0.09
N08-12723	Nylon®	filter blank	NAREL	CSN	-----	0.49	-----	<1	<1	<0.5	<0.5
N08-12497	Nylon®	144-hr Event 07/18/08	DRI	CSN	-----	35.45	-----	571.80	185.52	4.39	2.96
N08-12498	Nylon®	144-hr Event 07/18/08	DRI	CSN	-----	34.86	-----	581.83	186.53	4.69	2.97
N08-12501	Nylon®	144-hr Event 07/18/08	AQMD	CSN	-----	33.90	-----	560.10	207.15	<1.37	2.54
N08-12499	Nylon®	144-hr Event 07/18/08	NAREL	CSN	-----	35.52	-----	543.27	172.66	3.37	2.83
N08-12500	Nylon®	144-hr Event 07/18/08	NAREL	CSN	-----	35.07	-----	559.17	175.57	3.53	2.80
N08-12502	Nylon®	156-hr Event 07/24/08	DRI	CSN	-----	32.36	-----	326.60	86.00	3.45	6.85
N08-12503	Nylon®	156-hr Event 07/24/08	DRI	CSN	-----	29.93	-----	331.91	86.48	3.38	6.77
N08-12506	Nylon®	156-hr Event 07/24/08	AQMD	CSN	-----	28.20	-----	336.00	88.47	<1.37	5.88
N08-12504	Nylon®	156-hr Event 07/24/08	NAREL	CSN	-----	32.01	-----	311.99	77.71	2.79	6.69
N08-12505	Nylon®	156-hr Event 07/24/08	NAREL	CSN	-----	28.76	-----	314.86	77.96	2.83	6.67
T08-12487	Teflon®	144-hr Event 07/18/08	DRI	CSN	-----	1.23	-----	573.99	205.42	4.85	3.08
T08-12488	Teflon®	144-hr Event 07/18/08	DRI	CSN	-----	1.31	-----	590.01	215.01	5.05	3.20
T08-12489	Teflon®	144-hr Event 07/18/08	NAREL	CSN	-----	3.96	-----	557.26	197.40	3.77	3.14
T08-12490	Teflon®	144-hr Event 07/18/08	NAREL	CSN	-----	3.91	-----	548.96	190.37	3.88	3.22
T08-12492	Teflon®	156-hr Event 07/24/08	DRI	CSN	-----	1.02	-----	312.24	93.16	3.44	6.81
T08-12493	Teflon®	156-hr Event 07/24/08	DRI	CSN	-----	0.94	-----	320.97	95.96	3.58	6.83
T08-12494	Teflon®	156-hr Event 07/24/08	NAREL	CSN	-----	1.47	-----	301.66	86.76	2.95	6.85
T08-12495	Teflon®	156-hr Event 07/24/08	NAREL	CSN	-----	1.33	-----	297.79	85.45	2.90	7.05
T08-12728	Teflon®	filter blank	DRI	CSN	-----	0.55	-----	0.34	0.00	0.39	0.31
T08-12729	Teflon®	filter blank	DRI	CSN	-----	0.62	-----	0.34	0.00	0.39	0.34
T08-12730	Teflon®	filter blank	NAREL	CSN	-----	0.90	-----	<1	<1	0.12	0.22
T08-12731	Teflon®	filter blank	NAREL	CSN	-----	1.31	-----	<1	<1	0.16	0.31
N08-12328	Nylon®	128-hr Event 01/30/08	RTI	IMPROVE	4.79	47.62	2.02	106.88	39.10	-----	-----
N08-12329	Nylon®	128-hr Event 01/30/08	RTI	IMPROVE	5.16	51.00	1.98	110.74	41.58	-----	-----
N08-12330	Nylon®	128-hr Event 01/30/08	NAREL	IMPROVE	5.33	51.03	1.52	109.26	39.52	-----	-----
N08-12331	Nylon®	128-hr Event 01/30/08	NAREL	IMPROVE	5.17	51.27	0.40	106.31	38.93	-----	-----
N08-12447	Nylon®	144-hr Event 5/19/08	RTI	IMPROVE	1.37	48.30	1.53	320.49	99.69	-----	-----

Table 12. Ion Chromatography PT Results

Sample ID	Filter Medium	Sample Description	Lab	Method	Concentration (µg/filter)						
					Chloride	Nitrate	Nitrite	Sulfate	Ammonium	Potassium	Sodium
N08-12448	Nylon®	144-hr Event 5/19/08	RTI	IMPROVE	1.26	43.75	0.99	324.60	100.13	-----	-----
N08-12449	Nylon®	144-hr Event 5/19/08	NAREL	IMPROVE	1.85	48.19	0.86	309.44	89.29	-----	-----
N08-12450	Nylon®	144-hr Event 5/19/08	NAREL	IMPROVE	1.62	44.38	0.37	307.15	88.66	-----	-----
N08-12724	Nylon®	filter blank	RTI	IMPROVE	0.12	0.94	2.02	0.32	0.00	-----	-----
N08-12725	Nylon®	filter blank	RTI	IMPROVE	0.12	0.80	2.29	0.00	0.00	-----	-----
N08-12726	Nylon®	filter blank	NAREL	IMPROVE	<0.5	<1	0.60	<1	<1	-----	-----
N08-12727	Nylon®	filter blank	NAREL	IMPROVE	<0.5	0.50	1.59	<1	<1	-----	-----

Table 13. TOA Carbon PT Results

Sample ID	Sample Description	Lab	Instrument (see text)*	Method	Concentration (µg/cm^2)							
					OC	EC	TC	OC1	OC2	OC3	OC4	PyrolC
Q08-12454	144-hr Event 05/27/07	CARB	#1	IMPROVE_A	16.9	5.3	22.3	<0.8	4.7	5.5	2.4	4.1
Q08-12455	144-hr Event 05/27/07	CARB	#1	IMPROVE_A	13.4	4.3	17.8	<0.8	3.6	4.2	2.0	3.7
Q08-12456	144-hr Event 05/27/07	DRI	#7	IMPROVE_A	12.7	3.8	16.5	0.0	4.2	2.8	1.6	4.1
Q08-12456	144-hr Event 05/27/07	DRI	#6	IMPROVE_A	12.3	3.9	16.2	0.1	4.2	3.1	1.3	3.5
Q08-12457	144-hr Event 05/27/07	DRI	#6	IMPROVE_A	12.4	4.0	16.4	0.1	4.3	3.1	1.5	3.4
Q08-12457	144-hr Event 05/27/07	DRI	#8	IMPROVE_A	12.5	3.8	16.3	0.2	4.6	2.4	1.4	3.9
Q08-12458	144-hr Event 05/27/07	RTI	#1	IMPROVE_A	13.8	3.7	17.5	0.0	5.0	3.1	1.6	4.1
Q08-12458	144-hr Event 05/27/07	RTI	F	IMPROVE_A	16.2	4.8	21.0	1.5	5.2	3.6	1.8	4.1
Q08-12459	144-hr Event 05/27/07	RTI	#1	IMPROVE_A	14.8	3.9	18.7	0.0	5.4	3.4	1.7	4.2
Q08-12459	144-hr Event 05/27/07	RTI	F	IMPROVE_A	14.8	4.5	19.3	1.0	5.0	3.2	1.8	3.9
Q08-12462	144-hr Event 05/27/07	AQMD	#1	IMPROVE	15.7	6.2	21.9	-----	-----	-----	-----	-----
Q08-12463	144-hr Event 05/27/07	AQMD	#1	IMPROVE	15.3	5.9	21.2	-----	-----	-----	-----	-----
Q08-12460	144-hr Event 05/27/07	NAREL	#2	IMPROVE_A	15.4	3.3	18.7	0.3	5.6	2.6	1.4	5.6
Q08-12461	144-hr Event 05/27/07	NAREL	#2	IMPROVE_A	15.4	3.7	19.1	0.5	5.6	2.7	1.6	5.0
Q08-12335	176-hr Event 08/29/07	CARB	#1	IMPROVE_A	13.4	4.7	18.2	<0.8	3.9	3.3	2.1	3.8
Q08-12336	176-hr Event 08/29/07	CARB	#1	IMPROVE_A	16.0	5.2	21.2	<0.8	5.1	3.7	2.1	4.5
Q08-12337	176-hr Event 08/29/07	DRI	#9	IMPROVE_A	14.2	4.4	18.6	1.2	4.7	2.3	1.4	4.6
Q08-12337	176-hr Event 08/29/07	DRI	#11	IMPROVE_A	14.7	3.8	18.5	2.0	4.5	2.4	1.2	4.5
Q08-12338	176-hr Event 08/29/07	DRI	#6	IMPROVE_A	13.0	4.6	17.5	0.5	4.9	2.4	1.6	3.5
Q08-12338	176-hr Event 08/29/07	DRI	#7	IMPROVE_A	14.2	4.5	18.7	0.4	5.6	2.3	1.6	4.3
Q08-12339	176-hr Event 08/29/07	RTI	#1	IMPROVE_A	16.9	4.8	21.7	0.6	6.8	3.0	1.9	4.6
Q08-12339	176-hr Event 08/29/07	RTI	F	IMPROVE_A	17.1	5.7	22.8	2.2	5.8	2.8	2.2	4.1
Q08-12340	176-hr Event 08/29/07	RTI	#1	IMPROVE_A	16.9	5.2	22.1	0.7	6.8	3.0	1.8	4.6
Q08-12340	176-hr Event 08/29/07	RTI	F	IMPROVE_A	16.9	5.1	22.1	2.2	5.6	2.7	2.0	4.6
Q08-12343	176-hr Event 08/29/07	AQMD	#1	IMPROVE	15.3	6.8	22.1	-----	-----	-----	-----	-----
Q08-12344	176-hr Event 08/29/07	AQMD	#1	IMPROVE	17.7	7.7	25.4	-----	-----	-----	-----	-----
Q08-12341	176-hr Event 08/29/07	NAREL	#2	IMPROVE_A	17.1	4.7	21.9	1.4	6.3	2.2	1.9	5.3
Q08-12342	176-hr Event 08/29/07	NAREL	#2	IMPROVE_A	17.3	4.9	22.1	1.7	6.3	2.3	1.9	5.0
Q08-12732	filter blank	CARB	#1	IMPROVE_A	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Q08-12733	filter blank	CARB	#1	IMPROVE_A	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8

Table 13. TOA Carbon PT Results

Sample ID	Sample Description	Lab	Instrument (see text)*	Method	Concentration (µg/cm^2)							
					OC	EC	TC	OC1	OC2	OC3	OC4	PyrolC
Q08-12734	filter blank	DRI	#7	IMPROVE_A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q08-12734	filter blank	DRI	#6	IMPROVE_A	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Q08-12735	filter blank	DRI	#6	IMPROVE_A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q08-12735	filter blank	DRI	#7	IMPROVE_A	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Q08-12736	filter blank	RTI	#1	IMPROVE_A	0.3	0.0	0.3	0.0	0.1	0.2	0.0	0.0
Q08-12736	filter blank	RTI	F	IMPROVE_A	0.6	0.0	0.6	0.1	0.1	0.1	0.1	0.3
Q08-12737	filter blank	RTI	#1	IMPROVE_A	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Q08-12737	filter blank	RTI	F	IMPROVE_A	0.4	0.0	0.4	0.1	0.1	0.1	0.0	0.1
Q08-12738	filter blank	AQMD	#1	IMPROVE	1.3	1.0	2.3	-----	-----	-----	-----	-----
Q08-12739	filter blank	AQMD	#1	IMPROVE	0.9	1.0	1.9	-----	-----	-----	-----	-----
Q08-12740	filter blank	NAREL	#2	IMPROVE_A	0.2	0.0	0.2	0.0	0.0	0.1	0.0	0.1
Q08-12741	filter blank	NAREL	#2	IMPROVE_A	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.0
Q08-12456	144-hr Event 05/27/07	DRI	#9	CSN	16.2	0.7	16.9	5.1	2.0	1.5	3.6	4.0
Q08-12456	144-hr Event 05/27/07	DRI	#12	CSN	16.4	1.0	17.4	4.8	2.2	1.5	3.6	4.1
Q08-12457	144-hr Event 05/27/07	DRI	#8	CSN	16.3	0.8	17.1	5.2	2.3	1.4	2.9	4.4
Q08-12457	144-hr Event 05/27/07	DRI	#12	CSN	16.6	0.8	17.4	5.0	2.4	1.5	3.6	4.0
Q08-12458	144-hr Event 05/27/07	RTI	R	CSN	17.0	1.3	18.3	5.1	2.1	1.9	3.3	4.5
Q08-12458	144-hr Event 05/27/07	RTI	T	CSN	16.5	1.2	17.7	3.8	2.9	1.9	3.8	4.0
Q08-12459	144-hr Event 05/27/07	RTI	R	CSN	16.5	1.3	17.8	4.9	2.1	1.8	3.2	4.5
Q08-12459	144-hr Event 05/27/07	RTI	T	CSN	16.3	1.4	17.7	4.1	2.7	2.1	4.5	2.9
Q08-12460	144-hr Event 05/27/07	NAREL	#1	CSN	17.3	1.4	18.7	5.1	2.0	1.2	1.6	7.5
Q08-12461	144-hr Event 05/27/07	NAREL	#1	CSN	17.2	1.4	18.6	5.2	2.0	1.1	1.5	7.4
Q08-12337	176-hr Event 08/29/07	DRI	#8	CSN	18.7	1.1	19.8	6.3	2.1	1.6	4.0	4.7
Q08-12337	176-hr Event 08/29/07	DRI	#12	CSN	19.5	1.0	20.5	6.9	1.9	1.7	4.3	4.7
Q08-12338	176-hr Event 08/29/07	DRI	#9	CSN	18.6	1.0	19.7	6.3	2.0	1.6	4.0	4.8
Q08-12338	176-hr Event 08/29/07	DRI	#12	CSN	19.9	1.0	20.9	7.0	2.1	1.6	4.2	5.0
Q08-12339	176-hr Event 08/29/07	RTI	R	CSN	19.6	1.3	21.0	6.6	1.7	1.8	3.5	5.9
Q08-12339	176-hr Event 08/29/07	RTI	T	CSN	19.2	1.6	20.7	5.2	3.0	2.0	5.6	3.4
Q08-12340	176-hr Event 08/29/07	RTI	R	CSN	19.6	1.4	21.0	7.0	1.6	1.7	3.4	5.9
Q08-12340	176-hr Event 08/29/07	RTI	T	CSN	20.7	1.3	22.0	5.7	3.2	2.1	5.8	3.8
Q08-12341	176-hr Event 08/29/07	NAREL	#1	CSN	20.2	1.6	21.8	6.8	1.9	1.1	1.7	8.7

Table 13. TOA Carbon PT Results

Sample ID	Sample Description	Lab	Instrument (see text)*	Method	Concentration (µg/cm^2)							
					OC	EC	TC	OC1	OC2	OC3	OC4	PyrolC
Q08-12342	176-hr Event 08/29/07	NAREL	#1	CSN	20.1	1.6	21.6	6.9	1.8	1.1	1.9	8.4
Q08-12734	filter blank	DRI	#9	CSN	0.3	0.0	0.3	0.2	0.1	0.0	0.0	0.0
Q08-12734	filter blank	DRI	#12	CSN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q08-12735	filter blank	DRI	#8	CSN	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Q08-12735	filter blank	DRI	#9	CSN	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Q08-12736	filter blank	RTI	R	CSN	0.2	0.0	0.2	0.1	0.1	0.0	0.0	0.0
Q08-12736	filter blank	RTI	T	CSN	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Q08-12737	filter blank	RTI	R	CSN	0.1	0.0	0.1	0.1	0.0	0.0	0.0	0.0
Q08-12737	filter blank	RTI	T	CSN	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Q08-12740	filter blank	NAREL	#1	CSN	0.3	0.0	0.3	0.0	0.1	0.0	0.0	0.0
Q08-12741	filter blank	NAREL	#1	CSN	0.2	0.0	0.2	0.0	0.0	0.0	0.0	0.1

**** Instruments identified as CARB #1, DRI #6, #7, #8, #9, #11, #12, RTI #1, and AQMD #1 are DRI/Model 2001 instruments capable of the TOR and the TOT analysis. Instruments identified as RTI "R" or "T" and NAREL #1 are early model Sunset instruments set up for the CSN/TOT analysis. The instruments identified as RTI "F" and NAREL #2 are newer Sunset dual-mode instruments capable of the TOR and the TOT analysis.***

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12382	CARB	Na	11	-----	-----	-----	7.808	0.667	0.342	-----
80-hr event	T08-12382	CARB	Mg	12	-----	-----	-----	0.685	0.075	0.115	-----
80-hr event	T08-12382	CARB	Al	13	1.630	0.101	0.200	1.345	0.163	0.267	-----
80-hr event	T08-12382	CARB	Si	14	4.270	0.217	0.060	4.596	0.317	0.139	4.592
80-hr event	T08-12382	CARB	P	15	0.090	0.019	0.040	0.000	0.074	0.116	-----
80-hr event	T08-12382	CARB	S	16	29.800	1.490	0.050	29.380	1.476	0.073	28.739
80-hr event	T08-12382	CARB	Cl	17	0.410	0.024	0.060	0.435	0.037	0.056	-----
80-hr event	T08-12382	CARB	K	19	1.910	0.096	0.070	1.816	0.094	0.044	1.736
80-hr event	T08-12382	CARB	Ca	20	1.070	0.054	0.060	0.937	0.052	0.050	1.000
80-hr event	T08-12382	CARB	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
80-hr event	T08-12382	CARB	Ti	22	0.090	0.010	0.040	0.061	0.024	0.044	-----
80-hr event	T08-12382	CARB	V	23	<0.03	-----	0.030	0.000	0.013	0.032	-----
80-hr event	T08-12382	CARB	Cr	24	<0.03	-----	0.030	0.002	0.011	0.023	-----
80-hr event	T08-12382	CARB	Mn	25	0.040	0.003	0.030	0.025	0.009	0.018	-----
80-hr event	T08-12382	CARB	Fe	26	1.420	0.071	0.040	1.445	0.075	0.014	1.480
80-hr event	T08-12382	CARB	Co	27	<0.03	-----	0.030	0.011	0.007	0.013	-----
80-hr event	T08-12382	CARB	Ni	28	<0.03	-----	0.030	0.001	0.005	0.012	-----
80-hr event	T08-12382	CARB	Cu	29	0.050	0.006	0.040	0.029	0.008	0.014	-----
80-hr event	T08-12382	CARB	Zn	30	0.150	0.009	0.020	0.105	0.010	0.017	0.139
80-hr event	T08-12382	CARB	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
80-hr event	T08-12382	CARB	As	33	<0.02	-----	0.020	0.005	0.016	0.018	-----
80-hr event	T08-12382	CARB	Se	34	<0.02	-----	0.020	0.011	0.012	0.021	-----
80-hr event	T08-12382	CARB	Br	35	0.100	0.007	0.020	0.130	0.017	0.024	0.113
80-hr event	T08-12382	CARB	Rb	37	<0.02	-----	0.020	0.000	0.005	0.015	-----
80-hr event	T08-12382	CARB	Sr	38	<0.03	-----	0.030	0.000	0.006	0.028	-----
80-hr event	T08-12382	CARB	Y	39	<0.03	-----	0.030	0.000	0.008	0.027	-----
80-hr event	T08-12382	CARB	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
80-hr event	T08-12382	CARB	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
80-hr event	T08-12382	CARB	Mo	42	<0.06	-----	0.060	0.000	0.016	0.047	-----
80-hr event	T08-12382	CARB	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
80-hr event	T08-12382	CARB	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
80-hr event	T08-12382	CARB	In	49	-----	-----	-----	0.000	0.069	0.219	-----
80-hr event	T08-12382	CARB	Sn	50	<0.2	-----	0.200	0.000	0.088	0.342	-----
80-hr event	T08-12382	CARB	Sb	51	<0.2	-----	0.200	0.486	0.475	0.401	-----
80-hr event	T08-12382	CARB	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
80-hr event	T08-12382	CARB	Ba	56	<0.2	-----	0.200	0.000	0.039	0.103	-----
80-hr event	T08-12382	CARB	La	57	-----	-----	-----	0.000	0.032	0.082	-----
80-hr event	T08-12382	CARB	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
80-hr event	T08-12382	CARB	Sm	62	-----	-----	-----	0.015	0.023	0.052	-----
80-hr event	T08-12382	CARB	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
80-hr event	T08-12382	CARB	Tb	65	-----	-----	-----	0.000	0.035	0.040	-----
80-hr event	T08-12382	CARB	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12382	CARB	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
80-hr event	T08-12382	CARB	W	74	-----	-----	-----	0.000	0.026	0.087	-----
80-hr event	T08-12382	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
80-hr event	T08-12382	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
80-hr event	T08-12382	CARB	Hg	80	<0.03	-----	0.030	0.000	0.044	0.152	-----
80-hr event	T08-12382	CARB	Pb	82	0.060	0.007	0.030	0.063	0.031	0.056	-----
80-hr event	T08-12383	DRI	Na	11	3.645	1.452	0.911	8.159	0.694	0.342	-----
80-hr event	T08-12383	DRI	Mg	12	0.345	0.726	0.346	0.815	0.082	0.115	-----
80-hr event	T08-12383	DRI	Al	13	0.949	0.124	0.079	1.605	0.182	0.267	-----
80-hr event	T08-12383	DRI	Si	14	3.317	0.150	0.092	5.326	0.364	0.139	4.592
80-hr event	T08-12383	DRI	P	15	1.026	0.042	0.027	0.000	0.074	0.116	-----
80-hr event	T08-12383	DRI	S	16	30.032	0.268	0.075	30.499	1.532	0.073	28.739
80-hr event	T08-12383	DRI	Cl	17	0.269	0.027	0.019	0.424	0.038	0.056	-----
80-hr event	T08-12383	DRI	K	19	1.722	0.028	0.017	1.904	0.098	0.044	1.736
80-hr event	T08-12383	DRI	Ca	20	0.997	0.031	0.021	1.002	0.055	0.050	1.000
80-hr event	T08-12383	DRI	Sc	21	0.000	0.097	0.068	0.000	0.025	0.069	-----
80-hr event	T08-12383	DRI	Ti	22	0.121	0.018	0.013	0.106	0.024	0.044	-----
80-hr event	T08-12383	DRI	V	23	0.000	0.002	0.001	0.000	0.013	0.032	-----
80-hr event	T08-12383	DRI	Cr	24	0.013	0.016	0.012	0.006	0.010	0.023	-----
80-hr event	T08-12383	DRI	Mn	25	0.034	0.035	0.024	0.009	0.009	0.018	-----
80-hr event	T08-12383	DRI	Fe	26	1.664	0.047	0.031	1.514	0.078	0.014	1.480
80-hr event	T08-12383	DRI	Co	27	0.000	0.002	0.001	0.002	0.008	0.013	-----
80-hr event	T08-12383	DRI	Ni	28	0.000	0.008	0.006	0.000	0.005	0.012	-----
80-hr event	T08-12383	DRI	Cu	29	0.040	0.015	0.010	0.044	0.009	0.014	-----
80-hr event	T08-12383	DRI	Zn	30	0.198	0.016	0.010	0.152	0.012	0.017	0.139
80-hr event	T08-12383	DRI	Ga	31	0.000	0.053	0.037	0.000	0.009	0.027	-----
80-hr event	T08-12383	DRI	As	33	0.000	0.002	0.001	0.000	0.006	0.018	-----
80-hr event	T08-12383	DRI	Se	34	0.000	0.035	0.024	0.000	0.006	0.021	-----
80-hr event	T08-12383	DRI	Br	35	0.091	0.025	0.017	0.121	0.018	0.024	0.113
80-hr event	T08-12383	DRI	Rb	37	0.000	0.018	0.013	0.000	0.005	0.015	-----
80-hr event	T08-12383	DRI	Sr	38	0.028	0.033	0.023	0.001	0.016	0.028	-----
80-hr event	T08-12383	DRI	Y	39	0.011	0.025	0.017	0.000	0.008	0.027	-----
80-hr event	T08-12383	DRI	Zr	40	0.004	0.057	0.041	0.000	0.081	0.036	-----
80-hr event	T08-12383	DRI	Nb	41	0.019	0.044	0.031	0.000	0.013	0.037	-----
80-hr event	T08-12383	DRI	Mo	42	0.000	0.039	0.028	0.000	0.016	0.047	-----
80-hr event	T08-12383	DRI	Ag	47	0.064	0.069	0.049	0.000	0.045	0.135	-----
80-hr event	T08-12383	DRI	Cd	48	0.000	0.086	0.060	0.000	0.047	0.141	-----
80-hr event	T08-12383	DRI	In	49	0.000	0.051	0.036	0.260	0.260	0.219	-----
80-hr event	T08-12383	DRI	Sn	50	0.000	0.064	0.045	0.034	0.362	0.342	-----
80-hr event	T08-12383	DRI	Sb	51	0.000	0.121	0.084	0.000	0.120	0.401	-----
80-hr event	T08-12383	DRI	Cs	55	0.000	0.020	0.014	0.000	0.042	0.110	-----
80-hr event	T08-12383	DRI	Ba	56	0.005	0.010	0.007	0.000	0.039	0.103	-----
80-hr event	T08-12383	DRI	La	57	0.000	0.015	0.010	0.000	0.032	0.082	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12383	DRI	Ce	58	0.008	0.021	0.015	0.000	0.032	0.080	-----
80-hr event	T08-12383	DRI	Sm	62	0.000	0.030	0.021	0.000	0.019	0.052	-----
80-hr event	T08-12383	DRI	Eu	63	0.000	0.107	0.075	0.000	0.018	0.045	-----
80-hr event	T08-12383	DRI	Tb	65	0.000	0.037	0.026	0.010	0.026	0.040	-----
80-hr event	T08-12383	DRI	Hf	72	0.232	0.237	0.164	0.000	0.016	0.045	-----
80-hr event	T08-12383	DRI	Ta	73	0.000	0.195	0.137	0.000	0.034	0.077	-----
80-hr event	T08-12383	DRI	W	74	0.037	0.285	0.167	0.000	0.026	0.087	-----
80-hr event	T08-12383	DRI	Ir	77	0.005	0.061	0.043	0.000	0.024	0.076	-----
80-hr event	T08-12383	DRI	Au	79	0.114	0.131	0.092	0.000	0.017	0.051	-----
80-hr event	T08-12383	DRI	Hg	80	0.000	0.039	0.028	0.000	0.044	0.152	-----
80-hr event	T08-12383	DRI	Pb	82	0.026	0.043	0.030	0.055	0.033	0.056	-----
80-hr event	T08-12384	ODEQ	Na	11	-----	-----	-----	8.034	0.684	0.342	-----
80-hr event	T08-12384	ODEQ	Mg	12	-----	-----	-----	0.642	0.074	0.115	-----
80-hr event	T08-12384	ODEQ	Al	13	0.989	0.169	0.452	1.209	0.158	0.267	-----
80-hr event	T08-12384	ODEQ	Si	14	4.799	0.427	0.565	4.641	0.320	0.139	4.592
80-hr event	T08-12384	ODEQ	P	15	-0.289	0.090	0.260	0.000	0.070	0.116	-----
80-hr event	T08-12384	ODEQ	S	16	33.667	2.711	0.915	30.284	1.521	0.073	28.739
80-hr event	T08-12384	ODEQ	Cl	17	-0.181	0.251	0.757	0.451	0.037	0.056	-----
80-hr event	T08-12384	ODEQ	K	19	2.007	0.165	0.113	1.865	0.096	0.044	1.736
80-hr event	T08-12384	ODEQ	Ca	20	1.251	0.113	0.147	0.988	0.053	0.050	1.000
80-hr event	T08-12384	ODEQ	Sc	21	-----	-----	-----	0.000	0.023	0.069	-----
80-hr event	T08-12384	ODEQ	Ti	22	0.169	0.070	0.203	0.089	0.022	0.044	-----
80-hr event	T08-12384	ODEQ	V	23	0.003	0.022	0.067	0.000	0.013	0.032	-----
80-hr event	T08-12384	ODEQ	Cr	24	0.013	0.012	0.036	0.003	0.009	0.023	-----
80-hr event	T08-12384	ODEQ	Mn	25	0.024	0.018	0.054	0.018	0.008	0.018	-----
80-hr event	T08-12384	ODEQ	Fe	26	1.559	0.128	0.084	1.485	0.076	0.014	1.480
80-hr event	T08-12384	ODEQ	Co	27	-0.001	0.018	0.054	0.008	0.007	0.013	-----
80-hr event	T08-12384	ODEQ	Ni	28	0.009	0.010	0.031	0.000	0.004	0.012	-----
80-hr event	T08-12384	ODEQ	Cu	29	0.003	0.057	0.173	0.030	0.008	0.014	-----
80-hr event	T08-12384	ODEQ	Zn	30	0.142	0.016	0.033	0.107	0.010	0.017	0.139
80-hr event	T08-12384	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
80-hr event	T08-12384	ODEQ	As	33	0.038	0.016	0.046	0.000	0.006	0.018	-----
80-hr event	T08-12384	ODEQ	Se	34	-0.002	0.019	0.058	0.008	0.012	0.021	-----
80-hr event	T08-12384	ODEQ	Br	35	0.076	0.019	0.055	0.132	0.018	0.024	0.113
80-hr event	T08-12384	ODEQ	Rb	37	-0.004	0.016	0.049	0.000	0.005	0.015	-----
80-hr event	T08-12384	ODEQ	Sr	38	0.001	0.011	0.034	0.005	0.015	0.028	-----
80-hr event	T08-12384	ODEQ	Y	39	-----	-----	-----	0.000	0.007	0.027	-----
80-hr event	T08-12384	ODEQ	Zr	40	0.004	0.017	0.051	0.000	0.081	0.036	-----
80-hr event	T08-12384	ODEQ	Nb	41	-----	-----	-----	0.000	0.012	0.037	-----
80-hr event	T08-12384	ODEQ	Mo	42	-----	-----	-----	0.000	0.015	0.047	-----
80-hr event	T08-12384	ODEQ	Ag	47	-0.014	0.038	0.113	0.000	0.045	0.135	-----
80-hr event	T08-12384	ODEQ	Cd	48	-0.031	0.040	0.124	0.000	0.047	0.141	-----
80-hr event	T08-12384	ODEQ	In	49	0.005	0.045	0.136	0.000	0.050	0.219	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12384	ODEQ	Sn	50	-0.038	0.073	0.215	0.000	0.088	0.342	-----
80-hr event	T08-12384	ODEQ	Sb	51	-0.032	0.066	0.192	0.124	0.463	0.401	-----
80-hr event	T08-12384	ODEQ	Cs	55	0.016	0.105	0.316	0.000	0.042	0.110	-----
80-hr event	T08-12384	ODEQ	Ba	56	-0.147	0.147	0.441	0.000	0.039	0.103	-----
80-hr event	T08-12384	ODEQ	La	57	-----	-----	-----	0.000	0.032	0.082	-----
80-hr event	T08-12384	ODEQ	Ce	58	0.045	0.245	0.735	0.000	0.032	0.080	-----
80-hr event	T08-12384	ODEQ	Sm	62	-----	-----	-----	0.000	0.014	0.052	-----
80-hr event	T08-12384	ODEQ	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
80-hr event	T08-12384	ODEQ	Tb	65	-----	-----	-----	0.000	0.035	0.040	-----
80-hr event	T08-12384	ODEQ	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
80-hr event	T08-12384	ODEQ	Ta	73	-----	-----	-----	0.016	0.047	0.077	-----
80-hr event	T08-12384	ODEQ	W	74	-----	-----	-----	0.000	0.026	0.087	-----
80-hr event	T08-12384	ODEQ	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
80-hr event	T08-12384	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
80-hr event	T08-12384	ODEQ	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
80-hr event	T08-12384	ODEQ	Pb	82	0.002	0.040	0.124	0.076	0.021	0.056	-----
80-hr event	T08-12385	AQMD	Na	11	-----	-----	-----	7.978	0.680	0.342	-----
80-hr event	T08-12385	AQMD	Mg	12	1.494	-----	2.016	0.796	0.080	0.115	-----
80-hr event	T08-12385	AQMD	Al	13	0.924	-----	1.440	0.927	0.149	0.267	-----
80-hr event	T08-12385	AQMD	Si	14	5.700	-----	1.920	4.191	0.291	0.139	4.592
80-hr event	T08-12385	AQMD	P	15	0.618	-----	1.902	0.000	0.070	0.116	-----
80-hr event	T08-12385	AQMD	S	16	29.616	-----	0.301	29.380	1.476	0.073	28.739
80-hr event	T08-12385	AQMD	Cl	17	0.594	-----	0.209	0.453	0.037	0.056	-----
80-hr event	T08-12385	AQMD	K	19	1.218	-----	0.073	1.749	0.091	0.044	1.736
80-hr event	T08-12385	AQMD	Ca	20	1.098	-----	0.080	0.896	0.049	0.050	1.000
80-hr event	T08-12385	AQMD	Sc	21	ND	-----	0.072	0.000	0.024	0.069	-----
80-hr event	T08-12385	AQMD	Ti	22	0.078	-----	0.074	0.105	0.019	0.044	-----
80-hr event	T08-12385	AQMD	V	23	0.030	-----	0.084	0.007	0.012	0.032	-----
80-hr event	T08-12385	AQMD	Cr	24	ND	-----	0.072	0.000	0.009	0.023	-----
80-hr event	T08-12385	AQMD	Mn	25	ND	-----	0.084	0.040	0.008	0.018	-----
80-hr event	T08-12385	AQMD	Fe	26	1.380	-----	0.042	1.420	0.073	0.014	1.480
80-hr event	T08-12385	AQMD	Co	27	ND	-----	0.024	0.008	0.007	0.013	-----
80-hr event	T08-12385	AQMD	Ni	28	0.000	-----	0.016	0.000	0.004	0.012	-----
80-hr event	T08-12385	AQMD	Cu	29	0.066	-----	0.021	0.028	0.008	0.014	-----
80-hr event	T08-12385	AQMD	Zn	30	0.108	-----	0.025	0.095	0.010	0.017	0.139
80-hr event	T08-12385	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
80-hr event	T08-12385	AQMD	As	33	ND	-----	0.156	0.024	0.011	0.018	-----
80-hr event	T08-12385	AQMD	Se	34	ND	-----	0.144	0.024	0.012	0.021	-----
80-hr event	T08-12385	AQMD	Br	35	ND	-----	0.036	0.113	0.018	0.024	0.113
80-hr event	T08-12385	AQMD	Rb	37	0.030	-----	0.084	0.000	0.005	0.015	-----
80-hr event	T08-12385	AQMD	Sr	38	0.018	-----	0.022	0.007	0.015	0.028	-----
80-hr event	T08-12385	AQMD	Y	39	ND	-----	0.084	0.003	0.017	0.027	-----
80-hr event	T08-12385	AQMD	Zr	40	-----	-----	-----	0.023	0.124	0.036	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12385	AQMD	Nb	41	0.036	-----	0.021	0.000	0.013	0.037	-----
80-hr event	T08-12385	AQMD	Mo	42	ND	-----	0.132	0.000	0.015	0.047	-----
80-hr event	T08-12385	AQMD	Ag	47	ND	-----	0.228	0.000	0.045	0.135	-----
80-hr event	T08-12385	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
80-hr event	T08-12385	AQMD	In	49	ND	-----	0.252	0.000	0.069	0.219	-----
80-hr event	T08-12385	AQMD	Sn	50	ND	-----	0.036	0.000	0.088	0.342	-----
80-hr event	T08-12385	AQMD	Sb	51	ND	-----	0.012	0.000	0.105	0.401	-----
80-hr event	T08-12385	AQMD	Cs	55	ND	-----	0.636	0.000	0.042	0.110	-----
80-hr event	T08-12385	AQMD	Ba	56	ND	-----	0.084	0.000	0.039	0.103	-----
80-hr event	T08-12385	AQMD	La	57	ND	-----	0.348	0.000	0.032	0.082	-----
80-hr event	T08-12385	AQMD	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
80-hr event	T08-12385	AQMD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
80-hr event	T08-12385	AQMD	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
80-hr event	T08-12385	AQMD	Tb	65	-----	-----	-----	0.000	0.035	0.040	-----
80-hr event	T08-12385	AQMD	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
80-hr event	T08-12385	AQMD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
80-hr event	T08-12385	AQMD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
80-hr event	T08-12385	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
80-hr event	T08-12385	AQMD	Au	79	ND	-----	0.156	0.009	0.028	0.051	-----
80-hr event	T08-12385	AQMD	Hg	80	-----	-----	-----	0.064	0.069	0.152	-----
80-hr event	T08-12385	AQMD	Pb	82	ND	-----	0.012	0.000	0.016	0.056	-----
80-hr event	T08-12386	UCD	Na	11	6.170	0.788	1.272	7.481	0.638	0.342	-----
80-hr event	T08-12386	UCD	Mg	12	0.000	0.000	0.723	0.705	0.076	0.115	-----
80-hr event	T08-12386	UCD	Al	13	1.418	0.186	0.251	0.972	0.150	0.267	-----
80-hr event	T08-12386	UCD	Si	14	5.605	0.326	0.138	3.965	0.277	0.139	4.592
80-hr event	T08-12386	UCD	P	15	0.000	0.000	0.093	0.000	0.070	0.116	-----
80-hr event	T08-12386	UCD	S	16	25.550	1.293	0.055	28.329	1.424	0.073	28.739
80-hr event	T08-12386	UCD	Cl	17	0.000	0.000	0.038	0.431	0.037	0.056	-----
80-hr event	T08-12386	UCD	K	19	1.581	0.086	0.022	1.695	0.088	0.044	1.736
80-hr event	T08-12386	UCD	Ca	20	0.914	0.049	0.011	0.844	0.047	0.050	1.000
80-hr event	T08-12386	UCD	Sc	21	-----	-----	-----	0.000	0.024	0.069	-----
80-hr event	T08-12386	UCD	Ti	22	0.078	0.006	0.006	0.057	0.024	0.044	-----
80-hr event	T08-12386	UCD	V	23	0.028	0.008	0.005	0.000	0.013	0.032	-----
80-hr event	T08-12386	UCD	Cr	24	0.000	0.000	0.004	0.015	0.010	0.023	-----
80-hr event	T08-12386	UCD	Mn	25	0.027	0.004	0.005	0.033	0.009	0.018	-----
80-hr event	T08-12386	UCD	Fe	26	1.253	0.064	0.008	1.301	0.067	0.014	1.480
80-hr event	T08-12386	UCD	Co	27	-----	-----	-----	0.000	0.006	0.013	-----
80-hr event	T08-12386	UCD	Ni	28	0.009	0.002	0.005	0.000	0.004	0.012	-----
80-hr event	T08-12386	UCD	Cu	29	0.032	0.004	0.005	0.024	0.008	0.014	-----
80-hr event	T08-12386	UCD	Zn	30	0.120	0.008	0.004	0.118	0.011	0.017	0.139
80-hr event	T08-12386	UCD	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
80-hr event	T08-12386	UCD	As	33	0.000	0.000	0.012	0.001	0.016	0.018	-----
80-hr event	T08-12386	UCD	Se	34	0.015	0.002	0.003	0.005	0.012	0.021	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12386	UCD	Br	35	0.112	0.007	0.004	0.125	0.017	0.024	0.113
80-hr event	T08-12386	UCD	Rb	37	0.000	0.000	0.009	0.000	0.007	0.015	-----
80-hr event	T08-12386	UCD	Sr	38	0.012	0.004	0.011	0.003	0.016	0.028	-----
80-hr event	T08-12386	UCD	Y	39	-----	-----	-----	0.000	0.007	0.027	-----
80-hr event	T08-12386	UCD	Zr	40	0.029	0.010	0.020	0.000	0.081	0.036	-----
80-hr event	T08-12386	UCD	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
80-hr event	T08-12386	UCD	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
80-hr event	T08-12386	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
80-hr event	T08-12386	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
80-hr event	T08-12386	UCD	In	49	-----	-----	-----	0.000	0.069	0.219	-----
80-hr event	T08-12386	UCD	Sn	50	-----	-----	-----	0.102	0.362	0.342	-----
80-hr event	T08-12386	UCD	Sb	51	-----	-----	-----	0.000	0.120	0.401	-----
80-hr event	T08-12386	UCD	Cs	55	-----	-----	-----	0.002	0.067	0.110	-----
80-hr event	T08-12386	UCD	Ba	56	-----	-----	-----	0.000	0.039	0.103	-----
80-hr event	T08-12386	UCD	La	57	-----	-----	-----	0.000	0.032	0.082	-----
80-hr event	T08-12386	UCD	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
80-hr event	T08-12386	UCD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
80-hr event	T08-12386	UCD	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
80-hr event	T08-12386	UCD	Tb	65	-----	-----	-----	0.000	0.033	0.040	-----
80-hr event	T08-12386	UCD	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
80-hr event	T08-12386	UCD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
80-hr event	T08-12386	UCD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
80-hr event	T08-12386	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
80-hr event	T08-12386	UCD	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
80-hr event	T08-12386	UCD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
80-hr event	T08-12386	UCD	Pb	82	0.073	0.006	0.007	0.023	0.032	0.056	-----
112-hr event	T08-12388	CARB	Na	11	-----	-----	-----	4.068	0.386	0.342	-----
112-hr event	T08-12388	CARB	Mg	12	-----	-----	-----	0.748	0.089	0.115	-----
112-hr event	T08-12388	CARB	Al	13	4.180	0.224	0.200	4.577	0.362	0.267	4.130
112-hr event	T08-12388	CARB	Si	14	10.470	0.527	0.060	11.300	0.756	0.139	11.436
112-hr event	T08-12388	CARB	P	15	0.210	0.028	0.040	0.200	0.108	0.116	-----
112-hr event	T08-12388	CARB	S	16	61.980	3.100	0.050	60.918	3.056	0.073	59.849
112-hr event	T08-12388	CARB	Cl	17	0.460	0.027	0.060	0.590	0.048	0.056	-----
112-hr event	T08-12388	CARB	K	19	5.210	0.261	0.070	4.931	0.249	0.044	4.848
112-hr event	T08-12388	CARB	Ca	20	3.390	0.170	0.060	3.338	0.169	0.050	3.524
112-hr event	T08-12388	CARB	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
112-hr event	T08-12388	CARB	Ti	22	0.290	0.018	0.040	0.293	0.032	0.044	0.299
112-hr event	T08-12388	CARB	V	23	0.050	0.007	0.030	0.045	0.017	0.032	-----
112-hr event	T08-12388	CARB	Cr	24	<0.03	-----	0.030	0.000	0.009	0.023	-----
112-hr event	T08-12388	CARB	Mn	25	0.110	0.007	0.030	0.127	0.012	0.018	0.113
112-hr event	T08-12388	CARB	Fe	26	3.630	0.182	0.040	3.705	0.187	0.014	3.937
112-hr event	T08-12388	CARB	Co	27	<0.03	-----	0.030	0.024	0.009	0.013	-----
112-hr event	T08-12388	CARB	Ni	28	<0.03	-----	0.030	0.004	0.005	0.012	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12388	CARB	Cu	29	0.130	0.009	0.040	0.117	0.011	0.014	-----
112-hr event	T08-12388	CARB	Zn	30	0.640	0.034	0.020	0.607	0.033	0.017	0.635
112-hr event	T08-12388	CARB	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
112-hr event	T08-12388	CARB	As	33	0.050	0.007	0.020	0.055	0.022	0.018	-----
112-hr event	T08-12388	CARB	Se	34	0.040	0.003	0.020	0.031	0.014	0.021	-----
112-hr event	T08-12388	CARB	Br	35	0.200	0.011	0.020	0.215	0.023	0.024	0.210
112-hr event	T08-12388	CARB	Rb	37	<0.02	-----	0.020	0.000	0.007	0.015	-----
112-hr event	T08-12388	CARB	Sr	38	0.040	0.005	0.030	0.027	0.016	0.028	-----
112-hr event	T08-12388	CARB	Y	39	<0.03	-----	0.030	0.003	0.018	0.027	-----
112-hr event	T08-12388	CARB	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
112-hr event	T08-12388	CARB	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
112-hr event	T08-12388	CARB	Mo	42	<0.06	-----	0.060	0.000	0.016	0.047	-----
112-hr event	T08-12388	CARB	Ag	47	-----	-----	-----	0.023	0.147	0.135	-----
112-hr event	T08-12388	CARB	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
112-hr event	T08-12388	CARB	In	49	-----	-----	-----	0.000	0.069	0.219	-----
112-hr event	T08-12388	CARB	Sn	50	<0.2	-----	0.200	0.294	0.339	0.342	-----
112-hr event	T08-12388	CARB	Sb	51	<0.2	-----	0.200	0.000	0.120	0.401	-----
112-hr event	T08-12388	CARB	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
112-hr event	T08-12388	CARB	Ba	56	0.240	0.031	0.200	0.000	0.054	0.103	-----
112-hr event	T08-12388	CARB	La	57	-----	-----	-----	0.009	0.077	0.082	-----
112-hr event	T08-12388	CARB	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
112-hr event	T08-12388	CARB	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12388	CARB	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
112-hr event	T08-12388	CARB	Tb	65	-----	-----	-----	0.000	0.054	0.040	-----
112-hr event	T08-12388	CARB	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
112-hr event	T08-12388	CARB	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
112-hr event	T08-12388	CARB	W	74	-----	-----	-----	0.000	0.036	0.087	-----
112-hr event	T08-12388	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
112-hr event	T08-12388	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
112-hr event	T08-12388	CARB	Hg	80	<0.03	-----	0.030	0.094	0.070	0.152	-----
112-hr event	T08-12388	CARB	Pb	82	0.270	0.017	0.030	0.216	0.041	0.056	0.251
112-hr event	T08-12389	DRI	Na	11	4.759	1.474	0.911	4.181	0.399	0.342	-----
112-hr event	T08-12389	DRI	Mg	12	0.459	0.727	0.346	0.539	0.082	0.115	-----
112-hr event	T08-12389	DRI	Al	13	3.229	0.135	0.079	4.599	0.364	0.267	4.130
112-hr event	T08-12389	DRI	Si	14	7.949	0.175	0.092	12.238	0.817	0.139	11.436
112-hr event	T08-12389	DRI	P	15	2.079	0.047	0.027	0.060	0.107	0.116	-----
112-hr event	T08-12389	DRI	S	16	59.706	0.443	0.075	60.749	3.047	0.073	59.849
112-hr event	T08-12389	DRI	Cl	17	0.271	0.027	0.019	0.480	0.043	0.056	-----
112-hr event	T08-12389	DRI	K	19	4.740	0.034	0.017	5.134	0.259	0.044	4.848
112-hr event	T08-12389	DRI	Ca	20	3.876	0.036	0.021	3.965	0.200	0.050	3.524
112-hr event	T08-12389	DRI	Sc	21	0.000	0.097	0.068	0.000	0.024	0.069	-----
112-hr event	T08-12389	DRI	Ti	22	0.350	0.019	0.013	0.318	0.031	0.044	0.299
112-hr event	T08-12389	DRI	V	23	0.033	0.002	0.001	0.020	0.016	0.032	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12389	DRI	Cr	24	0.000	0.016	0.012	0.016	0.010	0.023	-----
112-hr event	T08-12389	DRI	Mn	25	0.129	0.035	0.024	0.111	0.011	0.018	0.113
112-hr event	T08-12389	DRI	Fe	26	4.349	0.052	0.031	4.111	0.208	0.014	3.937
112-hr event	T08-12389	DRI	Co	27	0.000	0.002	0.001	0.020	0.009	0.013	-----
112-hr event	T08-12389	DRI	Ni	28	0.003	0.008	0.006	0.000	0.005	0.012	-----
112-hr event	T08-12389	DRI	Cu	29	0.103	0.015	0.010	0.118	0.010	0.014	-----
112-hr event	T08-12389	DRI	Zn	30	0.723	0.017	0.010	0.657	0.035	0.017	0.635
112-hr event	T08-12389	DRI	Ga	31	0.000	0.053	0.037	0.000	0.009	0.027	-----
112-hr event	T08-12389	DRI	As	33	0.000	0.002	0.001	0.049	0.020	0.018	-----
112-hr event	T08-12389	DRI	Se	34	0.000	0.035	0.024	0.027	0.014	0.021	-----
112-hr event	T08-12389	DRI	Br	35	0.155	0.026	0.017	0.232	0.021	0.024	0.210
112-hr event	T08-12389	DRI	Rb	37	0.000	0.018	0.013	0.000	0.007	0.015	-----
112-hr event	T08-12389	DRI	Sr	38	0.080	0.033	0.023	0.025	0.016	0.028	-----
112-hr event	T08-12389	DRI	Y	39	0.049	0.025	0.017	0.000	0.007	0.027	-----
112-hr event	T08-12389	DRI	Zr	40	0.015	0.057	0.041	0.000	0.081	0.036	-----
112-hr event	T08-12389	DRI	Nb	41	0.000	0.044	0.031	0.000	0.012	0.037	-----
112-hr event	T08-12389	DRI	Mo	42	0.000	0.039	0.028	0.000	0.015	0.047	-----
112-hr event	T08-12389	DRI	Ag	47	0.000	0.069	0.049	0.000	0.045	0.135	-----
112-hr event	T08-12389	DRI	Cd	48	0.000	0.086	0.060	0.000	0.047	0.141	-----
112-hr event	T08-12389	DRI	In	49	0.000	0.051	0.036	0.079	0.237	0.219	-----
112-hr event	T08-12389	DRI	Sn	50	0.050	0.065	0.045	0.000	0.088	0.342	-----
112-hr event	T08-12389	DRI	Sb	51	0.003	0.121	0.084	0.000	0.105	0.401	-----
112-hr event	T08-12389	DRI	Cs	55	0.000	0.020	0.014	0.000	0.042	0.110	-----
112-hr event	T08-12389	DRI	Ba	56	0.000	0.010	0.007	0.000	0.047	0.103	-----
112-hr event	T08-12389	DRI	La	57	0.000	0.015	0.010	0.043	0.053	0.082	-----
112-hr event	T08-12389	DRI	Ce	58	0.017	0.021	0.015	0.000	0.032	0.080	-----
112-hr event	T08-12389	DRI	Sm	62	0.000	0.030	0.021	0.000	0.019	0.052	-----
112-hr event	T08-12389	DRI	Eu	63	0.000	0.107	0.075	0.000	0.022	0.045	-----
112-hr event	T08-12389	DRI	Tb	65	0.000	0.037	0.026	0.000	0.056	0.040	-----
112-hr event	T08-12389	DRI	Hf	72	0.000	0.235	0.164	0.006	0.023	0.045	-----
112-hr event	T08-12389	DRI	Ta	73	0.011	0.196	0.137	0.000	0.034	0.077	-----
112-hr event	T08-12389	DRI	W	74	0.000	0.284	0.167	0.000	0.036	0.087	-----
112-hr event	T08-12389	DRI	Ir	77	0.000	0.061	0.043	0.000	0.024	0.076	-----
112-hr event	T08-12389	DRI	Au	79	0.029	0.131	0.092	0.000	0.017	0.051	-----
112-hr event	T08-12389	DRI	Hg	80	0.000	0.039	0.028	0.000	0.044	0.152	-----
112-hr event	T08-12389	DRI	Pb	82	0.264	0.044	0.030	0.250	0.040	0.056	0.251
112-hr event	T08-12390	DRI	Na	11	3.690	1.452	0.911	3.616	0.354	0.342	-----
112-hr event	T08-12390	DRI	Mg	12	1.590	0.735	0.346	0.447	0.078	0.115	-----
112-hr event	T08-12390	DRI	Al	13	3.680	0.138	0.079	4.170	0.340	0.267	4.130
112-hr event	T08-12390	DRI	Si	14	7.675	0.173	0.092	10.927	0.732	0.139	11.436
112-hr event	T08-12390	DRI	P	15	2.248	0.047	0.027	0.000	0.096	0.116	-----
112-hr event	T08-12390	DRI	S	16	62.322	0.459	0.075	59.992	3.010	0.073	59.849
112-hr event	T08-12390	DRI	Cl	17	0.281	0.027	0.019	0.462	0.043	0.056	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12390	DRI	K	19	4.832	0.035	0.017	5.012	0.253	0.044	4.848
112-hr event	T08-12390	DRI	Ca	20	3.485	0.035	0.021	3.328	0.169	0.050	3.524
112-hr event	T08-12390	DRI	Sc	21	0.000	0.097	0.068	0.000	0.026	0.069	-----
112-hr event	T08-12390	DRI	Ti	22	0.385	0.019	0.013	0.254	0.031	0.044	0.299
112-hr event	T08-12390	DRI	V	23	0.034	0.002	0.001	0.055	0.017	0.032	-----
112-hr event	T08-12390	DRI	Cr	24	0.003	0.016	0.012	0.010	0.010	0.023	-----
112-hr event	T08-12390	DRI	Mn	25	0.114	0.035	0.024	0.106	0.011	0.018	0.113
112-hr event	T08-12390	DRI	Fe	26	4.251	0.052	0.031	3.769	0.191	0.014	3.937
112-hr event	T08-12390	DRI	Co	27	0.000	0.002	0.001	0.017	0.011	0.013	-----
112-hr event	T08-12390	DRI	Ni	28	0.000	0.008	0.006	0.000	0.005	0.012	-----
112-hr event	T08-12390	DRI	Cu	29	0.114	0.015	0.010	0.115	0.011	0.014	-----
112-hr event	T08-12390	DRI	Zn	30	0.677	0.017	0.010	0.628	0.034	0.017	0.635
112-hr event	T08-12390	DRI	Ga	31	0.000	0.053	0.037	0.006	0.015	0.027	-----
112-hr event	T08-12390	DRI	As	33	0.000	0.002	0.001	0.089	0.022	0.018	-----
112-hr event	T08-12390	DRI	Se	34	0.053	0.035	0.024	0.015	0.012	0.021	-----
112-hr event	T08-12390	DRI	Br	35	0.201	0.026	0.017	0.246	0.024	0.024	0.210
112-hr event	T08-12390	DRI	Rb	37	0.028	0.018	0.013	0.000	0.007	0.015	-----
112-hr event	T08-12390	DRI	Sr	38	0.079	0.033	0.023	0.034	0.017	0.028	-----
112-hr event	T08-12390	DRI	Y	39	0.033	0.025	0.017	0.000	0.008	0.027	-----
112-hr event	T08-12390	DRI	Zr	40	0.030	0.057	0.041	0.000	0.081	0.036	-----
112-hr event	T08-12390	DRI	Nb	41	0.023	0.044	0.031	0.000	0.013	0.037	-----
112-hr event	T08-12390	DRI	Mo	42	0.037	0.039	0.028	0.000	0.017	0.047	-----
112-hr event	T08-12390	DRI	Ag	47	0.000	0.069	0.049	0.034	0.158	0.135	-----
112-hr event	T08-12390	DRI	Cd	48	0.014	0.086	0.060	0.000	0.047	0.141	-----
112-hr event	T08-12390	DRI	In	49	0.000	0.051	0.036	0.000	0.069	0.219	-----
112-hr event	T08-12390	DRI	Sn	50	0.000	0.065	0.045	0.305	0.362	0.342	-----
112-hr event	T08-12390	DRI	Sb	51	0.051	0.121	0.084	0.000	0.105	0.401	-----
112-hr event	T08-12390	DRI	Cs	55	0.000	0.020	0.014	0.000	0.042	0.110	-----
112-hr event	T08-12390	DRI	Ba	56	0.000	0.010	0.007	0.000	0.054	0.103	-----
112-hr event	T08-12390	DRI	La	57	0.000	0.015	0.010	0.000	0.039	0.082	-----
112-hr event	T08-12390	DRI	Ce	58	0.003	0.021	0.015	0.000	0.039	0.080	-----
112-hr event	T08-12390	DRI	Sm	62	0.016	0.030	0.021	0.000	0.019	0.052	-----
112-hr event	T08-12390	DRI	Eu	63	0.007	0.107	0.075	0.000	0.022	0.045	-----
112-hr event	T08-12390	DRI	Tb	65	0.000	0.037	0.026	0.012	0.035	0.040	-----
112-hr event	T08-12390	DRI	Hf	72	0.000	0.237	0.164	0.012	0.025	0.045	-----
112-hr event	T08-12390	DRI	Ta	73	0.006	0.196	0.137	0.000	0.034	0.077	-----
112-hr event	T08-12390	DRI	W	74	0.086	0.285	0.167	0.000	0.036	0.087	-----
112-hr event	T08-12390	DRI	Ir	77	0.000	0.061	0.043	0.000	0.024	0.076	-----
112-hr event	T08-12390	DRI	Au	79	0.073	0.131	0.092	0.000	0.017	0.051	-----
112-hr event	T08-12390	DRI	Hg	80	0.000	0.039	0.028	0.000	0.044	0.152	-----
112-hr event	T08-12390	DRI	Pb	82	0.391	0.044	0.030	0.252	0.043	0.056	0.251
112-hr event	T08-12391	ODEQ	Na	11	-----	-----	-----	4.068	0.391	0.342	-----
112-hr event	T08-12391	ODEQ	Mg	12	-----	-----	-----	0.605	0.085	0.115	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12391	ODEQ	Al	13	4.228	0.406	0.678	4.757	0.373	0.267	4.130
112-hr event	T08-12391	ODEQ	Si	14	12.410	1.086	1.356	11.865	0.793	0.139	11.436
112-hr event	T08-12391	ODEQ	P	15	-0.566	0.169	0.486	0.000	0.099	0.116	-----
112-hr event	T08-12391	ODEQ	S	16	68.118	5.475	1.582	64.241	3.223	0.073	59.849
112-hr event	T08-12391	ODEQ	Cl	17	-0.700	0.505	1.469	0.553	0.046	0.056	-----
112-hr event	T08-12391	ODEQ	K	19	5.641	0.456	0.203	5.379	0.271	0.044	4.848
112-hr event	T08-12391	ODEQ	Ca	20	4.273	0.351	0.237	3.704	0.188	0.050	3.524
112-hr event	T08-12391	ODEQ	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
112-hr event	T08-12391	ODEQ	Ti	22	0.430	0.081	0.226	0.263	0.030	0.044	0.299
112-hr event	T08-12391	ODEQ	V	23	0.039	0.024	0.072	0.054	0.017	0.032	-----
112-hr event	T08-12391	ODEQ	Cr	24	0.025	0.013	0.037	0.000	0.009	0.023	-----
112-hr event	T08-12391	ODEQ	Mn	25	0.164	0.024	0.058	0.131	0.012	0.018	0.113
112-hr event	T08-12391	ODEQ	Fe	26	4.409	0.356	0.136	4.218	0.213	0.014	3.937
112-hr event	T08-12391	ODEQ	Co	27	0.001	0.027	0.082	0.033	0.010	0.013	-----
112-hr event	T08-12391	ODEQ	Ni	28	0.024	0.011	0.032	0.004	0.005	0.012	-----
112-hr event	T08-12391	ODEQ	Cu	29	0.118	0.067	0.176	0.144	0.012	0.014	-----
112-hr event	T08-12391	ODEQ	Zn	30	0.801	0.066	0.047	0.669	0.036	0.017	0.635
112-hr event	T08-12391	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
112-hr event	T08-12391	ODEQ	As	33	0.032	0.023	0.070	0.043	0.022	0.018	-----
112-hr event	T08-12391	ODEQ	Se	34	0.027	0.020	0.059	0.027	0.015	0.021	-----
112-hr event	T08-12391	ODEQ	Br	35	0.197	0.025	0.058	0.284	0.025	0.024	0.210
112-hr event	T08-12391	ODEQ	Rb	37	0.010	0.017	0.051	0.000	0.007	0.015	-----
112-hr event	T08-12391	ODEQ	Sr	38	0.022	0.012	0.036	0.036	0.016	0.028	-----
112-hr event	T08-12391	ODEQ	Y	39	-----	-----	-----	0.012	0.018	0.027	-----
112-hr event	T08-12391	ODEQ	Zr	40	0.031	0.019	0.057	0.000	0.081	0.036	-----
112-hr event	T08-12391	ODEQ	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
112-hr event	T08-12391	ODEQ	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
112-hr event	T08-12391	ODEQ	Ag	47	0.026	0.041	0.124	0.102	0.147	0.135	-----
112-hr event	T08-12391	ODEQ	Cd	48	-0.005	0.042	0.124	0.000	0.047	0.141	-----
112-hr event	T08-12391	ODEQ	In	49	0.094	0.048	0.147	0.000	0.069	0.219	-----
112-hr event	T08-12391	ODEQ	Sn	50	-0.022	0.075	0.226	0.000	0.088	0.342	-----
112-hr event	T08-12391	ODEQ	Sb	51	0.056	0.071	0.215	0.000	0.120	0.401	-----
112-hr event	T08-12391	ODEQ	Cs	55	-0.037	0.113	0.339	0.000	0.042	0.110	-----
112-hr event	T08-12391	ODEQ	Ba	56	-0.056	0.156	0.463	0.070	0.071	0.103	-----
112-hr event	T08-12391	ODEQ	La	57	-----	-----	-----	0.062	0.076	0.082	-----
112-hr event	T08-12391	ODEQ	Ce	58	0.160	0.260	0.780	0.000	0.032	0.080	-----
112-hr event	T08-12391	ODEQ	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12391	ODEQ	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
112-hr event	T08-12391	ODEQ	Tb	65	-----	-----	-----	0.000	0.057	0.040	-----
112-hr event	T08-12391	ODEQ	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
112-hr event	T08-12391	ODEQ	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
112-hr event	T08-12391	ODEQ	W	74	-----	-----	-----	0.000	0.036	0.087	-----
112-hr event	T08-12391	ODEQ	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12391	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
112-hr event	T08-12391	ODEQ	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
112-hr event	T08-12391	ODEQ	Pb	82	0.317	0.050	0.124	0.278	0.043	0.056	0.251
112-hr event	T08-12392	AQMD	Na	11	-----	-----	-----	4.170	0.393	0.342	-----
112-hr event	T08-12392	AQMD	Mg	12	2.040	-----	2.016	0.722	0.088	0.115	-----
112-hr event	T08-12392	AQMD	Al	13	5.202	-----	1.440	3.865	0.323	0.267	4.130
112-hr event	T08-12392	AQMD	Si	14	14.178	-----	1.920	10.690	0.717	0.139	11.436
112-hr event	T08-12392	AQMD	P	15	1.290	-----	1.902	0.000	0.096	0.116	-----
112-hr event	T08-12392	AQMD	S	16	60.876	-----	0.301	60.930	3.056	0.073	59.849
112-hr event	T08-12392	AQMD	Cl	17	0.642	-----	0.209	0.480	0.043	0.056	-----
112-hr event	T08-12392	AQMD	K	19	4.122	-----	0.073	5.001	0.253	0.044	4.848
112-hr event	T08-12392	AQMD	Ca	20	4.242	-----	0.080	3.378	0.171	0.050	3.524
112-hr event	T08-12392	AQMD	Sc	21	ND	-----	0.072	0.000	0.025	0.069	-----
112-hr event	T08-12392	AQMD	Ti	22	0.366	-----	0.074	0.259	0.030	0.044	0.299
112-hr event	T08-12392	AQMD	V	23	0.018	-----	0.084	0.016	0.017	0.032	-----
112-hr event	T08-12392	AQMD	Cr	24	ND	-----	0.072	0.000	0.009	0.023	-----
112-hr event	T08-12392	AQMD	Mn	25	ND	-----	0.084	0.126	0.012	0.018	0.113
112-hr event	T08-12392	AQMD	Fe	26	3.948	-----	0.042	3.752	0.190	0.014	3.937
112-hr event	T08-12392	AQMD	Co	27	ND	-----	0.024	0.019	0.009	0.013	-----
112-hr event	T08-12392	AQMD	Ni	28	ND	-----	0.016	0.000	0.004	0.012	-----
112-hr event	T08-12392	AQMD	Cu	29	0.138	-----	0.021	0.113	0.011	0.014	-----
112-hr event	T08-12392	AQMD	Zn	30	0.588	-----	0.025	0.615	0.033	0.017	0.635
112-hr event	T08-12392	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
112-hr event	T08-12392	AQMD	As	33	0.012	-----	0.156	0.078	0.022	0.018	-----
112-hr event	T08-12392	AQMD	Se	34	ND	-----	0.144	0.033	0.014	0.021	-----
112-hr event	T08-12392	AQMD	Br	35	0.150	-----	0.036	0.220	0.022	0.024	0.210
112-hr event	T08-12392	AQMD	Rb	37	ND	-----	0.084	0.000	0.005	0.015	-----
112-hr event	T08-12392	AQMD	Sr	38	ND	-----	0.022	0.027	0.016	0.028	-----
112-hr event	T08-12392	AQMD	Y	39	ND	-----	0.084	0.000	0.007	0.027	-----
112-hr event	T08-12392	AQMD	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
112-hr event	T08-12392	AQMD	Nb	41	ND	-----	0.021	0.000	0.013	0.037	-----
112-hr event	T08-12392	AQMD	Mo	42	ND	-----	0.132	0.000	0.016	0.047	-----
112-hr event	T08-12392	AQMD	Ag	47	ND	-----	0.228	0.113	0.158	0.135	-----
112-hr event	T08-12392	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
112-hr event	T08-12392	AQMD	In	49	ND	-----	0.252	0.328	0.249	0.219	-----
112-hr event	T08-12392	AQMD	Sn	50	ND	-----	0.036	0.000	0.088	0.342	-----
112-hr event	T08-12392	AQMD	Sb	51	ND	-----	0.012	0.136	0.463	0.401	-----
112-hr event	T08-12392	AQMD	Cs	55	ND	-----	0.636	0.000	0.042	0.110	-----
112-hr event	T08-12392	AQMD	Ba	56	ND	-----	0.084	0.037	0.071	0.103	-----
112-hr event	T08-12392	AQMD	La	57	ND	-----	0.348	0.026	0.075	0.082	-----
112-hr event	T08-12392	AQMD	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
112-hr event	T08-12392	AQMD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12392	AQMD	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12392	AQMD	Tb	65	-----	-----	-----	0.000	0.054	0.040	-----
112-hr event	T08-12392	AQMD	Hf	72	-----	-----	-----	0.014	0.024	0.045	-----
112-hr event	T08-12392	AQMD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
112-hr event	T08-12392	AQMD	W	74	-----	-----	-----	0.000	0.036	0.087	-----
112-hr event	T08-12392	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
112-hr event	T08-12392	AQMD	Au	79	ND	-----	0.156	0.000	0.017	0.051	-----
112-hr event	T08-12392	AQMD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
112-hr event	T08-12392	AQMD	Pb	82	ND	-----	0.012	0.225	0.041	0.056	0.251
112-hr event	T08-12393	AQMD	Na	11	-----	-----	-----	4.057	0.385	0.342	-----
112-hr event	T08-12393	AQMD	Mg	12	2.172	-----	2.016	0.698	0.087	0.115	-----
112-hr event	T08-12393	AQMD	Al	13	5.040	-----	1.440	4.113	0.336	0.267	4.130
112-hr event	T08-12393	AQMD	Si	14	14.448	-----	1.920	11.571	0.774	0.139	11.436
112-hr event	T08-12393	AQMD	P	15	1.272	-----	1.902	0.096	0.107	0.116	-----
112-hr event	T08-12393	AQMD	S	16	57.762	-----	0.301	60.670	3.043	0.073	59.849
112-hr event	T08-12393	AQMD	Cl	17	0.714	-----	0.209	0.669	0.050	0.056	-----
112-hr event	T08-12393	AQMD	K	19	4.014	-----	0.073	5.027	0.254	0.044	4.848
112-hr event	T08-12393	AQMD	Ca	20	4.068	-----	0.080	3.509	0.178	0.050	3.524
112-hr event	T08-12393	AQMD	Sc	21	ND	-----	0.072	0.000	0.025	0.069	-----
112-hr event	T08-12393	AQMD	Ti	22	0.366	-----	0.074	0.269	0.030	0.044	0.299
112-hr event	T08-12393	AQMD	V	23	0.030	-----	0.084	0.024	0.016	0.032	-----
112-hr event	T08-12393	AQMD	Cr	24	ND	-----	0.072	0.000	0.009	0.023	-----
112-hr event	T08-12393	AQMD	Mn	25	ND	-----	0.084	0.099	0.011	0.018	0.113
112-hr event	T08-12393	AQMD	Fe	26	3.996	-----	0.042	3.926	0.198	0.014	3.937
112-hr event	T08-12393	AQMD	Co	27	0.012	-----	0.024	0.026	0.009	0.013	-----
112-hr event	T08-12393	AQMD	Ni	28	0.012	-----	0.016	0.000	0.004	0.012	-----
112-hr event	T08-12393	AQMD	Cu	29	0.150	-----	0.021	0.115	0.010	0.014	-----
112-hr event	T08-12393	AQMD	Zn	30	0.582	-----	0.025	0.636	0.034	0.017	0.635
112-hr event	T08-12393	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
112-hr event	T08-12393	AQMD	As	33	0.000	-----	0.156	0.068	0.022	0.018	-----
112-hr event	T08-12393	AQMD	Se	34	0.000	-----	0.144	0.023	0.014	0.021	-----
112-hr event	T08-12393	AQMD	Br	35	0.084	-----	0.036	0.215	0.023	0.024	0.210
112-hr event	T08-12393	AQMD	Rb	37	0.000	-----	0.084	0.000	0.007	0.015	-----
112-hr event	T08-12393	AQMD	Sr	38	0.024	-----	0.022	0.018	0.016	0.028	-----
112-hr event	T08-12393	AQMD	Y	39	ND	-----	0.084	0.000	0.007	0.027	-----
112-hr event	T08-12393	AQMD	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
112-hr event	T08-12393	AQMD	Nb	41	ND	-----	0.021	0.001	0.035	0.037	-----
112-hr event	T08-12393	AQMD	Mo	42	ND	-----	0.132	0.000	0.016	0.047	-----
112-hr event	T08-12393	AQMD	Ag	47	ND	-----	0.228	0.000	0.045	0.135	-----
112-hr event	T08-12393	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
112-hr event	T08-12393	AQMD	In	49	ND	-----	0.252	0.000	0.050	0.219	-----
112-hr event	T08-12393	AQMD	Sn	50	0.012	-----	0.036	0.192	0.350	0.342	-----
112-hr event	T08-12393	AQMD	Sb	51	ND	-----	0.012	0.147	0.486	0.401	-----
112-hr event	T08-12393	AQMD	Cs	55	ND	-----	0.636	0.000	0.042	0.110	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12393	AQMD	Ba	56	ND	-----	0.084	0.028	0.069	0.103	-----
112-hr event	T08-12393	AQMD	La	57	ND	-----	0.348	0.058	0.074	0.082	-----
112-hr event	T08-12393	AQMD	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
112-hr event	T08-12393	AQMD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12393	AQMD	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
112-hr event	T08-12393	AQMD	Tb	65	-----	-----	-----	0.000	0.056	0.040	-----
112-hr event	T08-12393	AQMD	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
112-hr event	T08-12393	AQMD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
112-hr event	T08-12393	AQMD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
112-hr event	T08-12393	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
112-hr event	T08-12393	AQMD	Au	79	ND	-----	0.156	0.000	0.017	0.051	-----
112-hr event	T08-12393	AQMD	Hg	80	-----	-----	-----	0.047	0.070	0.152	-----
112-hr event	T08-12393	AQMD	Pb	82	ND	-----	0.012	0.264	0.042	0.056	0.251
112-hr event	T08-12395	UCD	Na	11	9.913	1.609	1.681	4.068	0.391	0.342	-----
112-hr event	T08-12395	UCD	Mg	12	1.753	0.427	0.949	0.565	0.083	0.115	-----
112-hr event	T08-12395	UCD	Al	13	5.018	0.356	0.324	4.102	0.336	0.267	4.130
112-hr event	T08-12395	UCD	Si	14	13.980	0.740	0.178	11.074	0.741	0.139	11.436
112-hr event	T08-12395	UCD	P	15	0.000	0.000	0.119	0.000	0.099	0.116	-----
112-hr event	T08-12395	UCD	S	16	57.008	2.867	0.069	61.868	3.103	0.073	59.849
112-hr event	T08-12395	UCD	Cl	17	0.000	0.000	0.045	0.668	0.050	0.056	-----
112-hr event	T08-12395	UCD	K	19	4.594	0.236	0.025	5.049	0.255	0.044	4.848
112-hr event	T08-12395	UCD	Ca	20	3.568	0.183	0.013	3.382	0.171	0.050	3.524
112-hr event	T08-12395	UCD	Sc	21	-----	-----	-----	0.000	0.026	0.069	-----
112-hr event	T08-12395	UCD	Ti	22	0.297	0.018	0.007	0.260	0.030	0.044	0.299
112-hr event	T08-12395	UCD	V	23	0.049	0.007	0.005	0.024	0.017	0.032	-----
112-hr event	T08-12395	UCD	Cr	24	0.012	0.003	0.004	0.006	0.010	0.023	-----
112-hr event	T08-12395	UCD	Mn	25	0.102	0.007	0.005	0.107	0.011	0.018	0.113
112-hr event	T08-12395	UCD	Fe	26	3.684	0.186	0.009	3.761	0.190	0.014	3.937
112-hr event	T08-12395	UCD	Co	27	-----	-----	-----	0.036	0.009	0.013	-----
112-hr event	T08-12395	UCD	Ni	28	0.000	0.000	0.006	0.000	0.005	0.012	-----
112-hr event	T08-12395	UCD	Cu	29	0.099	0.007	0.006	0.123	0.011	0.014	-----
112-hr event	T08-12395	UCD	Zn	30	0.587	0.031	0.004	0.616	0.033	0.017	0.635
112-hr event	T08-12395	UCD	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
112-hr event	T08-12395	UCD	As	33	0.021	0.009	0.019	0.075	0.022	0.018	-----
112-hr event	T08-12395	UCD	Se	34	0.029	0.003	0.004	0.042	0.014	0.021	-----
112-hr event	T08-12395	UCD	Br	35	0.206	0.012	0.005	0.244	0.023	0.024	0.210
112-hr event	T08-12395	UCD	Rb	37	0.016	0.005	0.009	0.000	0.007	0.015	-----
112-hr event	T08-12395	UCD	Sr	38	0.033	0.006	0.012	0.051	0.017	0.028	-----
112-hr event	T08-12395	UCD	Y	39	-----	-----	-----	0.000	0.008	0.027	-----
112-hr event	T08-12395	UCD	Zr	40	0.036	0.011	0.021	0.000	0.081	0.036	-----
112-hr event	T08-12395	UCD	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
112-hr event	T08-12395	UCD	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
112-hr event	T08-12395	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12395	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
112-hr event	T08-12395	UCD	In	49	-----	-----	-----	0.136	0.249	0.219	-----
112-hr event	T08-12395	UCD	Sn	50	-----	-----	-----	0.000	0.088	0.342	-----
112-hr event	T08-12395	UCD	Sb	51	-----	-----	-----	0.000	0.120	0.401	-----
112-hr event	T08-12395	UCD	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
112-hr event	T08-12395	UCD	Ba	56	-----	-----	-----	0.000	0.054	0.103	-----
112-hr event	T08-12395	UCD	La	57	-----	-----	-----	0.000	0.039	0.082	-----
112-hr event	T08-12395	UCD	Ce	58	-----	-----	-----	0.000	0.039	0.080	-----
112-hr event	T08-12395	UCD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12395	UCD	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
112-hr event	T08-12395	UCD	Tb	65	-----	-----	-----	0.000	0.055	0.040	-----
112-hr event	T08-12395	UCD	Hf	72	-----	-----	-----	0.000	0.020	0.045	-----
112-hr event	T08-12395	UCD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
112-hr event	T08-12395	UCD	W	74	-----	-----	-----	0.000	0.036	0.087	-----
112-hr event	T08-12395	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
112-hr event	T08-12395	UCD	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
112-hr event	T08-12395	UCD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
112-hr event	T08-12395	UCD	Pb	82	0.293	0.021	0.007	0.210	0.042	0.056	0.251
112-hr event	T08-12396	UCD	Na	11	13.882	1.761	1.688	3.526	0.354	0.342	-----
112-hr event	T08-12396	UCD	Mg	12	1.161	0.416	0.958	0.495	0.081	0.115	-----
112-hr event	T08-12396	UCD	Al	13	4.628	0.338	0.332	4.486	0.357	0.267	4.130
112-hr event	T08-12396	UCD	Si	14	13.777	0.733	0.182	11.051	0.740	0.139	11.436
112-hr event	T08-12396	UCD	P	15	0.000	0.000	0.122	0.066	0.110	0.116	-----
112-hr event	T08-12396	UCD	S	16	52.383	2.637	0.072	60.173	3.019	0.073	59.849
112-hr event	T08-12396	UCD	Cl	17	0.000	0.000	0.048	0.551	0.047	0.056	-----
112-hr event	T08-12396	UCD	K	19	4.389	0.226	0.026	5.116	0.258	0.044	4.848
112-hr event	T08-12396	UCD	Ca	20	3.577	0.184	0.014	3.624	0.184	0.050	3.524
112-hr event	T08-12396	UCD	Sc	21	-----	-----	-----	0.000	0.029	0.069	-----
112-hr event	T08-12396	UCD	Ti	22	0.299	0.019	0.008	0.322	0.034	0.044	0.299
112-hr event	T08-12396	UCD	V	23	0.048	0.008	0.006	0.035	0.018	0.032	-----
112-hr event	T08-12396	UCD	Cr	24	0.010	0.003	0.005	0.000	0.009	0.023	-----
112-hr event	T08-12396	UCD	Mn	25	0.111	0.008	0.006	0.114	0.015	0.018	0.113
112-hr event	T08-12396	UCD	Fe	26	3.656	0.185	0.009	3.850	0.195	0.014	3.937
112-hr event	T08-12396	UCD	Co	27	-----	-----	-----	0.024	0.010	0.013	-----
112-hr event	T08-12396	UCD	Ni	28	0.000	0.000	0.007	0.000	0.005	0.012	-----
112-hr event	T08-12396	UCD	Cu	29	0.089	0.007	0.007	0.111	0.011	0.014	-----
112-hr event	T08-12396	UCD	Zn	30	0.557	0.030	0.005	0.622	0.034	0.017	0.635
112-hr event	T08-12396	UCD	Ga	31	-----	-----	-----	0.003	0.015	0.027	-----
112-hr event	T08-12396	UCD	As	33	0.053	0.009	0.018	0.052	0.023	0.018	-----
112-hr event	T08-12396	UCD	Se	34	0.028	0.003	0.004	0.029	0.015	0.021	-----
112-hr event	T08-12396	UCD	Br	35	0.202	0.012	0.005	0.245	0.025	0.024	0.210
112-hr event	T08-12396	UCD	Rb	37	0.000	0.000	0.010	0.000	0.007	0.015	-----
112-hr event	T08-12396	UCD	Sr	38	0.027	0.006	0.013	0.057	0.018	0.028	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12396	UCD	Y	39	-----	-----	-----	0.000	0.009	0.027	-----
112-hr event	T08-12396	UCD	Zr	40	0.000	0.000	0.024	0.000	0.081	0.036	-----
112-hr event	T08-12396	UCD	Nb	41	-----	-----	-----	0.000	0.014	0.037	-----
112-hr event	T08-12396	UCD	Mo	42	-----	-----	-----	0.000	0.018	0.047	-----
112-hr event	T08-12396	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
112-hr event	T08-12396	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
112-hr event	T08-12396	UCD	In	49	-----	-----	-----	0.068	0.271	0.219	-----
112-hr event	T08-12396	UCD	Sn	50	-----	-----	-----	0.102	0.384	0.342	-----
112-hr event	T08-12396	UCD	Sb	51	-----	-----	-----	0.000	0.120	0.401	-----
112-hr event	T08-12396	UCD	Cs	55	-----	-----	-----	0.000	0.051	0.110	-----
112-hr event	T08-12396	UCD	Ba	56	-----	-----	-----	0.000	0.054	0.103	-----
112-hr event	T08-12396	UCD	La	57	-----	-----	-----	0.028	0.084	0.082	-----
112-hr event	T08-12396	UCD	Ce	58	-----	-----	-----	0.000	0.039	0.080	-----
112-hr event	T08-12396	UCD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
112-hr event	T08-12396	UCD	Eu	63	-----	-----	-----	0.012	0.033	0.045	-----
112-hr event	T08-12396	UCD	Tb	65	-----	-----	-----	0.000	0.055	0.040	-----
112-hr event	T08-12396	UCD	Hf	72	-----	-----	-----	0.049	0.027	0.045	-----
112-hr event	T08-12396	UCD	Ta	73	-----	-----	-----	0.000	0.047	0.077	-----
112-hr event	T08-12396	UCD	W	74	-----	-----	-----	0.000	0.036	0.087	-----
112-hr event	T08-12396	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
112-hr event	T08-12396	UCD	Au	79	-----	-----	-----	0.000	0.023	0.051	-----
112-hr event	T08-12396	UCD	Hg	80	-----	-----	-----	0.053	0.083	0.152	-----
112-hr event	T08-12396	UCD	Pb	82	0.189	0.017	0.008	0.294	0.045	0.056	0.251
100-hr event	T08-12397	CARB	Na	11	-----	-----	-----	2.124	0.251	0.342	-----
100-hr event	T08-12397	CARB	Mg	12	-----	-----	-----	0.346	0.073	0.115	-----
100-hr event	T08-12397	CARB	Al	13	3.250	0.181	0.200	3.740	0.309	0.267	3.153
100-hr event	T08-12397	CARB	Si	14	8.680	0.437	0.060	9.119	0.613	0.139	9.272
100-hr event	T08-12397	CARB	P	15	0.200	0.029	0.040	0.000	0.093	0.116	-----
100-hr event	T08-12397	CARB	S	16	59.380	2.970	0.050	58.523	2.936	0.073	58.031
100-hr event	T08-12397	CARB	Cl	17	0.330	0.023	0.060	0.445	0.042	0.056	-----
100-hr event	T08-12397	CARB	K	19	3.070	0.154	0.070	3.022	0.154	0.044	2.880
100-hr event	T08-12397	CARB	Ca	20	2.210	0.112	0.060	2.124	0.109	0.050	2.278
100-hr event	T08-12397	CARB	Sc	21	-----	-----	-----	0.000	0.026	0.069	-----
100-hr event	T08-12397	CARB	Ti	22	0.250	0.016	0.040	0.201	0.029	0.044	0.253
100-hr event	T08-12397	CARB	V	23	<0.03	-----	0.030	0.007	0.016	0.032	-----
100-hr event	T08-12397	CARB	Cr	24	<0.03	-----	0.030	0.000	0.009	0.023	-----
100-hr event	T08-12397	CARB	Mn	25	0.080	0.006	0.030	0.077	0.010	0.018	-----
100-hr event	T08-12397	CARB	Fe	26	2.750	0.138	0.040	2.830	0.144	0.014	2.932
100-hr event	T08-12397	CARB	Co	27	<0.03	-----	0.030	0.024	0.010	0.013	-----
100-hr event	T08-12397	CARB	Ni	28	<0.03	-----	0.030	0.002	0.006	0.012	-----
100-hr event	T08-12397	CARB	Cu	29	0.080	0.007	0.040	0.080	0.010	0.014	-----
100-hr event	T08-12397	CARB	Zn	30	0.690	0.036	0.020	0.680	0.037	0.017	0.691
100-hr event	T08-12397	CARB	Ga	31	-----	-----	-----	0.002	0.014	0.027	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12397	CARB	As	33	0.040	0.006	0.020	0.059	0.018	0.018	-----
100-hr event	T08-12397	CARB	Se	34	0.030	0.003	0.020	0.009	0.014	0.021	-----
100-hr event	T08-12397	CARB	Br	35	0.120	0.008	0.020	0.168	0.020	0.024	0.136
100-hr event	T08-12397	CARB	Rb	37	<0.02	-----	0.020	0.000	0.007	0.015	-----
100-hr event	T08-12397	CARB	Sr	38	<0.03	-----	0.030	0.000	0.006	0.028	-----
100-hr event	T08-12397	CARB	Y	39	<0.03	-----	0.030	0.000	0.008	0.027	-----
100-hr event	T08-12397	CARB	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
100-hr event	T08-12397	CARB	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
100-hr event	T08-12397	CARB	Mo	42	<0.06	-----	0.060	0.000	0.016	0.047	-----
100-hr event	T08-12397	CARB	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
100-hr event	T08-12397	CARB	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
100-hr event	T08-12397	CARB	In	49	-----	-----	-----	0.000	0.069	0.219	-----
100-hr event	T08-12397	CARB	Sn	50	<0.2	-----	0.200	0.000	0.088	0.342	-----
100-hr event	T08-12397	CARB	Sb	51	<0.2	-----	0.200	0.000	0.120	0.401	-----
100-hr event	T08-12397	CARB	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
100-hr event	T08-12397	CARB	Ba	56	<0.2	-----	0.200	0.000	0.047	0.103	-----
100-hr event	T08-12397	CARB	La	57	-----	-----	-----	0.000	0.039	0.082	-----
100-hr event	T08-12397	CARB	Ce	58	-----	-----	-----	0.000	0.039	0.080	-----
100-hr event	T08-12397	CARB	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
100-hr event	T08-12397	CARB	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
100-hr event	T08-12397	CARB	Tb	65	-----	-----	-----	0.000	0.048	0.040	-----
100-hr event	T08-12397	CARB	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
100-hr event	T08-12397	CARB	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
100-hr event	T08-12397	CARB	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12397	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12397	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
100-hr event	T08-12397	CARB	Hg	80	<0.03	-----	0.030	0.033	0.075	0.152	-----
100-hr event	T08-12397	CARB	Pb	82	0.110	0.010	0.030	0.046	0.033	0.056	-----
100-hr event	T08-12398	CARB	Na	11	-----	-----	-----	1.763	0.241	0.342	-----
100-hr event	T08-12398	CARB	Mg	12	-----	-----	-----	0.125	0.071	0.115	-----
100-hr event	T08-12398	CARB	Al	13	3.420	0.188	0.200	3.650	0.305	0.267	3.153
100-hr event	T08-12398	CARB	Si	14	8.830	0.445	0.060	9.289	0.624	0.139	9.272
100-hr event	T08-12398	CARB	P	15	0.180	0.027	0.040	0.000	0.096	0.116	-----
100-hr event	T08-12398	CARB	S	16	59.340	2.967	0.050	60.918	3.056	0.073	58.031
100-hr event	T08-12398	CARB	Cl	17	0.440	0.027	0.060	0.470	0.042	0.056	-----
100-hr event	T08-12398	CARB	K	19	3.100	0.156	0.070	3.045	0.155	0.044	2.880
100-hr event	T08-12398	CARB	Ca	20	2.270	0.114	0.060	2.255	0.116	0.050	2.278
100-hr event	T08-12398	CARB	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
100-hr event	T08-12398	CARB	Ti	22	0.230	0.016	0.040	0.262	0.030	0.044	0.253
100-hr event	T08-12398	CARB	V	23	<0.03	-----	0.030	0.000	0.013	0.032	-----
100-hr event	T08-12398	CARB	Cr	24	<0.03	-----	0.030	0.029	0.011	0.023	-----
100-hr event	T08-12398	CARB	Mn	25	0.080	0.006	0.030	0.075	0.013	0.018	-----
100-hr event	T08-12398	CARB	Fe	26	2.750	0.138	0.040	2.931	0.149	0.014	2.932

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12398	CARB	Co	27	<0.03	-----	0.030	0.014	0.009	0.013	-----
100-hr event	T08-12398	CARB	Ni	28	<0.03	-----	0.030	0.000	0.004	0.012	-----
100-hr event	T08-12398	CARB	Cu	29	0.080	0.007	0.040	0.071	0.009	0.014	-----
100-hr event	T08-12398	CARB	Zn	30	0.700	0.036	0.020	0.693	0.037	0.017	0.691
100-hr event	T08-12398	CARB	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
100-hr event	T08-12398	CARB	As	33	0.040	0.006	0.020	0.058	0.019	0.018	-----
100-hr event	T08-12398	CARB	Se	34	0.040	0.003	0.020	0.052	0.014	0.021	-----
100-hr event	T08-12398	CARB	Br	35	0.130	0.008	0.020	0.144	0.019	0.024	0.136
100-hr event	T08-12398	CARB	Rb	37	<0.02	-----	0.020	0.000	0.005	0.015	-----
100-hr event	T08-12398	CARB	Sr	38	<0.03	-----	0.030	0.034	0.016	0.028	-----
100-hr event	T08-12398	CARB	Y	39	<0.03	-----	0.030	0.000	0.008	0.027	-----
100-hr event	T08-12398	CARB	Zr	40	-----	-----	-----	0.045	0.124	0.036	-----
100-hr event	T08-12398	CARB	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
100-hr event	T08-12398	CARB	Mo	42	<0.06	-----	0.060	0.000	0.016	0.047	-----
100-hr event	T08-12398	CARB	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
100-hr event	T08-12398	CARB	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
100-hr event	T08-12398	CARB	In	49	-----	-----	-----	0.068	0.260	0.219	-----
100-hr event	T08-12398	CARB	Sn	50	<0.2	-----	0.200	0.475	0.351	0.342	-----
100-hr event	T08-12398	CARB	Sb	51	<0.2	-----	0.200	0.000	0.105	0.401	-----
100-hr event	T08-12398	CARB	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
100-hr event	T08-12398	CARB	Ba	56	<0.2	-----	0.200	0.000	0.054	0.103	-----
100-hr event	T08-12398	CARB	La	57	-----	-----	-----	0.000	0.039	0.082	-----
100-hr event	T08-12398	CARB	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
100-hr event	T08-12398	CARB	Sm	62	-----	-----	-----	0.001	0.027	0.052	-----
100-hr event	T08-12398	CARB	Eu	63	-----	-----	-----	0.027	0.033	0.045	-----
100-hr event	T08-12398	CARB	Tb	65	-----	-----	-----	0.000	0.049	0.040	-----
100-hr event	T08-12398	CARB	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
100-hr event	T08-12398	CARB	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
100-hr event	T08-12398	CARB	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12398	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12398	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
100-hr event	T08-12398	CARB	Hg	80	<0.03	-----	0.030	0.001	0.069	0.152	-----
100-hr event	T08-12398	CARB	Pb	82	0.110	0.010	0.030	0.078	0.034	0.056	-----
100-hr event	T08-12399	DRI	Na	11	2.353	1.424	0.911	1.910	0.248	0.342	-----
100-hr event	T08-12399	DRI	Mg	12	0.774	0.730	0.346	0.195	0.071	0.115	-----
100-hr event	T08-12399	DRI	Al	13	2.226	0.130	0.079	3.571	0.300	0.267	3.153
100-hr event	T08-12399	DRI	Si	14	6.112	0.165	0.092	10.012	0.671	0.139	9.272
100-hr event	T08-12399	DRI	P	15	2.024	0.046	0.027	0.000	0.096	0.116	-----
100-hr event	T08-12399	DRI	S	16	59.416	0.442	0.075	61.009	3.060	0.073	58.031
100-hr event	T08-12399	DRI	Cl	17	0.131	0.026	0.019	0.371	0.040	0.056	-----
100-hr event	T08-12399	DRI	K	19	2.832	0.030	0.017	3.158	0.161	0.044	2.880
100-hr event	T08-12399	DRI	Ca	20	2.367	0.033	0.021	2.379	0.122	0.050	2.278
100-hr event	T08-12399	DRI	Sc	21	0.008	0.097	0.068	0.000	0.025	0.069	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12399	DRI	Ti	22	0.294	0.019	0.013	0.218	0.029	0.044	0.253
100-hr event	T08-12399	DRI	V	23	0.000	0.002	0.001	0.041	0.016	0.032	-----
100-hr event	T08-12399	DRI	Cr	24	0.012	0.016	0.012	0.000	0.009	0.023	-----
100-hr event	T08-12399	DRI	Mn	25	0.100	0.035	0.024	0.076	0.012	0.018	-----
100-hr event	T08-12399	DRI	Fe	26	3.254	0.050	0.031	3.017	0.153	0.014	2.932
100-hr event	T08-12399	DRI	Co	27	0.000	0.002	0.001	0.020	0.009	0.013	-----
100-hr event	T08-12399	DRI	Ni	28	0.006	0.008	0.006	0.000	0.005	0.012	-----
100-hr event	T08-12399	DRI	Cu	29	0.074	0.015	0.010	0.075	0.009	0.014	-----
100-hr event	T08-12399	DRI	Zn	30	0.784	0.017	0.010	0.688	0.037	0.017	0.691
100-hr event	T08-12399	DRI	Ga	31	0.000	0.053	0.037	0.000	0.009	0.027	-----
100-hr event	T08-12399	DRI	As	33	0.000	0.002	0.001	0.054	0.018	0.018	-----
100-hr event	T08-12399	DRI	Se	34	0.060	0.035	0.024	0.026	0.014	0.021	-----
100-hr event	T08-12399	DRI	Br	35	0.097	0.025	0.017	0.125	0.018	0.024	0.136
100-hr event	T08-12399	DRI	Rb	37	0.002	0.018	0.013	0.000	0.005	0.015	-----
100-hr event	T08-12399	DRI	Sr	38	0.085	0.033	0.023	0.038	0.016	0.028	-----
100-hr event	T08-12399	DRI	Y	39	0.032	0.025	0.017	0.001	0.018	0.027	-----
100-hr event	T08-12399	DRI	Zr	40	0.011	0.057	0.041	0.000	0.081	0.036	-----
100-hr event	T08-12399	DRI	Nb	41	0.013	0.044	0.031	0.000	0.013	0.037	-----
100-hr event	T08-12399	DRI	Mo	42	0.000	0.039	0.028	0.000	0.016	0.047	-----
100-hr event	T08-12399	DRI	Ag	47	0.038	0.069	0.049	0.034	0.158	0.135	-----
100-hr event	T08-12399	DRI	Cd	48	0.000	0.086	0.060	0.000	0.047	0.141	-----
100-hr event	T08-12399	DRI	In	49	0.000	0.051	0.036	0.000	0.069	0.219	-----
100-hr event	T08-12399	DRI	Sn	50	0.000	0.064	0.045	0.068	0.362	0.342	-----
100-hr event	T08-12399	DRI	Sb	51	0.000	0.121	0.084	0.000	0.105	0.401	-----
100-hr event	T08-12399	DRI	Cs	55	0.000	0.020	0.014	0.000	0.042	0.110	-----
100-hr event	T08-12399	DRI	Ba	56	0.000	0.010	0.007	0.000	0.047	0.103	-----
100-hr event	T08-12399	DRI	La	57	0.000	0.015	0.010	0.000	0.039	0.082	-----
100-hr event	T08-12399	DRI	Ce	58	0.006	0.021	0.015	0.000	0.032	0.080	-----
100-hr event	T08-12399	DRI	Sm	62	0.000	0.030	0.021	0.000	0.019	0.052	-----
100-hr event	T08-12399	DRI	Eu	63	0.000	0.107	0.075	0.014	0.028	0.045	-----
100-hr event	T08-12399	DRI	Tb	65	0.000	0.037	0.026	0.000	0.049	0.040	-----
100-hr event	T08-12399	DRI	Hf	72	0.199	0.236	0.164	0.000	0.018	0.045	-----
100-hr event	T08-12399	DRI	Ta	73	0.022	0.196	0.137	0.000	0.034	0.077	-----
100-hr event	T08-12399	DRI	W	74	0.174	0.285	0.167	0.000	0.036	0.087	-----
100-hr event	T08-12399	DRI	Ir	77	0.000	0.061	0.043	0.000	0.024	0.076	-----
100-hr event	T08-12399	DRI	Au	79	0.000	0.130	0.092	0.000	0.017	0.051	-----
100-hr event	T08-12399	DRI	Hg	80	0.000	0.039	0.028	0.000	0.044	0.152	-----
100-hr event	T08-12399	DRI	Pb	82	0.127	0.044	0.030	0.068	0.034	0.056	-----
100-hr event	T08-12400	ODEQ	Na	11	-----	-----	-----	1.605	0.224	0.342	-----
100-hr event	T08-12400	ODEQ	Mg	12	-----	-----	-----	0.244	0.071	0.115	-----
100-hr event	T08-12400	ODEQ	Al	13	2.892	0.297	0.565	3.141	0.278	0.267	3.153
100-hr event	T08-12400	ODEQ	Si	14	9.256	0.812	1.006	8.690	0.585	0.139	9.272
100-hr event	T08-12400	ODEQ	P	15	-0.542	0.160	0.463	0.000	0.093	0.116	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12400	ODEQ	S	16	64.050	5.149	1.469	58.308	2.926	0.073	58.031
100-hr event	T08-12400	ODEQ	Cl	17	-0.911	0.477	1.469	0.431	0.041	0.056	-----
100-hr event	T08-12400	ODEQ	K	19	3.076	0.251	0.147	2.897	0.148	0.044	2.880
100-hr event	T08-12400	ODEQ	Ca	20	2.524	0.212	0.181	2.110	0.108	0.050	2.278
100-hr event	T08-12400	ODEQ	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
100-hr event	T08-12400	ODEQ	Ti	22	0.351	0.078	0.226	0.233	0.023	0.044	0.253
100-hr event	T08-12400	ODEQ	V	23	0.025	0.024	0.072	0.009	0.015	0.032	-----
100-hr event	T08-12400	ODEQ	Cr	24	0.018	0.012	0.037	0.000	0.009	0.023	-----
100-hr event	T08-12400	ODEQ	Mn	25	0.094	0.020	0.055	0.078	0.010	0.018	-----
100-hr event	T08-12400	ODEQ	Fe	26	2.975	0.241	0.108	2.772	0.141	0.014	2.932
100-hr event	T08-12400	ODEQ	Co	27	0.015	0.022	0.067	0.007	0.010	0.013	-----
100-hr event	T08-12400	ODEQ	Ni	28	-0.005	0.010	0.031	0.001	0.005	0.012	-----
100-hr event	T08-12400	ODEQ	Cu	29	0.041	0.060	0.176	0.071	0.009	0.014	-----
100-hr event	T08-12400	ODEQ	Zn	30	0.768	0.064	0.046	0.692	0.037	0.017	0.691
100-hr event	T08-12400	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
100-hr event	T08-12400	ODEQ	As	33	0.022	0.017	0.052	0.040	0.018	0.018	-----
100-hr event	T08-12400	ODEQ	Se	34	0.020	0.019	0.058	0.020	0.014	0.021	-----
100-hr event	T08-12400	ODEQ	Br	35	0.108	0.021	0.055	0.157	0.019	0.024	0.136
100-hr event	T08-12400	ODEQ	Rb	37	0.018	0.017	0.050	0.000	0.005	0.015	-----
100-hr event	T08-12400	ODEQ	Sr	38	0.029	0.012	0.036	0.027	0.016	0.028	-----
100-hr event	T08-12400	ODEQ	Y	39	-----	-----	-----	0.000	0.008	0.027	-----
100-hr event	T08-12400	ODEQ	Zr	40	0.027	0.019	0.055	0.000	0.081	0.036	-----
100-hr event	T08-12400	ODEQ	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
100-hr event	T08-12400	ODEQ	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
100-hr event	T08-12400	ODEQ	Ag	47	-0.012	0.040	0.124	0.000	0.045	0.135	-----
100-hr event	T08-12400	ODEQ	Cd	48	0.018	0.042	0.124	0.000	0.047	0.141	-----
100-hr event	T08-12400	ODEQ	In	49	0.002	0.046	0.136	0.000	0.069	0.219	-----
100-hr event	T08-12400	ODEQ	Sn	50	0.133	0.076	0.226	0.000	0.088	0.342	-----
100-hr event	T08-12400	ODEQ	Sb	51	0.110	0.071	0.215	0.000	0.120	0.401	-----
100-hr event	T08-12400	ODEQ	Cs	55	0.026	0.113	0.339	0.000	0.042	0.110	-----
100-hr event	T08-12400	ODEQ	Ba	56	0.118	0.157	0.475	0.000	0.054	0.103	-----
100-hr event	T08-12400	ODEQ	La	57	-----	-----	-----	0.000	0.039	0.082	-----
100-hr event	T08-12400	ODEQ	Ce	58	0.344	0.261	0.780	0.000	0.032	0.080	-----
100-hr event	T08-12400	ODEQ	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
100-hr event	T08-12400	ODEQ	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
100-hr event	T08-12400	ODEQ	Tb	65	-----	-----	-----	0.012	0.032	0.040	-----
100-hr event	T08-12400	ODEQ	Hf	72	-----	-----	-----	0.021	0.024	0.045	-----
100-hr event	T08-12400	ODEQ	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
100-hr event	T08-12400	ODEQ	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12400	ODEQ	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12400	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
100-hr event	T08-12400	ODEQ	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
100-hr event	T08-12400	ODEQ	Pb	82	0.111	0.042	0.124	0.078	0.033	0.056	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12401	ODEQ	Na	11	-----	-----	-----	2.283	0.268	0.342	-----
100-hr event	T08-12401	ODEQ	Mg	12	-----	-----	-----	0.210	0.071	0.115	-----
100-hr event	T08-12401	ODEQ	Al	13	3.228	0.324	0.599	3.458	0.294	0.267	3.153
100-hr event	T08-12401	ODEQ	Si	14	10.126	0.888	1.096	9.729	0.652	0.139	9.272
100-hr event	T08-12401	ODEQ	P	15	-0.549	0.162	0.463	0.000	0.096	0.116	-----
100-hr event	T08-12401	ODEQ	S	16	65.261	5.246	1.582	58.930	2.957	0.073	58.031
100-hr event	T08-12401	ODEQ	Cl	17	-0.863	0.485	1.469	0.344	0.039	0.056	-----
100-hr event	T08-12401	ODEQ	K	19	3.321	0.270	0.147	3.024	0.154	0.044	2.880
100-hr event	T08-12401	ODEQ	Ca	20	2.800	0.233	0.192	2.346	0.120	0.050	2.278
100-hr event	T08-12401	ODEQ	Sc	21	-----	-----	-----	0.000	0.026	0.069	-----
100-hr event	T08-12401	ODEQ	Ti	22	0.361	0.080	0.226	0.259	0.025	0.044	0.253
100-hr event	T08-12401	ODEQ	V	23	0.036	0.025	0.073	0.000	0.013	0.032	-----
100-hr event	T08-12401	ODEQ	Cr	24	0.027	0.013	0.037	0.011	0.010	0.023	-----
100-hr event	T08-12401	ODEQ	Mn	25	0.075	0.020	0.055	0.071	0.010	0.018	-----
100-hr event	T08-12401	ODEQ	Fe	26	3.327	0.269	0.113	3.007	0.153	0.014	2.932
100-hr event	T08-12401	ODEQ	Co	27	-0.017	0.024	0.070	0.017	0.009	0.013	-----
100-hr event	T08-12401	ODEQ	Ni	28	0.009	0.011	0.032	0.000	0.005	0.012	-----
100-hr event	T08-12401	ODEQ	Cu	29	0.070	0.062	0.176	0.074	0.009	0.014	-----
100-hr event	T08-12401	ODEQ	Zn	30	0.835	0.069	0.047	0.686	0.036	0.017	0.691
100-hr event	T08-12401	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
100-hr event	T08-12401	ODEQ	As	33	0.053	0.018	0.053	0.044	0.018	0.018	-----
100-hr event	T08-12401	ODEQ	Se	34	0.032	0.020	0.059	0.017	0.014	0.021	-----
100-hr event	T08-12401	ODEQ	Br	35	0.120	0.021	0.057	0.164	0.020	0.024	0.136
100-hr event	T08-12401	ODEQ	Rb	37	-0.001	0.017	0.051	0.000	0.005	0.015	-----
100-hr event	T08-12401	ODEQ	Sr	38	0.015	0.013	0.037	0.033	0.016	0.028	-----
100-hr event	T08-12401	ODEQ	Y	39	-----	-----	-----	0.000	0.008	0.027	-----
100-hr event	T08-12401	ODEQ	Zr	40	0.018	0.019	0.057	0.000	0.081	0.036	-----
100-hr event	T08-12401	ODEQ	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
100-hr event	T08-12401	ODEQ	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
100-hr event	T08-12401	ODEQ	Ag	47	-0.010	0.040	0.124	0.045	0.158	0.135	-----
100-hr event	T08-12401	ODEQ	Cd	48	0.018	0.042	0.124	0.000	0.047	0.141	-----
100-hr event	T08-12401	ODEQ	In	49	0.057	0.048	0.147	0.000	0.069	0.219	-----
100-hr event	T08-12401	ODEQ	Sn	50	0.072	0.076	0.226	0.000	0.088	0.342	-----
100-hr event	T08-12401	ODEQ	Sb	51	0.054	0.072	0.215	0.000	0.120	0.401	-----
100-hr event	T08-12401	ODEQ	Cs	55	0.010	0.115	0.350	0.000	0.042	0.110	-----
100-hr event	T08-12401	ODEQ	Ba	56	-0.063	0.160	0.475	0.000	0.054	0.103	-----
100-hr event	T08-12401	ODEQ	La	57	-----	-----	-----	0.000	0.039	0.082	-----
100-hr event	T08-12401	ODEQ	Ce	58	0.372	0.264	0.791	0.000	0.032	0.080	-----
100-hr event	T08-12401	ODEQ	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
100-hr event	T08-12401	ODEQ	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
100-hr event	T08-12401	ODEQ	Tb	65	-----	-----	-----	0.000	0.049	0.040	-----
100-hr event	T08-12401	ODEQ	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
100-hr event	T08-12401	ODEQ	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12401	ODEQ	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12401	ODEQ	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12401	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
100-hr event	T08-12401	ODEQ	Hg	80	-----	-----	-----	0.027	0.072	0.152	-----
100-hr event	T08-12401	ODEQ	Pb	82	0.081	0.042	0.124	0.042	0.034	0.056	-----
100-hr event	T08-12402	AQMD	Na	11	-----	-----	-----	2.339	0.264	0.342	-----
100-hr event	T08-12402	AQMD	Mg	12	1.314	-----	2.016	0.421	0.075	0.115	-----
100-hr event	T08-12402	AQMD	Al	13	3.846	-----	1.440	3.164	0.279	0.267	3.153
100-hr event	T08-12402	AQMD	Si	14	11.784	-----	1.920	8.837	0.595	0.139	9.272
100-hr event	T08-12402	AQMD	P	15	1.230	-----	1.902	0.166	0.104	0.116	-----
100-hr event	T08-12402	AQMD	S	16	58.428	-----	0.301	57.268	2.873	0.073	58.031
100-hr event	T08-12402	AQMD	Cl	17	0.540	-----	0.209	0.425	0.041	0.056	-----
100-hr event	T08-12402	AQMD	K	19	2.172	-----	0.073	2.887	0.147	0.044	2.880
100-hr event	T08-12402	AQMD	Ca	20	2.670	-----	0.080	2.190	0.113	0.050	2.278
100-hr event	T08-12402	AQMD	Sc	21	ND	-----	0.072	0.000	0.026	0.069	-----
100-hr event	T08-12402	AQMD	Ti	22	0.342	-----	0.074	0.166	0.028	0.044	0.253
100-hr event	T08-12402	AQMD	V	23	ND	-----	0.084	0.000	0.013	0.032	-----
100-hr event	T08-12402	AQMD	Cr	24	ND	-----	0.072	0.011	0.011	0.023	-----
100-hr event	T08-12402	AQMD	Mn	25	ND	-----	0.084	0.066	0.010	0.018	-----
100-hr event	T08-12402	AQMD	Fe	26	2.958	-----	0.042	2.828	0.144	0.014	2.932
100-hr event	T08-12402	AQMD	Co	27	ND	-----	0.024	0.019	0.009	0.013	-----
100-hr event	T08-12402	AQMD	Ni	28	0.018	-----	0.016	0.000	0.005	0.012	-----
100-hr event	T08-12402	AQMD	Cu	29	0.156	-----	0.021	0.080	0.010	0.014	-----
100-hr event	T08-12402	AQMD	Zn	30	0.660	-----	0.025	0.683	0.037	0.017	0.691
100-hr event	T08-12402	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
100-hr event	T08-12402	AQMD	As	33	ND	-----	0.156	0.050	0.019	0.018	-----
100-hr event	T08-12402	AQMD	Se	34	ND	-----	0.144	0.029	0.015	0.021	-----
100-hr event	T08-12402	AQMD	Br	35	0.078	-----	0.036	0.158	0.021	0.024	0.136
100-hr event	T08-12402	AQMD	Rb	37	0.000	-----	0.084	0.000	0.005	0.015	-----
100-hr event	T08-12402	AQMD	Sr	38	0.024	-----	0.022	0.026	0.017	0.028	-----
100-hr event	T08-12402	AQMD	Y	39	ND	-----	0.084	0.000	0.008	0.027	-----
100-hr event	T08-12402	AQMD	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
100-hr event	T08-12402	AQMD	Nb	41	0.006	-----	0.021	0.000	0.014	0.037	-----
100-hr event	T08-12402	AQMD	Mo	42	ND	-----	0.132	0.000	0.017	0.047	-----
100-hr event	T08-12402	AQMD	Ag	47	ND	-----	0.228	0.000	0.045	0.135	-----
100-hr event	T08-12402	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
100-hr event	T08-12402	AQMD	In	49	ND	-----	0.252	0.000	0.069	0.219	-----
100-hr event	T08-12402	AQMD	Sn	50	ND	-----	0.036	0.000	0.088	0.342	-----
100-hr event	T08-12402	AQMD	Sb	51	ND	-----	0.012	0.000	0.120	0.401	-----
100-hr event	T08-12402	AQMD	Cs	55	ND	-----	0.636	0.000	0.042	0.110	-----
100-hr event	T08-12402	AQMD	Ba	56	ND	-----	0.084	0.043	0.073	0.103	-----
100-hr event	T08-12402	AQMD	La	57	ND	-----	0.348	0.081	0.078	0.082	-----
100-hr event	T08-12402	AQMD	Ce	58	-----	-----	-----	0.018	0.047	0.080	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12402	AQMD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
100-hr event	T08-12402	AQMD	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
100-hr event	T08-12402	AQMD	Tb	65	-----	-----	-----	0.000	0.048	0.040	-----
100-hr event	T08-12402	AQMD	Hf	72	-----	-----	-----	0.000	0.018	0.045	-----
100-hr event	T08-12402	AQMD	Ta	73	-----	-----	-----	0.000	0.047	0.077	-----
100-hr event	T08-12402	AQMD	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12402	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12402	AQMD	Au	79	ND	-----	0.156	0.000	0.017	0.051	-----
100-hr event	T08-12402	AQMD	Hg	80	-----	-----	-----	0.064	0.079	0.152	-----
100-hr event	T08-12402	AQMD	Pb	82	ND	-----	0.012	0.099	0.035	0.056	-----
100-hr event	T08-12403	UCD	Na	11	4.011	0.982	1.659	1.898	0.247	0.342	-----
100-hr event	T08-12403	UCD	Mg	12	0.000	0.000	0.936	0.235	0.071	0.115	-----
100-hr event	T08-12403	UCD	Al	13	3.984	0.314	0.322	2.983	0.270	0.267	3.153
100-hr event	T08-12403	UCD	Si	14	12.007	0.644	0.177	8.645	0.582	0.139	9.272
100-hr event	T08-12403	UCD	P	15	0.000	0.000	0.118	0.000	0.093	0.116	-----
100-hr event	T08-12403	UCD	S	16	55.279	2.781	0.068	57.754	2.898	0.073	58.031
100-hr event	T08-12403	UCD	Cl	17	0.000	0.000	0.045	0.383	0.040	0.056	-----
100-hr event	T08-12403	UCD	K	19	2.746	0.145	0.024	2.872	0.147	0.044	2.880
100-hr event	T08-12403	UCD	Ca	20	2.332	0.122	0.013	2.112	0.109	0.050	2.278
100-hr event	T08-12403	UCD	Sc	21	-----	-----	-----	0.000	0.027	0.069	-----
100-hr event	T08-12403	UCD	Ti	22	0.250	0.016	0.007	0.228	0.028	0.044	0.253
100-hr event	T08-12403	UCD	V	23	0.013	0.005	0.005	0.000	0.013	0.032	-----
100-hr event	T08-12403	UCD	Cr	24	0.008	0.002	0.005	0.000	0.009	0.023	-----
100-hr event	T08-12403	UCD	Mn	25	0.079	0.006	0.006	0.081	0.010	0.018	-----
100-hr event	T08-12403	UCD	Fe	26	2.800	0.142	0.009	2.694	0.137	0.014	2.932
100-hr event	T08-12403	UCD	Co	27	-----	-----	-----	0.019	0.009	0.013	-----
100-hr event	T08-12403	UCD	Ni	28	0.000	0.000	0.006	0.000	0.005	0.012	-----
100-hr event	T08-12403	UCD	Cu	29	0.055	0.005	0.006	0.071	0.010	0.014	-----
100-hr event	T08-12403	UCD	Zn	30	0.652	0.035	0.005	0.680	0.037	0.017	0.691
100-hr event	T08-12403	UCD	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
100-hr event	T08-12403	UCD	As	33	0.044	0.008	0.016	0.067	0.019	0.018	-----
100-hr event	T08-12403	UCD	Se	34	0.034	0.003	0.004	0.012	0.015	0.021	-----
100-hr event	T08-12403	UCD	Br	35	0.129	0.008	0.005	0.147	0.018	0.024	0.136
100-hr event	T08-12403	UCD	Rb	37	0.014	0.006	0.010	0.000	0.007	0.015	-----
100-hr event	T08-12403	UCD	Sr	38	0.020	0.005	0.013	0.016	0.017	0.028	-----
100-hr event	T08-12403	UCD	Y	39	-----	-----	-----	0.000	0.008	0.027	-----
100-hr event	T08-12403	UCD	Zr	40	0.032	0.009	0.022	0.000	0.081	0.036	-----
100-hr event	T08-12403	UCD	Nb	41	-----	-----	-----	0.000	0.014	0.037	-----
100-hr event	T08-12403	UCD	Mo	42	-----	-----	-----	0.000	0.017	0.047	-----
100-hr event	T08-12403	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
100-hr event	T08-12403	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
100-hr event	T08-12403	UCD	In	49	-----	-----	-----	0.226	0.260	0.219	-----
100-hr event	T08-12403	UCD	Sn	50	-----	-----	-----	0.000	0.088	0.342	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12403	UCD	Sb	51	-----	-----	-----	0.384	0.509	0.401	-----
100-hr event	T08-12403	UCD	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
100-hr event	T08-12403	UCD	Ba	56	-----	-----	-----	0.000	0.054	0.103	-----
100-hr event	T08-12403	UCD	La	57	-----	-----	-----	0.000	0.039	0.082	-----
100-hr event	T08-12403	UCD	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
100-hr event	T08-12403	UCD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
100-hr event	T08-12403	UCD	Eu	63	-----	-----	-----	0.000	0.022	0.045	-----
100-hr event	T08-12403	UCD	Tb	65	-----	-----	-----	0.000	0.047	0.040	-----
100-hr event	T08-12403	UCD	Hf	72	-----	-----	-----	0.019	0.025	0.045	-----
100-hr event	T08-12403	UCD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
100-hr event	T08-12403	UCD	W	74	-----	-----	-----	0.000	0.036	0.087	-----
100-hr event	T08-12403	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
100-hr event	T08-12403	UCD	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
100-hr event	T08-12403	UCD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
100-hr event	T08-12403	UCD	Pb	82	0.097	0.013	0.007	0.085	0.035	0.056	-----
blank filter	T08-12405	CARB	Na	11	-----	-----	-----	0	0.118	0.342	-----
blank filter	T08-12405	CARB	Mg	12	-----	-----	-----	0	0.040	0.115	-----
blank filter	T08-12405	CARB	Al	13	<0.2	-----	0.200	0	0.087	0.267	-----
blank filter	T08-12405	CARB	Si	14	<0.06	-----	0.060	0	0.050	0.139	-----
blank filter	T08-12405	CARB	P	15	<0.04	-----	0.040	0	0.041	0.116	-----
blank filter	T08-12405	CARB	S	16	<0.05	-----	0.050	0	0.025	0.073	-----
blank filter	T08-12405	CARB	Cl	17	<0.06	-----	0.060	0	0.018	0.056	-----
blank filter	T08-12405	CARB	K	19	<0.07	-----	0.070	0	0.015	0.044	-----
blank filter	T08-12405	CARB	Ca	20	<0.06	-----	0.060	0	0.017	0.050	-----
blank filter	T08-12405	CARB	Sc	21	-----	-----	-----	0	0.024	0.069	-----
blank filter	T08-12405	CARB	Ti	22	<0.04	-----	0.040	0	0.016	0.044	-----
blank filter	T08-12405	CARB	V	23	<0.03	-----	0.030	0	0.013	0.032	-----
blank filter	T08-12405	CARB	Cr	24	<0.03	-----	0.030	0	0.009	0.023	-----
blank filter	T08-12405	CARB	Mn	25	<0.03	-----	0.030	0	0.007	0.018	-----
blank filter	T08-12405	CARB	Fe	26	<0.04	-----	0.040	0	0.004	0.014	-----
blank filter	T08-12405	CARB	Co	27	<0.03	-----	0.030	0	0.005	0.013	-----
blank filter	T08-12405	CARB	Ni	28	<0.03	-----	0.030	0	0.004	0.012	-----
blank filter	T08-12405	CARB	Cu	29	<0.04	-----	0.040	0	0.005	0.014	-----
blank filter	T08-12405	CARB	Zn	30	<0.02	-----	0.020	0	0.005	0.017	-----
blank filter	T08-12405	CARB	Ga	31	-----	-----	-----	0	0.009	0.027	-----
blank filter	T08-12405	CARB	As	33	<0.02	-----	0.020	0	0.006	0.018	-----
blank filter	T08-12405	CARB	Se	34	<0.02	-----	0.020	0	0.006	0.021	-----
blank filter	T08-12405	CARB	Br	35	<0.02	-----	0.020	0	0.006	0.024	-----
blank filter	T08-12405	CARB	Rb	37	<0.02	-----	0.020	0	0.005	0.015	-----
blank filter	T08-12405	CARB	Sr	38	<0.03	-----	0.030	0	0.006	0.028	-----
blank filter	T08-12405	CARB	Y	39	<0.03	-----	0.030	0	0.007	0.027	-----
blank filter	T08-12405	CARB	Zr	40	-----	-----	-----	0	0.081	0.036	-----
blank filter	T08-12405	CARB	Nb	41	-----	-----	-----	0	0.013	0.037	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12405	CARB	Mo	42	<0.06	-----	0.060	0	0.016	0.047	-----
blank filter	T08-12405	CARB	Ag	47	-----	-----	-----	0	0.045	0.135	-----
blank filter	T08-12405	CARB	Cd	48	-----	-----	-----	0	0.047	0.141	-----
blank filter	T08-12405	CARB	In	49	-----	-----	-----	0	0.260	0.219	-----
blank filter	T08-12405	CARB	Sn	50	<0.2	-----	0.200	0.015	0.350	0.342	-----
blank filter	T08-12405	CARB	Sb	51	<0.2	-----	0.200	0.000	0.105	0.401	-----
blank filter	T08-12405	CARB	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
blank filter	T08-12405	CARB	Ba	56	<0.2	-----	0.200	0.000	0.039	0.103	-----
blank filter	T08-12405	CARB	La	57	-----	-----	-----	0.000	0.032	0.082	-----
blank filter	T08-12405	CARB	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
blank filter	T08-12405	CARB	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
blank filter	T08-12405	CARB	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
blank filter	T08-12405	CARB	Tb	65	-----	-----	-----	0.000	0.014	0.040	-----
blank filter	T08-12405	CARB	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
blank filter	T08-12405	CARB	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12405	CARB	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12405	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12405	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
blank filter	T08-12405	CARB	Hg	80	<0.03	-----	0.030	0.000	0.044	0.152	-----
blank filter	T08-12405	CARB	Pb	82	<0.03	-----	0.030	0.012	0.019	0.056	-----
blank filter	T08-12406	CARB	Na	11	-----	-----	-----	0.000	0.123	0.342	-----
blank filter	T08-12406	CARB	Mg	12	-----	-----	-----	0.000	0.040	0.115	-----
blank filter	T08-12406	CARB	Al	13	<0.2	-----	0.200	0.000	0.101	0.267	-----
blank filter	T08-12406	CARB	Si	14	<0.06	-----	0.060	0.000	0.050	0.139	-----
blank filter	T08-12406	CARB	P	15	<0.04	-----	0.040	0.000	0.041	0.116	-----
blank filter	T08-12406	CARB	S	16	<0.05	-----	0.050	0.000	0.025	0.073	-----
blank filter	T08-12406	CARB	Cl	17	<0.06	-----	0.060	0.000	0.021	0.056	-----
blank filter	T08-12406	CARB	K	19	<0.07	-----	0.070	0.000	0.016	0.044	-----
blank filter	T08-12406	CARB	Ca	20	0.060	0.023	0.060	0.000	0.018	0.050	-----
blank filter	T08-12406	CARB	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
blank filter	T08-12406	CARB	Ti	22	<0.04	-----	0.040	0.000	0.016	0.044	-----
blank filter	T08-12406	CARB	V	23	<0.03	-----	0.030	0.000	0.013	0.032	-----
blank filter	T08-12406	CARB	Cr	24	<0.03	-----	0.030	0.011	0.010	0.023	-----
blank filter	T08-12406	CARB	Mn	25	<0.03	-----	0.030	0.000	0.007	0.018	-----
blank filter	T08-12406	CARB	Fe	26	<0.04	-----	0.040	0.000	0.004	0.014	-----
blank filter	T08-12406	CARB	Co	27	<0.03	-----	0.030	0.002	0.005	0.013	-----
blank filter	T08-12406	CARB	Ni	28	<0.03	-----	0.030	0.000	0.004	0.012	-----
blank filter	T08-12406	CARB	Cu	29	<0.04	-----	0.040	0.000	0.005	0.014	-----
blank filter	T08-12406	CARB	Zn	30	<0.02	-----	0.020	0.000	0.006	0.017	-----
blank filter	T08-12406	CARB	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
blank filter	T08-12406	CARB	As	33	<0.02	-----	0.020	0.000	0.006	0.018	-----
blank filter	T08-12406	CARB	Se	34	<0.02	-----	0.020	0.000	0.006	0.021	-----
blank filter	T08-12406	CARB	Br	35	<0.02	-----	0.020	0.000	0.006	0.024	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12406	CARB	Rb	37	<0.02	-----	0.020	0.000	0.005	0.015	-----
blank filter	T08-12406	CARB	Sr	38	<0.03	-----	0.030	0.000	0.006	0.028	-----
blank filter	T08-12406	CARB	Y	39	<0.03	-----	0.030	0.000	0.008	0.027	-----
blank filter	T08-12406	CARB	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
blank filter	T08-12406	CARB	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
blank filter	T08-12406	CARB	Mo	42	<0.06	-----	0.060	0.000	0.017	0.047	-----
blank filter	T08-12406	CARB	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
blank filter	T08-12406	CARB	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
blank filter	T08-12406	CARB	In	49	-----	-----	-----	0.011	0.260	0.219	-----
blank filter	T08-12406	CARB	Sn	50	<0.2	-----	0.200	0.000	0.088	0.342	-----
blank filter	T08-12406	CARB	Sb	51	<0.2	-----	0.200	0.000	0.120	0.401	-----
blank filter	T08-12406	CARB	Cs	55	-----	-----	-----	0.002	0.035	0.110	-----
blank filter	T08-12406	CARB	Ba	56	<0.2	-----	0.200	0.000	0.039	0.103	-----
blank filter	T08-12406	CARB	La	57	-----	-----	-----	0.000	0.032	0.082	-----
blank filter	T08-12406	CARB	Ce	58	-----	-----	-----	0.000	0.032	0.080	-----
blank filter	T08-12406	CARB	Sm	62	-----	-----	-----	0.009	0.023	0.052	-----
blank filter	T08-12406	CARB	Eu	63	-----	-----	-----	0.000	0.018	0.045	-----
blank filter	T08-12406	CARB	Tb	65	-----	-----	-----	0.000	0.014	0.040	-----
blank filter	T08-12406	CARB	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
blank filter	T08-12406	CARB	Ta	73	-----	-----	-----	0.014	0.050	0.077	-----
blank filter	T08-12406	CARB	W	74	-----	-----	-----	0.035	0.043	0.087	-----
blank filter	T08-12406	CARB	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12406	CARB	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
blank filter	T08-12406	CARB	Hg	80	<0.03	-----	0.030	0.007	0.061	0.152	-----
blank filter	T08-12406	CARB	Pb	82	<0.03	-----	0.030	0.019	0.020	0.056	-----
blank filter	T08-12407	DRI	Na	11	0.517	1.387	0.911	0.000	0.118	0.342	-----
blank filter	T08-12407	DRI	Mg	12	0.225	0.725	0.346	0.000	0.040	0.115	-----
blank filter	T08-12407	DRI	Al	13	0.079	0.119	0.079	0.035	0.092	0.267	-----
blank filter	T08-12407	DRI	Si	14	0.000	0.133	0.092	0.000	0.050	0.139	-----
blank filter	T08-12407	DRI	P	15	0.022	0.039	0.027	0.000	0.041	0.116	-----
blank filter	T08-12407	DRI	S	16	0.000	0.107	0.075	0.000	0.029	0.073	-----
blank filter	T08-12407	DRI	Cl	17	0.007	0.026	0.019	0.000	0.021	0.056	-----
blank filter	T08-12407	DRI	K	19	0.000	0.025	0.017	0.000	0.016	0.044	-----
blank filter	T08-12407	DRI	Ca	20	0.016	0.030	0.021	0.000	0.018	0.050	-----
blank filter	T08-12407	DRI	Sc	21	0.063	0.098	0.068	0.000	0.025	0.069	-----
blank filter	T08-12407	DRI	Ti	22	0.000	0.018	0.013	0.000	0.016	0.044	-----
blank filter	T08-12407	DRI	V	23	0.000	0.002	0.001	0.000	0.013	0.032	-----
blank filter	T08-12407	DRI	Cr	24	0.010	0.016	0.012	0.000	0.009	0.023	-----
blank filter	T08-12407	DRI	Mn	25	0.040	0.035	0.024	0.000	0.007	0.018	-----
blank filter	T08-12407	DRI	Fe	26	0.000	0.044	0.031	0.000	0.006	0.014	-----
blank filter	T08-12407	DRI	Co	27	0.000	0.002	0.001	0.014	0.006	0.013	-----
blank filter	T08-12407	DRI	Ni	28	0.000	0.008	0.006	0.000	0.004	0.012	-----
blank filter	T08-12407	DRI	Cu	29	0.000	0.015	0.010	0.000	0.005	0.014	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12407	DRI	Zn	30	0.009	0.015	0.010	0.000	0.006	0.017	-----
blank filter	T08-12407	DRI	Ga	31	0.000	0.053	0.037	0.000	0.009	0.027	-----
blank filter	T08-12407	DRI	As	33	0.000	0.002	0.001	0.000	0.006	0.018	-----
blank filter	T08-12407	DRI	Se	34	0.010	0.035	0.024	0.000	0.006	0.021	-----
blank filter	T08-12407	DRI	Br	35	0.002	0.025	0.017	0.002	0.011	0.024	-----
blank filter	T08-12407	DRI	Rb	37	0.000	0.018	0.013	0.000	0.005	0.015	-----
blank filter	T08-12407	DRI	Sr	38	0.000	0.033	0.023	0.000	0.006	0.028	-----
blank filter	T08-12407	DRI	Y	39	0.009	0.025	0.017	0.000	0.008	0.027	-----
blank filter	T08-12407	DRI	Zr	40	0.000	0.057	0.041	0.000	0.081	0.036	-----
blank filter	T08-12407	DRI	Nb	41	0.000	0.044	0.031	0.000	0.013	0.037	-----
blank filter	T08-12407	DRI	Mo	42	0.000	0.039	0.028	0.000	0.017	0.047	-----
blank filter	T08-12407	DRI	Ag	47	0.000	0.069	0.049	0.000	0.045	0.135	-----
blank filter	T08-12407	DRI	Cd	48	0.000	0.086	0.060	0.000	0.047	0.141	-----
blank filter	T08-12407	DRI	In	49	0.000	0.051	0.036	0.000	0.069	0.219	-----
blank filter	T08-12407	DRI	Sn	50	0.000	0.064	0.045	0.000	0.088	0.342	-----
blank filter	T08-12407	DRI	Sb	51	0.000	0.121	0.084	0.057	0.497	0.401	-----
blank filter	T08-12407	DRI	Cs	55	0.000	0.020	0.014	0.000	0.042	0.110	-----
blank filter	T08-12407	DRI	Ba	56	0.000	0.010	0.007	0.000	0.039	0.103	-----
blank filter	T08-12407	DRI	La	57	0.000	0.015	0.010	0.000	0.032	0.082	-----
blank filter	T08-12407	DRI	Ce	58	0.001	0.021	0.015	0.000	0.032	0.080	-----
blank filter	T08-12407	DRI	Sm	62	0.009	0.030	0.021	0.000	0.019	0.052	-----
blank filter	T08-12407	DRI	Eu	63	0.000	0.107	0.075	0.013	0.018	0.045	-----
blank filter	T08-12407	DRI	Tb	65	0.029	0.036	0.026	0.000	0.014	0.040	-----
blank filter	T08-12407	DRI	Hf	72	0.000	0.237	0.164	0.000	0.016	0.045	-----
blank filter	T08-12407	DRI	Ta	73	0.013	0.196	0.137	0.000	0.034	0.077	-----
blank filter	T08-12407	DRI	W	74	0.064	0.285	0.167	0.000	0.026	0.087	-----
blank filter	T08-12407	DRI	Ir	77	0.032	0.061	0.043	0.000	0.024	0.076	-----
blank filter	T08-12407	DRI	Au	79	0.000	0.130	0.092	0.000	0.017	0.051	-----
blank filter	T08-12407	DRI	Hg	80	0.000	0.039	0.028	0.000	0.044	0.152	-----
blank filter	T08-12407	DRI	Pb	82	0.000	0.043	0.030	0.001	0.020	0.056	-----
blank filter	T08-12408	DRI	Na	11	0.000	1.364	0.911	0.000	0.113	0.342	-----
blank filter	T08-12408	DRI	Mg	12	0.131	0.725	0.346	0.000	0.036	0.115	-----
blank filter	T08-12408	DRI	Al	13	0.000	0.118	0.079	0.000	0.083	0.267	-----
blank filter	T08-12408	DRI	Si	14	0.047	0.134	0.092	0.014	0.042	0.139	-----
blank filter	T08-12408	DRI	P	15	0.000	0.038	0.027	0.000	0.034	0.116	-----
blank filter	T08-12408	DRI	S	16	0.000	0.107	0.075	0.000	0.025	0.073	-----
blank filter	T08-12408	DRI	Cl	17	0.000	0.026	0.019	0.000	0.018	0.056	-----
blank filter	T08-12408	DRI	K	19	0.005	0.025	0.017	0.000	0.014	0.044	-----
blank filter	T08-12408	DRI	Ca	20	0.009	0.030	0.021	0.000	0.016	0.050	-----
blank filter	T08-12408	DRI	Sc	21	0.000	0.097	0.068	0.000	0.022	0.069	-----
blank filter	T08-12408	DRI	Ti	22	0.000	0.018	0.013	0.000	0.012	0.044	-----
blank filter	T08-12408	DRI	V	23	0.000	0.002	0.001	0.000	0.009	0.032	-----
blank filter	T08-12408	DRI	Cr	24	0.000	0.016	0.012	0.000	0.007	0.023	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12408	DRI	Mn	25	0.003	0.035	0.024	0.000	0.005	0.018	-----
blank filter	T08-12408	DRI	Fe	26	0.000	0.044	0.031	0.000	0.004	0.014	-----
blank filter	T08-12408	DRI	Co	27	0.000	0.002	0.001	0.000	0.004	0.013	-----
blank filter	T08-12408	DRI	Ni	28	0.000	0.008	0.006	0.000	0.004	0.012	-----
blank filter	T08-12408	DRI	Cu	29	0.000	0.015	0.010	0.000	0.004	0.014	-----
blank filter	T08-12408	DRI	Zn	30	0.000	0.015	0.010	0.000	0.005	0.017	-----
blank filter	T08-12408	DRI	Ga	31	0.000	0.053	0.037	0.000	0.009	0.027	-----
blank filter	T08-12408	DRI	As	33	0.000	0.002	0.001	0.000	0.006	0.018	-----
blank filter	T08-12408	DRI	Se	34	0.000	0.035	0.024	0.000	0.006	0.021	-----
blank filter	T08-12408	DRI	Br	35	0.000	0.025	0.017	0.000	0.006	0.024	-----
blank filter	T08-12408	DRI	Rb	37	0.000	0.018	0.013	0.000	0.005	0.015	-----
blank filter	T08-12408	DRI	Sr	38	0.000	0.033	0.023	0.002	0.014	0.028	-----
blank filter	T08-12408	DRI	Y	39	0.000	0.025	0.017	0.000	0.007	0.027	-----
blank filter	T08-12408	DRI	Zr	40	0.000	0.057	0.041	0.006	0.124	0.036	-----
blank filter	T08-12408	DRI	Nb	41	0.013	0.044	0.031	0.000	0.012	0.037	-----
blank filter	T08-12408	DRI	Mo	42	0.000	0.039	0.028	0.000	0.015	0.047	-----
blank filter	T08-12408	DRI	Ag	47	0.000	0.069	0.049	0.000	0.045	0.135	-----
blank filter	T08-12408	DRI	Cd	48	0.009	0.086	0.060	0.000	0.047	0.141	-----
blank filter	T08-12408	DRI	In	49	0.000	0.051	0.036	0.000	0.050	0.219	-----
blank filter	T08-12408	DRI	Sn	50	0.000	0.064	0.045	0.000	0.088	0.342	-----
blank filter	T08-12408	DRI	Sb	51	0.000	0.121	0.084	0.034	0.452	0.401	-----
blank filter	T08-12408	DRI	Cs	55	0.000	0.020	0.014	0.000	0.030	0.110	-----
blank filter	T08-12408	DRI	Ba	56	0.000	0.010	0.007	0.000	0.028	0.103	-----
blank filter	T08-12408	DRI	La	57	0.000	0.015	0.010	0.000	0.023	0.082	-----
blank filter	T08-12408	DRI	Ce	58	0.000	0.021	0.015	0.000	0.023	0.080	-----
blank filter	T08-12408	DRI	Sm	62	0.000	0.030	0.021	0.000	0.014	0.052	-----
blank filter	T08-12408	DRI	Eu	63	0.000	0.107	0.075	0.000	0.013	0.045	-----
blank filter	T08-12408	DRI	Tb	65	0.000	0.036	0.026	0.000	0.014	0.040	-----
blank filter	T08-12408	DRI	Hf	72	0.000	0.235	0.164	0.000	0.014	0.045	-----
blank filter	T08-12408	DRI	Ta	73	0.035	0.196	0.137	0.000	0.034	0.077	-----
blank filter	T08-12408	DRI	W	74	0.000	0.285	0.167	0.000	0.026	0.087	-----
blank filter	T08-12408	DRI	Ir	77	0.000	0.061	0.043	0.000	0.024	0.076	-----
blank filter	T08-12408	DRI	Au	79	0.000	0.130	0.092	0.000	0.017	0.051	-----
blank filter	T08-12408	DRI	Hg	80	0.000	0.039	0.028	0.076	0.055	0.152	-----
blank filter	T08-12408	DRI	Pb	82	0.000	0.043	0.030	0.007	0.018	0.056	-----
blank filter	T08-12409	ODEQ	Na	11	-----	-----	-----	0.000	0.118	0.342	-----
blank filter	T08-12409	ODEQ	Mg	12	-----	-----	-----	0.000	0.040	0.115	-----
blank filter	T08-12409	ODEQ	Al	13	0.059	0.140	0.418	0.037	0.090	0.267	-----
blank filter	T08-12409	ODEQ	Si	14	-0.022	0.076	0.226	0.000	0.050	0.139	-----
blank filter	T08-12409	ODEQ	P	15	0.017	0.038	0.113	0.000	0.041	0.116	-----
blank filter	T08-12409	ODEQ	S	16	0.010	0.047	0.136	0.000	0.025	0.073	-----
blank filter	T08-12409	ODEQ	Cl	17	-0.046	0.040	0.124	0.000	0.021	0.056	-----
blank filter	T08-12409	ODEQ	K	19	0.004	0.021	0.062	0.000	0.016	0.044	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12409	ODEQ	Ca	20	0.015	0.042	0.124	0.000	0.018	0.050	-----
blank filter	T08-12409	ODEQ	Sc	21	-----	-----	-----	0.000	0.025	0.069	-----
blank filter	T08-12409	ODEQ	Ti	22	0.030	0.072	0.215	0.000	0.016	0.044	-----
blank filter	T08-12409	ODEQ	V	23	-0.004	0.023	0.069	0.000	0.013	0.032	-----
blank filter	T08-12409	ODEQ	Cr	24	0.006	0.012	0.036	0.000	0.009	0.023	-----
blank filter	T08-12409	ODEQ	Mn	25	-0.022	0.017	0.051	0.000	0.007	0.018	-----
blank filter	T08-12409	ODEQ	Fe	26	-0.002	0.014	0.043	0.000	0.006	0.014	-----
blank filter	T08-12409	ODEQ	Co	27	0.011	0.016	0.047	0.003	0.006	0.013	-----
blank filter	T08-12409	ODEQ	Ni	28	0.004	0.010	0.029	0.000	0.004	0.012	-----
blank filter	T08-12409	ODEQ	Cu	29	-0.004	0.057	0.173	0.003	0.008	0.014	-----
blank filter	T08-12409	ODEQ	Zn	30	-0.003	0.010	0.029	0.000	0.005	0.017	-----
blank filter	T08-12409	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
blank filter	T08-12409	ODEQ	As	33	0.002	0.015	0.046	0.000	0.006	0.018	-----
blank filter	T08-12409	ODEQ	Se	34	-0.001	0.019	0.058	0.000	0.006	0.021	-----
blank filter	T08-12409	ODEQ	Br	35	0.006	0.018	0.054	0.002	0.011	0.024	-----
blank filter	T08-12409	ODEQ	Rb	37	0.005	0.016	0.050	0.000	0.005	0.015	-----
blank filter	T08-12409	ODEQ	Sr	38	-0.001	0.012	0.036	0.001	0.015	0.028	-----
blank filter	T08-12409	ODEQ	Y	39	-----	-----	-----	0.000	0.007	0.027	-----
blank filter	T08-12409	ODEQ	Zr	40	0.001	0.018	0.055	0.000	0.081	0.036	-----
blank filter	T08-12409	ODEQ	Nb	41	-----	-----	-----	0.000	0.013	0.037	-----
blank filter	T08-12409	ODEQ	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
blank filter	T08-12409	ODEQ	Ag	47	-0.010	0.039	0.113	0.000	0.045	0.135	-----
blank filter	T08-12409	ODEQ	Cd	48	0.012	0.041	0.124	0.000	0.047	0.141	-----
blank filter	T08-12409	ODEQ	In	49	-0.005	0.045	0.136	0.000	0.069	0.219	-----
blank filter	T08-12409	ODEQ	Sn	50	0.021	0.075	0.226	0.000	0.088	0.342	-----
blank filter	T08-12409	ODEQ	Sb	51	0.001	0.068	0.203	0.000	0.105	0.401	-----
blank filter	T08-12409	ODEQ	Cs	55	0.079	0.112	0.328	0.000	0.042	0.110	-----
blank filter	T08-12409	ODEQ	Ba	56	0.108	0.156	0.463	0.000	0.039	0.103	-----
blank filter	T08-12409	ODEQ	La	57	-----	-----	-----	0.000	0.032	0.082	-----
blank filter	T08-12409	ODEQ	Ce	58	0.272	0.259	0.780	0.000	0.032	0.080	-----
blank filter	T08-12409	ODEQ	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
blank filter	T08-12409	ODEQ	Eu	63	-----	-----	-----	0.000	0.013	0.045	-----
blank filter	T08-12409	ODEQ	Tb	65	-----	-----	-----	0.003	0.015	0.040	-----
blank filter	T08-12409	ODEQ	Hf	72	-----	-----	-----	0.000	0.016	0.045	-----
blank filter	T08-12409	ODEQ	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12409	ODEQ	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12409	ODEQ	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12409	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
blank filter	T08-12409	ODEQ	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
blank filter	T08-12409	ODEQ	Pb	82	-0.002	0.040	0.124	0.002	0.019	0.056	-----
blank filter	T08-12410	ODEQ	Na	11	-----	-----	-----	0.000	0.113	0.342	-----
blank filter	T08-12410	ODEQ	Mg	12	-----	-----	-----	0.000	0.038	0.115	-----
blank filter	T08-12410	ODEQ	Al	13	0.030	0.140	0.418	0.000	0.083	0.267	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12410	ODEQ	Si	14	-0.069	0.077	0.226	0.000	0.050	0.139	-----
blank filter	T08-12410	ODEQ	P	15	-0.004	0.037	0.112	0.000	0.041	0.116	-----
blank filter	T08-12410	ODEQ	S	16	0.001	0.046	0.136	0.000	0.025	0.073	-----
blank filter	T08-12410	ODEQ	Cl	17	-0.018	0.039	0.113	0.000	0.018	0.056	-----
blank filter	T08-12410	ODEQ	K	19	0.013	0.020	0.060	0.000	0.015	0.044	-----
blank filter	T08-12410	ODEQ	Ca	20	0.000	0.042	0.124	0.000	0.016	0.050	-----
blank filter	T08-12410	ODEQ	Sc	21	-----	-----	-----	0.000	0.023	0.069	-----
blank filter	T08-12410	ODEQ	Ti	22	0.031	0.071	0.215	0.001	0.020	0.044	-----
blank filter	T08-12410	ODEQ	V	23	0.009	0.023	0.069	0.000	0.009	0.032	-----
blank filter	T08-12410	ODEQ	Cr	24	0.012	0.012	0.036	0.000	0.007	0.023	-----
blank filter	T08-12410	ODEQ	Mn	25	-0.027	0.017	0.052	0.000	0.007	0.018	-----
blank filter	T08-12410	ODEQ	Fe	26	-0.036	0.015	0.043	0.000	0.004	0.014	-----
blank filter	T08-12410	ODEQ	Co	27	-0.014	0.016	0.047	0.000	0.004	0.013	-----
blank filter	T08-12410	ODEQ	Ni	28	-0.015	0.010	0.029	0.000	0.004	0.012	-----
blank filter	T08-12410	ODEQ	Cu	29	0.000	0.057	0.170	0.000	0.004	0.014	-----
blank filter	T08-12410	ODEQ	Zn	30	-0.003	0.010	0.029	0.000	0.005	0.017	-----
blank filter	T08-12410	ODEQ	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
blank filter	T08-12410	ODEQ	As	33	0.002	0.015	0.045	0.000	0.006	0.018	-----
blank filter	T08-12410	ODEQ	Se	34	0.000	0.019	0.058	0.000	0.006	0.021	-----
blank filter	T08-12410	ODEQ	Br	35	-0.005	0.018	0.053	0.000	0.006	0.024	-----
blank filter	T08-12410	ODEQ	Rb	37	-0.006	0.016	0.049	0.000	0.005	0.015	-----
blank filter	T08-12410	ODEQ	Sr	38	0.003	0.011	0.034	0.009	0.015	0.028	-----
blank filter	T08-12410	ODEQ	Y	39	-----	-----	-----	0.000	0.008	0.027	-----
blank filter	T08-12410	ODEQ	Zr	40	0.004	0.018	0.054	0.000	0.081	0.036	-----
blank filter	T08-12410	ODEQ	Nb	41	-----	-----	-----	0.000	0.012	0.037	-----
blank filter	T08-12410	ODEQ	Mo	42	-----	-----	-----	0.000	0.016	0.047	-----
blank filter	T08-12410	ODEQ	Ag	47	-0.068	0.039	0.113	0.000	0.045	0.135	-----
blank filter	T08-12410	ODEQ	Cd	48	-0.024	0.042	0.124	0.000	0.047	0.141	-----
blank filter	T08-12410	ODEQ	In	49	-0.092	0.046	0.136	0.000	0.050	0.219	-----
blank filter	T08-12410	ODEQ	Sn	50	0.026	0.075	0.226	0.000	0.088	0.342	-----
blank filter	T08-12410	ODEQ	Sb	51	0.092	0.069	0.203	0.000	0.105	0.401	-----
blank filter	T08-12410	ODEQ	Cs	55	-0.097	0.110	0.328	0.000	0.042	0.110	-----
blank filter	T08-12410	ODEQ	Ba	56	-0.049	0.153	0.463	0.000	0.039	0.103	-----
blank filter	T08-12410	ODEQ	La	57	-----	-----	-----	0.000	0.032	0.082	-----
blank filter	T08-12410	ODEQ	Ce	58	0.034	0.254	0.757	0.000	0.023	0.080	-----
blank filter	T08-12410	ODEQ	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
blank filter	T08-12410	ODEQ	Eu	63	-----	-----	-----	0.000	0.013	0.045	-----
blank filter	T08-12410	ODEQ	Tb	65	-----	-----	-----	0.000	0.014	0.040	-----
blank filter	T08-12410	ODEQ	Hf	72	-----	-----	-----	0.000	0.014	0.045	-----
blank filter	T08-12410	ODEQ	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12410	ODEQ	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12410	ODEQ	Ir	77	-----	-----	-----	0.003	0.035	0.076	-----
blank filter	T08-12410	ODEQ	Au	79	-----	-----	-----	0.000	0.017	0.051	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12410	ODEQ	Hg	80	-----	-----	-----	0.003	0.058	0.152	-----
blank filter	T08-12410	ODEQ	Pb	82	-0.002	0.040	0.124	0.006	0.026	0.056	-----
blank filter	T08-12411	AQMD	Na	11	-----	-----	-----	0.000	0.107	0.342	-----
blank filter	T08-12411	AQMD	Mg	12	0.402	-----	2.016	0.000	0.036	0.115	-----
blank filter	T08-12411	AQMD	Al	13	ND	-----	1.440	0.000	0.083	0.267	-----
blank filter	T08-12411	AQMD	Si	14	ND	-----	1.920	0.016	0.038	0.139	-----
blank filter	T08-12411	AQMD	P	15	0.018	-----	1.902	0.000	0.034	0.116	-----
blank filter	T08-12411	AQMD	S	16	ND	-----	0.301	0.000	0.021	0.073	-----
blank filter	T08-12411	AQMD	Cl	17	0.474	-----	0.209	0.000	0.015	0.056	-----
blank filter	T08-12411	AQMD	K	19	0.000	-----	0.073	0.000	0.013	0.044	-----
blank filter	T08-12411	AQMD	Ca	20	ND	-----	0.080	0.000	0.015	0.050	-----
blank filter	T08-12411	AQMD	Sc	21	ND	-----	0.072	0.000	0.021	0.069	-----
blank filter	T08-12411	AQMD	Ti	22	0.012	-----	0.074	0.000	0.012	0.044	-----
blank filter	T08-12411	AQMD	V	23	ND	-----	0.084	0.000	0.009	0.032	-----
blank filter	T08-12411	AQMD	Cr	24	ND	-----	0.072	0.000	0.007	0.023	-----
blank filter	T08-12411	AQMD	Mn	25	ND	-----	0.084	0.000	0.005	0.018	-----
blank filter	T08-12411	AQMD	Fe	26	ND	-----	0.042	0.000	0.004	0.014	-----
blank filter	T08-12411	AQMD	Co	27	ND	-----	0.024	0.000	0.004	0.013	-----
blank filter	T08-12411	AQMD	Ni	28	0.006	-----	0.016	0.000	0.004	0.012	-----
blank filter	T08-12411	AQMD	Cu	29	0.030	-----	0.021	0.000	0.004	0.014	-----
blank filter	T08-12411	AQMD	Zn	30	ND	-----	0.025	0.009	0.007	0.017	-----
blank filter	T08-12411	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
blank filter	T08-12411	AQMD	As	33	ND	-----	0.156	0.000	0.006	0.018	-----
blank filter	T08-12411	AQMD	Se	34	ND	-----	0.144	0.000	0.006	0.021	-----
blank filter	T08-12411	AQMD	Br	35	ND	-----	0.036	0.014	0.010	0.024	-----
blank filter	T08-12411	AQMD	Rb	37	0.018	-----	0.084	0.000	0.005	0.015	-----
blank filter	T08-12411	AQMD	Sr	38	ND	-----	0.022	0.003	0.014	0.028	-----
blank filter	T08-12411	AQMD	Y	39	0.018	-----	0.084	0.000	0.007	0.027	-----
blank filter	T08-12411	AQMD	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
blank filter	T08-12411	AQMD	Nb	41	ND	-----	0.021	0.000	0.011	0.037	-----
blank filter	T08-12411	AQMD	Mo	42	ND	-----	0.132	0.000	0.015	0.047	-----
blank filter	T08-12411	AQMD	Ag	47	ND	-----	0.228	0.000	0.045	0.135	-----
blank filter	T08-12411	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
blank filter	T08-12411	AQMD	In	49	ND	-----	0.252	0.000	0.050	0.219	-----
blank filter	T08-12411	AQMD	Sn	50	ND	-----	0.036	0.000	0.088	0.342	-----
blank filter	T08-12411	AQMD	Sb	51	ND	-----	0.012	0.000	0.105	0.401	-----
blank filter	T08-12411	AQMD	Cs	55	ND	-----	0.636	0.000	0.030	0.110	-----
blank filter	T08-12411	AQMD	Ba	56	ND	-----	0.084	0.000	0.028	0.103	-----
blank filter	T08-12411	AQMD	La	57	ND	-----	0.348	0.000	0.023	0.082	-----
blank filter	T08-12411	AQMD	Ce	58	-----	-----	-----	0.000	0.023	0.080	-----
blank filter	T08-12411	AQMD	Sm	62	-----	-----	-----	0.000	0.014	0.052	-----
blank filter	T08-12411	AQMD	Eu	63	-----	-----	-----	0.006	0.016	0.045	-----
blank filter	T08-12411	AQMD	Tb	65	-----	-----	-----	0.000	0.014	0.040	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12411	AQMD	Hf	72	-----	-----	-----	0.000	0.014	0.045	-----
blank filter	T08-12411	AQMD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12411	AQMD	W	74	-----	-----	-----	0.023	0.038	0.087	-----
blank filter	T08-12411	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12411	AQMD	Au	79	ND	-----	0.156	0.000	0.017	0.051	-----
blank filter	T08-12411	AQMD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
blank filter	T08-12411	AQMD	Pb	82	ND	-----	0.012	0.000	0.016	0.056	-----
blank filter	T08-12412	AQMD	Na	11	-----	-----	-----	0.000	0.107	0.342	-----
blank filter	T08-12412	AQMD	Mg	12	0.288	-----	2.016	0.000	0.036	0.115	-----
blank filter	T08-12412	AQMD	Al	13	ND	-----	1.440	0.000	0.083	0.267	-----
blank filter	T08-12412	AQMD	Si	14	ND	-----	1.920	0.000	0.041	0.139	-----
blank filter	T08-12412	AQMD	P	15	0.042	-----	1.902	0.000	0.034	0.116	-----
blank filter	T08-12412	AQMD	S	16	ND	-----	0.301	0.000	0.021	0.073	-----
blank filter	T08-12412	AQMD	Cl	17	0.456	-----	0.209	0.000	0.015	0.056	-----
blank filter	T08-12412	AQMD	K	19	0.000	-----	0.073	0.000	0.014	0.044	-----
blank filter	T08-12412	AQMD	Ca	20	ND	-----	0.080	0.000	0.015	0.050	-----
blank filter	T08-12412	AQMD	Sc	21	ND	-----	0.072	0.000	0.021	0.069	-----
blank filter	T08-12412	AQMD	Ti	22	0.018	-----	0.074	0.000	0.012	0.044	-----
blank filter	T08-12412	AQMD	V	23	0.012	-----	0.084	0.000	0.009	0.032	-----
blank filter	T08-12412	AQMD	Cr	24	ND	-----	0.072	0.000	0.007	0.023	-----
blank filter	T08-12412	AQMD	Mn	25	ND	-----	0.084	0.005	0.007	0.018	-----
blank filter	T08-12412	AQMD	Fe	26	ND	-----	0.042	0.000	0.004	0.014	-----
blank filter	T08-12412	AQMD	Co	27	ND	-----	0.024	0.000	0.004	0.013	-----
blank filter	T08-12412	AQMD	Ni	28	0.012	-----	0.016	0.003	0.004	0.012	-----
blank filter	T08-12412	AQMD	Cu	29	0.018	-----	0.021	0.000	0.004	0.014	-----
blank filter	T08-12412	AQMD	Zn	30	ND	-----	0.025	0.002	0.007	0.017	-----
blank filter	T08-12412	AQMD	Ga	31	ND	-----	0.108	0.000	0.009	0.027	-----
blank filter	T08-12412	AQMD	As	33	ND	-----	0.156	0.000	0.006	0.018	-----
blank filter	T08-12412	AQMD	Se	34	ND	-----	0.144	0.000	0.006	0.021	-----
blank filter	T08-12412	AQMD	Br	35	ND	-----	0.036	0.000	0.006	0.024	-----
blank filter	T08-12412	AQMD	Rb	37	0.018	-----	0.084	0.000	0.005	0.015	-----
blank filter	T08-12412	AQMD	Sr	38	ND	-----	0.022	0.000	0.006	0.028	-----
blank filter	T08-12412	AQMD	Y	39	ND	-----	0.084	0.005	0.016	0.027	-----
blank filter	T08-12412	AQMD	Zr	40	-----	-----	-----	0.000	0.081	0.036	-----
blank filter	T08-12412	AQMD	Nb	41	ND	-----	0.021	0.000	0.011	0.037	-----
blank filter	T08-12412	AQMD	Mo	42	ND	-----	0.132	0.000	0.015	0.047	-----
blank filter	T08-12412	AQMD	Ag	47	ND	-----	0.228	0.000	0.045	0.135	-----
blank filter	T08-12412	AQMD	Cd	48	ND	-----	0.216	0.000	0.047	0.141	-----
blank filter	T08-12412	AQMD	In	49	ND	-----	0.252	0.000	0.050	0.219	-----
blank filter	T08-12412	AQMD	Sn	50	ND	-----	0.036	0.000	0.088	0.342	-----
blank filter	T08-12412	AQMD	Sb	51	ND	-----	0.012	0.000	0.105	0.401	-----
blank filter	T08-12412	AQMD	Cs	55	ND	-----	0.636	0.000	0.030	0.110	-----
blank filter	T08-12412	AQMD	Ba	56	ND	-----	0.084	0.000	0.039	0.103	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12412	AQMD	La	57	ND	-----	0.348	0.000	0.023	0.082	-----
blank filter	T08-12412	AQMD	Ce	58	-----	-----	-----	0.000	0.023	0.080	-----
blank filter	T08-12412	AQMD	Sm	62	-----	-----	-----	0.000	0.014	0.052	-----
blank filter	T08-12412	AQMD	Eu	63	-----	-----	-----	0.000	0.013	0.045	-----
blank filter	T08-12412	AQMD	Tb	65	-----	-----	-----	0.000	0.010	0.040	-----
blank filter	T08-12412	AQMD	Hf	72	-----	-----	-----	0.000	0.014	0.045	-----
blank filter	T08-12412	AQMD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12412	AQMD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12412	AQMD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12412	AQMD	Au	79	ND	-----	0.156	0.000	0.017	0.051	-----
blank filter	T08-12412	AQMD	Hg	80	-----	-----	-----	0.024	0.054	0.152	-----
blank filter	T08-12412	AQMD	Pb	82	ND	-----	0.012	0.000	0.016	0.056	-----
blank filter	T08-12413	UCD	Na	11	0.000	0.000	0.908	0.000	0.107	0.342	-----
blank filter	T08-12413	UCD	Mg	12	0.000	0.000	0.482	0.000	0.038	0.115	-----
blank filter	T08-12413	UCD	Al	13	0.578	0.210	0.163	0.000	0.083	0.267	-----
blank filter	T08-12413	UCD	Si	14	0.308	0.065	0.086	0.000	0.041	0.139	-----
blank filter	T08-12413	UCD	P	15	0.104	0.029	0.058	0.000	0.034	0.116	-----
blank filter	T08-12413	UCD	S	16	0.000	0.000	0.035	0.000	0.021	0.073	-----
blank filter	T08-12413	UCD	Cl	17	0.000	0.000	0.025	0.000	0.018	0.056	-----
blank filter	T08-12413	UCD	K	19	0.000	0.000	0.016	0.000	0.014	0.044	-----
blank filter	T08-12413	UCD	Ca	20	0.033	0.007	0.008	0.000	0.016	0.050	-----
blank filter	T08-12413	UCD	Sc	21	-----	-----	-----	0.000	0.021	0.069	-----
blank filter	T08-12413	UCD	Ti	22	0.010	0.002	0.004	0.000	0.012	0.044	-----
blank filter	T08-12413	UCD	V	23	0.000	0.000	0.003	0.000	0.009	0.032	-----
blank filter	T08-12413	UCD	Cr	24	0.000	0.000	0.003	0.000	0.007	0.023	-----
blank filter	T08-12413	UCD	Mn	25	0.000	0.000	0.004	0.000	0.005	0.018	-----
blank filter	T08-12413	UCD	Fe	26	0.007	0.002	0.006	0.000	0.004	0.014	-----
blank filter	T08-12413	UCD	Co	27	-----	-----	-----	0.000	0.004	0.013	-----
blank filter	T08-12413	UCD	Ni	28	0.000	0.000	0.005	0.000	0.004	0.012	-----
blank filter	T08-12413	UCD	Cu	29	0.000	0.000	0.005	0.000	0.004	0.014	-----
blank filter	T08-12413	UCD	Zn	30	0.000	0.000	0.003	0.000	0.005	0.017	-----
blank filter	T08-12413	UCD	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
blank filter	T08-12413	UCD	As	33	0.000	0.000	0.011	0.000	0.006	0.018	-----
blank filter	T08-12413	UCD	Se	34	0.000	0.000	0.003	0.008	0.011	0.021	-----
blank filter	T08-12413	UCD	Br	35	0.000	0.000	0.004	0.005	0.011	0.024	-----
blank filter	T08-12413	UCD	Rb	37	0.000	0.000	0.008	0.000	0.005	0.015	-----
blank filter	T08-12413	UCD	Sr	38	0.000	0.000	0.010	0.000	0.006	0.028	-----
blank filter	T08-12413	UCD	Y	39	-----	-----	-----	0.003	0.016	0.027	-----
blank filter	T08-12413	UCD	Zr	40	0.008	0.005	0.018	0.000	0.081	0.036	-----
blank filter	T08-12413	UCD	Nb	41	-----	-----	-----	0.000	0.012	0.037	-----
blank filter	T08-12413	UCD	Mo	42	-----	-----	-----	0.000	0.014	0.047	-----
blank filter	T08-12413	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
blank filter	T08-12413	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12413	UCD	In	49	-----	-----	-----	0.000	0.050	0.219	-----
blank filter	T08-12413	UCD	Sn	50	-----	-----	-----	0.000	0.088	0.342	-----
blank filter	T08-12413	UCD	Sb	51	-----	-----	-----	0.000	0.105	0.401	-----
blank filter	T08-12413	UCD	Cs	55	-----	-----	-----	0.000	0.030	0.110	-----
blank filter	T08-12413	UCD	Ba	56	-----	-----	-----	0.000	0.028	0.103	-----
blank filter	T08-12413	UCD	La	57	-----	-----	-----	0.000	0.023	0.082	-----
blank filter	T08-12413	UCD	Ce	58	-----	-----	-----	0.000	0.023	0.080	-----
blank filter	T08-12413	UCD	Sm	62	-----	-----	-----	0.000	0.014	0.052	-----
blank filter	T08-12413	UCD	Eu	63	-----	-----	-----	0.000	0.013	0.045	-----
blank filter	T08-12413	UCD	Tb	65	-----	-----	-----	0.000	0.010	0.040	-----
blank filter	T08-12413	UCD	Hf	72	-----	-----	-----	0.000	0.014	0.045	-----
blank filter	T08-12413	UCD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12413	UCD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12413	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12413	UCD	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
blank filter	T08-12413	UCD	Hg	80	-----	-----	-----	0.007	0.060	0.152	-----
blank filter	T08-12413	UCD	Pb	82	0.034	0.003	0.006	0.000	0.016	0.056	-----
blank filter	T08-12414	UCD	Na	11	0.000	0.000	0.956	0.000	0.113	0.342	-----
blank filter	T08-12414	UCD	Mg	12	0.000	0.000	0.515	0.000	0.038	0.115	-----
blank filter	T08-12414	UCD	Al	13	0.318	0.103	0.174	0.000	0.101	0.267	-----
blank filter	T08-12414	UCD	Si	14	0.000	0.000	0.093	0.000	0.050	0.139	-----
blank filter	T08-12414	UCD	P	15	0.110	0.030	0.062	0.000	0.041	0.116	-----
blank filter	T08-12414	UCD	S	16	0.000	0.000	0.038	0.000	0.025	0.073	-----
blank filter	T08-12414	UCD	Cl	17	0.150	0.033	0.028	0.000	0.018	0.056	-----
blank filter	T08-12414	UCD	K	19	0.000	0.000	0.017	0.000	0.015	0.044	-----
blank filter	T08-12414	UCD	Ca	20	0.063	0.017	0.009	0.000	0.017	0.050	-----
blank filter	T08-12414	UCD	Sc	21	-----	-----	-----	0.000	0.023	0.069	-----
blank filter	T08-12414	UCD	Ti	22	0.000	0.000	0.005	0.000	0.016	0.044	-----
blank filter	T08-12414	UCD	V	23	0.000	0.000	0.004	0.000	0.009	0.032	-----
blank filter	T08-12414	UCD	Cr	24	0.005	0.003	0.004	0.000	0.007	0.023	-----
blank filter	T08-12414	UCD	Mn	25	0.008	0.002	0.004	0.000	0.005	0.018	-----
blank filter	T08-12414	UCD	Fe	26	0.012	0.007	0.007	0.000	0.004	0.014	-----
blank filter	T08-12414	UCD	Co	27	-----	-----	-----	0.003	0.005	0.013	-----
blank filter	T08-12414	UCD	Ni	28	0.000	0.000	0.005	0.000	0.004	0.012	-----
blank filter	T08-12414	UCD	Cu	29	0.008	0.003	0.005	0.000	0.004	0.014	-----
blank filter	T08-12414	UCD	Zn	30	0.000	0.000	0.003	0.000	0.005	0.017	-----
blank filter	T08-12414	UCD	Ga	31	-----	-----	-----	0.000	0.009	0.027	-----
blank filter	T08-12414	UCD	As	33	0.000	0.000	0.010	0.000	0.006	0.018	-----
blank filter	T08-12414	UCD	Se	34	0.004	0.002	0.003	0.000	0.006	0.021	-----
blank filter	T08-12414	UCD	Br	35	0.000	0.000	0.004	0.000	0.006	0.024	-----
blank filter	T08-12414	UCD	Rb	37	0.003	0.002	0.008	0.000	0.005	0.015	-----
blank filter	T08-12414	UCD	Sr	38	0.008	0.003	0.011	0.000	0.006	0.028	-----
blank filter	T08-12414	UCD	Y	39	-----	-----	-----	0.000	0.007	0.027	-----

Table 14. XRF PT Results (47-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			RTI (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12414	UCD	Zr	40	0.000	0.000	0.019	0.000	0.081	0.036	-----
blank filter	T08-12414	UCD	Nb	41	-----	-----	-----	0.000	0.012	0.037	-----
blank filter	T08-12414	UCD	Mo	42	-----	-----	-----	0.000	0.015	0.047	-----
blank filter	T08-12414	UCD	Ag	47	-----	-----	-----	0.000	0.045	0.135	-----
blank filter	T08-12414	UCD	Cd	48	-----	-----	-----	0.000	0.047	0.141	-----
blank filter	T08-12414	UCD	In	49	-----	-----	-----	0.000	0.050	0.219	-----
blank filter	T08-12414	UCD	Sn	50	-----	-----	-----	0.000	0.088	0.342	-----
blank filter	T08-12414	UCD	Sb	51	-----	-----	-----	0.000	0.105	0.401	-----
blank filter	T08-12414	UCD	Cs	55	-----	-----	-----	0.000	0.042	0.110	-----
blank filter	T08-12414	UCD	Ba	56	-----	-----	-----	0.000	0.028	0.103	-----
blank filter	T08-12414	UCD	La	57	-----	-----	-----	0.000	0.023	0.082	-----
blank filter	T08-12414	UCD	Ce	58	-----	-----	-----	0.000	0.023	0.080	-----
blank filter	T08-12414	UCD	Sm	62	-----	-----	-----	0.000	0.019	0.052	-----
blank filter	T08-12414	UCD	Eu	63	-----	-----	-----	0.000	0.013	0.045	-----
blank filter	T08-12414	UCD	Tb	65	-----	-----	-----	0.000	0.014	0.040	-----
blank filter	T08-12414	UCD	Hf	72	-----	-----	-----	0.000	0.014	0.045	-----
blank filter	T08-12414	UCD	Ta	73	-----	-----	-----	0.000	0.034	0.077	-----
blank filter	T08-12414	UCD	W	74	-----	-----	-----	0.000	0.026	0.087	-----
blank filter	T08-12414	UCD	Ir	77	-----	-----	-----	0.000	0.024	0.076	-----
blank filter	T08-12414	UCD	Au	79	-----	-----	-----	0.000	0.017	0.051	-----
blank filter	T08-12414	UCD	Hg	80	-----	-----	-----	0.000	0.044	0.152	-----
blank filter	T08-12414	UCD	Pb	82	0.029	0.003	0.006	0.000	0.016	0.056	-----

**** Median was calculated only when the result from all reporting labs was greater than three times the uncertainty.***

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12415	DRI	Na	11	3.387	0.460	0.270	5.212	0.690	0.739	-----
80-hr event	T08-12415	DRI	Mg	12	0.549	0.216	0.103	0.000	0.000	0.402	-----
80-hr event	T08-12415	DRI	Al	13	0.941	0.039	0.023	0.894	0.105	0.130	-----
80-hr event	T08-12415	DRI	Si	14	2.732	0.054	0.027	5.023	0.272	0.066	4.592
80-hr event	T08-12415	DRI	P	15	0.919	0.015	0.008	0.000	0.000	0.041	-----
80-hr event	T08-12415	DRI	S	16	27.347	0.189	0.022	28.424	1.432	0.025	28.739
80-hr event	T08-12415	DRI	Cl	17	0.108	0.008	0.006	0.000	0.000	0.016	-----
80-hr event	T08-12415	DRI	K	19	1.646	0.011	0.005	1.720	0.090	0.007	1.736
80-hr event	T08-12415	DRI	Ca	20	0.973	0.010	0.006	1.131	0.060	0.004	1.000
80-hr event	T08-12415	DRI	Ti	22	0.104	0.006	0.020	0.102	0.007	0.002	-----
80-hr event	T08-12415	DRI	V	23	0.017	0.000	0.004	0.017	0.003	0.001	-----
80-hr event	T08-12415	DRI	Cr	24	0.006	0.005	0.000	0.004	0.001	0.001	-----
80-hr event	T08-12415	DRI	Mn	25	0.024	0.010	0.003	0.042	0.003	0.001	-----
80-hr event	T08-12415	DRI	Fe	26	1.558	0.016	0.007	1.524	0.077	0.001	1.480
80-hr event	T08-12415	DRI	Ni	28	0.008	0.002	0.009	0.006	0.001	0.002	-----
80-hr event	T08-12415	DRI	Cu	29	0.031	0.004	0.000	0.036	0.002	0.002	-----
80-hr event	T08-12415	DRI	Zn	30	0.165	0.005	0.002	0.158	0.008	0.001	0.139
80-hr event	T08-12415	DRI	As	33	0.000	0.000	0.003	0.014	0.002	0.004	-----
80-hr event	T08-12415	DRI	Se	34	0.006	0.010	0.003	0.015	0.001	0.001	-----
80-hr event	T08-12415	DRI	Br	35	0.105	0.008	0.011	0.124	0.007	0.001	0.113
80-hr event	T08-12415	DRI	Rb	37	0.000	0.005	0.000	0.008	0.002	0.002	-----
80-hr event	T08-12415	DRI	Sr	38	0.004	0.010	0.007	0.013	0.002	0.003	-----
80-hr event	T08-12415	DRI	Zr	40	0.000	0.017	0.005	0.000	0.000	0.005	-----
80-hr event	T08-12415	DRI	Pb	82	0.060	0.013	0.004	0.042	0.004	0.002	-----
80-hr event	T08-12417	DRI	Na	11	3.541	0.463	0.007	5.273	0.723	0.738	-----
80-hr event	T08-12417	DRI	Mg	12	0.581	0.216	0.005	0.000	0.000	0.398	-----
80-hr event	T08-12417	DRI	Al	13	0.698	0.038	0.012	0.831	0.096	0.129	-----
80-hr event	T08-12417	DRI	Si	14	2.533	0.053	0.009	4.626	0.251	0.066	4.592
80-hr event	T08-12417	DRI	P	15	0.930	0.015	0.008	0.000	0.000	0.040	-----
80-hr event	T08-12417	DRI	S	16	26.319	0.183	0.014	26.388	1.331	0.025	28.739
80-hr event	T08-12417	DRI	Cl	17	0.131	0.008	0.018	0.000	0.000	0.016	-----
80-hr event	T08-12417	DRI	K	19	1.568	0.011	0.011	1.555	0.081	0.008	1.736
80-hr event	T08-12417	DRI	Ca	20	0.959	0.010	0.013	1.089	0.058	0.004	1.000
80-hr event	T08-12417	DRI	Ti	22	0.113	0.006	0.025	0.090	0.006	0.002	-----
80-hr event	T08-12417	DRI	V	23	0.016	0.000	0.004	0.010	0.002	0.002	-----
80-hr event	T08-12417	DRI	Cr	24	0.015	0.005	0.002	0.000	0.000	0.001	-----
80-hr event	T08-12417	DRI	Mn	25	0.057	0.011	0.003	0.032	0.002	0.001	-----
80-hr event	T08-12417	DRI	Fe	26	1.557	0.016	0.004	1.435	0.073	0.002	1.480
80-hr event	T08-12417	DRI	Ni	28	0.006	0.002	0.006	0.008	0.001	0.002	-----
80-hr event	T08-12417	DRI	Cu	29	0.036	0.004	0.022	0.036	0.002	0.002	-----
80-hr event	T08-12417	DRI	Zn	30	0.134	0.005	0.008	0.127	0.007	0.001	0.139
80-hr event	T08-12417	DRI	As	33	0.000	0.000	0.049	0.015	0.002	0.004	-----

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12417	DRI	Se	34	0.012	0.010	0.041	0.014	0.001	0.001	-----
80-hr event	T08-12417	DRI	Br	35	0.102	0.008	0.050	0.118	0.006	0.001	0.113
80-hr event	T08-12417	DRI	Rb	37	0.002	0.005	0.013	0.008	0.002	0.002	-----
80-hr event	T08-12417	DRI	Sr	38	0.008	0.010	0.027	0.013	0.002	0.003	-----
80-hr event	T08-12417	DRI	Zr	40	0.013	0.017	0.008	0.007	0.003	0.005	-----
80-hr event	T08-12417	DRI	Pb	82	0.059	0.013	0.009	0.033	0.004	0.002	-----
80-hr event	T08-12418	RTI	Na	11	1.204	0.098	0.065	3.694	0.541	0.769	-----
80-hr event	T08-12418	RTI	Mg	12	0.012	0.004	0.024	0.000	0.000	0.418	-----
80-hr event	T08-12418	RTI	Al	13	0.110	0.008	0.051	0.000	0.000	0.134	-----
80-hr event	T08-12418	RTI	Si	14	0.902	0.046	0.027	4.542	0.251	0.067	4.592
80-hr event	T08-12418	RTI	P	15	0.203	0.015	0.010	0.000	0.000	0.041	-----
80-hr event	T08-12418	RTI	S	16	0.000	0.002	0.013	27.428	1.383	0.026	28.739
80-hr event	T08-12418	RTI	Cl	17	0.034	0.003	0.009	0.000	0.000	0.017	-----
80-hr event	T08-12418	RTI	K	19	1.401	0.071	0.009	1.609	0.084	0.007	1.736
80-hr event	T08-12418	RTI	Ca	20	1.768	0.089	0.010	1.060	0.056	0.004	1.000
80-hr event	T08-12418	RTI	Ti	22	0.739	0.056	0.013	0.091	0.006	0.002	-----
80-hr event	T08-12418	RTI	V	23	0.043	0.004	0.009	0.012	0.002	0.002	-----
80-hr event	T08-12418	RTI	Cr	24	7.152	0.593	0.007	0.000	0.000	0.001	-----
80-hr event	T08-12418	RTI	Mn	25	0.008	0.002	0.006	0.033	0.002	0.001	-----
80-hr event	T08-12418	RTI	Fe	26	0.064	0.021	0.007	1.444	0.073	0.002	1.480
80-hr event	T08-12418	RTI	Ni	28	0.039	0.009	0.004	0.006	0.001	0.002	-----
80-hr event	T08-12418	RTI	Cu	29	0.002	0.004	0.006	0.034	0.002	0.002	-----
80-hr event	T08-12418	RTI	Zn	30	27.458	1.376	0.006	0.132	0.007	0.001	0.139
80-hr event	T08-12418	RTI	As	33	0.010	0.003	0.008	0.013	0.003	0.005	-----
80-hr event	T08-12418	RTI	Se	34	4.300	0.287	0.009	0.015	0.001	0.001	-----
80-hr event	T08-12418	RTI	Br	35	0.010	0.004	0.008	0.125	0.007	0.001	0.113
80-hr event	T08-12418	RTI	Rb	37	0.100	0.009	0.009	0.010	0.002	0.002	-----
80-hr event	T08-12418	RTI	Sr	38	0.014	0.004	0.011	0.015	0.002	0.003	-----
80-hr event	T08-12418	RTI	Zr	40	0.139	0.008	0.080	0.012	0.003	0.005	-----
80-hr event	T08-12418	RTI	Pb	82	0.000	0.020	0.017	0.041	0.005	0.002	-----
80-hr event	T08-12419	RTI	Na	11	1.204	0.098	0.065	4.772	0.646	0.730	-----
80-hr event	T08-12419	RTI	Mg	12	0.004	0.004	0.024	0.292	0.140	0.393	-----
80-hr event	T08-12419	RTI	Al	13	0.104	0.008	0.051	0.838	0.095	0.128	-----
80-hr event	T08-12419	RTI	Si	14	0.989	0.050	0.027	4.740	0.256	0.064	4.592
80-hr event	T08-12419	RTI	P	15	0.207	0.014	0.010	0.000	0.000	0.040	-----
80-hr event	T08-12419	RTI	S	16	0.010	0.003	0.013	27.518	1.387	0.025	28.739
80-hr event	T08-12419	RTI	Cl	17	0.034	0.003	0.009	0.000	0.000	0.016	-----
80-hr event	T08-12419	RTI	K	19	1.476	0.075	0.009	1.636	0.086	0.007	1.736
80-hr event	T08-12419	RTI	Ca	20	1.786	0.090	0.010	1.105	0.058	0.004	1.000
80-hr event	T08-12419	RTI	Ti	22	0.677	0.052	0.013	0.096	0.006	0.002	-----
80-hr event	T08-12419	RTI	V	23	0.041	0.004	0.009	0.016	0.002	0.001	-----
80-hr event	T08-12419	RTI	Cr	24	7.152	0.593	0.007	0.003	0.001	0.001	-----
80-hr event	T08-12419	RTI	Mn	25	0.006	0.002	0.006	0.038	0.003	0.001	-----

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
80-hr event	T08-12419	RTI	Fe	26	0.062	0.020	0.007	1.523	0.077	0.001	1.480
80-hr event	T08-12419	RTI	Ni	28	0.044	0.010	0.004	0.008	0.001	0.001	-----
80-hr event	T08-12419	RTI	Cu	29	0.000	0.002	0.006	0.035	0.002	0.001	-----
80-hr event	T08-12419	RTI	Zn	30	27.730	1.389	0.006	0.139	0.008	0.001	0.139
80-hr event	T08-12419	RTI	As	33	0.013	0.003	0.008	0.014	0.002	0.004	-----
80-hr event	T08-12419	RTI	Se	34	4.348	0.290	0.009	0.014	0.001	0.001	-----
80-hr event	T08-12419	RTI	Br	35	0.011	0.004	0.008	0.124	0.007	0.001	0.113
80-hr event	T08-12419	RTI	Rb	37	0.093	0.009	0.009	0.008	0.002	0.002	-----
80-hr event	T08-12419	RTI	Sr	38	0.009	0.004	0.011	0.015	0.002	0.003	-----
80-hr event	T08-12419	RTI	Zr	40	0.145	0.008	0.080	0.000	0.000	0.005	-----
80-hr event	T08-12419	RTI	Pb	82	0.000	0.020	0.017	0.043	0.004	0.001	-----
80-hr event	T08-12420	RTI	Na	11	1.211	0.100	0.065	7.580	1.462	0.799	-----
80-hr event	T08-12420	RTI	Mg	12	0.010	0.004	0.024	0.000	0.000	0.430	-----
80-hr event	T08-12420	RTI	Al	13	0.107	0.008	0.051	0.828	0.097	0.138	-----
80-hr event	T08-12420	RTI	Si	14	1.009	0.051	0.027	4.942	0.267	0.069	4.592
80-hr event	T08-12420	RTI	P	15	0.215	0.015	0.010	0.000	0.000	0.043	-----
80-hr event	T08-12420	RTI	S	16	0.017	0.003	0.013	29.054	1.464	0.027	28.739
80-hr event	T08-12420	RTI	Cl	17	0.037	0.003	0.009	0.000	0.000	0.017	-----
80-hr event	T08-12420	RTI	K	19	1.530	0.077	0.009	1.755	0.092	0.008	1.736
80-hr event	T08-12420	RTI	Ca	20	1.934	0.097	0.010	1.131	0.059	0.004	1.000
80-hr event	T08-12420	RTI	Ti	22	0.724	0.056	0.013	0.100	0.007	0.002	-----
80-hr event	T08-12420	RTI	V	23	0.047	0.004	0.009	0.015	0.003	0.002	-----
80-hr event	T08-12420	RTI	Cr	24	7.747	0.642	0.007	0.003	0.001	0.001	-----
80-hr event	T08-12420	RTI	Mn	25	0.008	0.002	0.006	0.035	0.002	0.001	-----
80-hr event	T08-12420	RTI	Fe	26	0.057	0.021	0.007	1.562	0.079	0.002	1.480
80-hr event	T08-12420	RTI	Ni	28	0.045	0.010	0.004	0.006	0.001	0.002	-----
80-hr event	T08-12420	RTI	Cu	29	0.000	0.002	0.006	0.036	0.002	0.002	-----
80-hr event	T08-12420	RTI	Zn	30	29.567	1.481	0.006	0.140	0.008	0.001	0.139
80-hr event	T08-12420	RTI	As	33	0.014	0.004	0.008	0.021	0.002	0.004	-----
80-hr event	T08-12420	RTI	Se	34	4.589	0.306	0.009	0.014	0.001	0.001	-----
80-hr event	T08-12420	RTI	Br	35	0.012	0.005	0.008	0.133	0.007	0.001	0.113
80-hr event	T08-12420	RTI	Rb	37	0.130	0.011	0.009	0.009	0.002	0.002	-----
80-hr event	T08-12420	RTI	Sr	38	0.015	0.005	0.011	0.012	0.002	0.003	-----
80-hr event	T08-12420	RTI	Zr	40	0.148	0.008	0.080	0.000	0.000	0.005	-----
80-hr event	T08-12420	RTI	Pb	82	0.000	0.020	0.017	0.032	0.003	0.002	-----
112-hr event	T08-12421	DRI	Na	11	4.415	0.483	0.270	2.366	0.675	1.173	-----
112-hr event	T08-12421	DRI	Mg	12	1.212	0.221	0.103	0.000	0.000	0.604	-----
112-hr event	T08-12421	DRI	Al	13	2.655	0.049	0.023	3.759	0.271	0.192	4.130
112-hr event	T08-12421	DRI	Si	14	6.888	0.079	0.027	12.493	0.647	0.096	11.436
112-hr event	T08-12421	DRI	P	15	1.833	0.019	0.008	0.000	0.000	0.058	-----
112-hr event	T08-12421	DRI	S	16	52.051	0.338	0.022	55.510	2.788	0.036	59.849
112-hr event	T08-12421	DRI	Cl	17	0.211	0.008	0.006	0.000	0.000	0.023	-----
112-hr event	T08-12421	DRI	K	19	4.323	0.017	0.005	4.465	0.227	0.010	4.848

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12421	DRI	Ca	20	3.163	0.014	0.006	3.540	0.180	0.006	3.524
112-hr event	T08-12421	DRI	Ti	22	0.335	0.006	0.020	0.296	0.017	0.003	0.299
112-hr event	T08-12421	DRI	V	23	0.038	0.000	0.004	0.031	0.005	0.002	-----
112-hr event	T08-12421	DRI	Cr	24	0.008	0.005	0.000	0.005	0.001	0.002	-----
112-hr event	T08-12421	DRI	Mn	25	0.129	0.011	0.003	0.114	0.007	0.001	0.113
112-hr event	T08-12421	DRI	Fe	26	4.138	0.021	0.007	3.855	0.194	0.002	3.937
112-hr event	T08-12421	DRI	Ni	28	0.005	0.002	0.009	0.005	0.001	0.002	-----
112-hr event	T08-12421	DRI	Cu	29	0.101	0.005	0.000	0.106	0.006	0.002	-----
112-hr event	T08-12421	DRI	Zn	30	0.676	0.006	0.002	0.635	0.032	0.002	0.635
112-hr event	T08-12421	DRI	As	33	0.000	0.000	0.003	0.050	0.005	0.008	-----
112-hr event	T08-12421	DRI	Se	34	0.035	0.010	0.003	0.032	0.002	0.001	-----
112-hr event	T08-12421	DRI	Br	35	0.203	0.008	0.011	0.224	0.012	0.001	0.210
112-hr event	T08-12421	DRI	Rb	37	0.016	0.005	0.000	0.017	0.003	0.002	-----
112-hr event	T08-12421	DRI	Sr	38	0.035	0.010	0.007	0.034	0.002	0.003	-----
112-hr event	T08-12421	DRI	Zr	40	0.022	0.017	0.005	0.000	0.000	0.005	-----
112-hr event	T08-12421	DRI	Pb	82	0.289	0.013	0.004	0.250	0.014	0.002	0.251
112-hr event	T08-12422	DRI	Na	11	4.669	0.489	0.007	0.000	0.000	1.179	-----
112-hr event	T08-12422	DRI	Mg	12	1.081	0.220	0.005	0.000	0.000	0.612	-----
112-hr event	T08-12422	DRI	Al	13	2.900	0.050	0.012	4.062	0.277	0.195	4.130
112-hr event	T08-12422	DRI	Si	14	7.089	0.080	0.009	13.033	0.677	0.097	11.436
112-hr event	T08-12422	DRI	P	15	1.731	0.019	0.008	0.000	0.000	0.059	-----
112-hr event	T08-12422	DRI	S	16	51.928	0.338	0.014	56.006	2.813	0.037	59.849
112-hr event	T08-12422	DRI	Cl	17	0.181	0.008	0.018	0.000	0.000	0.023	-----
112-hr event	T08-12422	DRI	K	19	4.399	0.017	0.011	4.676	0.238	0.010	4.848
112-hr event	T08-12422	DRI	Ca	20	3.320	0.015	0.013	3.815	0.194	0.007	3.524
112-hr event	T08-12422	DRI	Ti	22	0.323	0.006	0.025	0.333	0.019	0.003	0.299
112-hr event	T08-12422	DRI	V	23	0.038	0.000	0.004	0.035	0.006	0.002	-----
112-hr event	T08-12422	DRI	Cr	24	0.008	0.005	0.002	0.004	0.001	0.002	-----
112-hr event	T08-12422	DRI	Mn	25	0.129	0.011	0.003	0.112	0.007	0.002	0.113
112-hr event	T08-12422	DRI	Fe	26	4.240	0.021	0.004	4.091	0.206	0.002	3.937
112-hr event	T08-12422	DRI	Ni	28	0.006	0.002	0.006	0.006	0.001	0.002	-----
112-hr event	T08-12422	DRI	Cu	29	0.113	0.005	0.022	0.112	0.006	0.002	-----
112-hr event	T08-12422	DRI	Zn	30	0.650	0.006	0.008	0.635	0.032	0.002	0.635
112-hr event	T08-12422	DRI	As	33	0.000	0.000	0.049	0.048	0.005	0.008	-----
112-hr event	T08-12422	DRI	Se	34	0.014	0.010	0.041	0.032	0.002	0.001	-----
112-hr event	T08-12422	DRI	Br	35	0.179	0.008	0.050	0.228	0.012	0.001	0.210
112-hr event	T08-12422	DRI	Rb	37	0.007	0.005	0.013	0.017	0.003	0.002	-----
112-hr event	T08-12422	DRI	Sr	38	0.036	0.010	0.027	0.038	0.003	0.003	-----
112-hr event	T08-12422	DRI	Zr	40	0.009	0.017	0.008	0.000	0.000	0.005	-----
112-hr event	T08-12422	DRI	Pb	82	0.259	0.013	0.009	0.249	0.014	0.002	0.251
112-hr event	T08-12423	RTI	Na	11	4.035	0.284	0.065	0.000	0.000	1.178	-----
112-hr event	T08-12423	RTI	Mg	12	0.046	0.008	0.024	0.418	0.221	0.609	-----
112-hr event	T08-12423	RTI	Al	13	0.180	0.012	0.051	3.517	0.239	0.194	4.130

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
112-hr event	T08-12423	RTI	Si	14	3.462	0.174	0.027	12.565	0.649	0.096	11.436
112-hr event	T08-12423	RTI	P	15	0.379	0.024	0.010	0.000	0.000	0.059	-----
112-hr event	T08-12423	RTI	S	16	0.017	0.004	0.013	53.297	2.677	0.037	59.849
112-hr event	T08-12423	RTI	Cl	17	0.111	0.006	0.009	0.000	0.000	0.024	-----
112-hr event	T08-12423	RTI	K	19	3.960	0.199	0.009	4.444	0.226	0.011	4.848
112-hr event	T08-12423	RTI	Ca	20	4.865	0.244	0.010	3.806	0.194	0.007	3.524
112-hr event	T08-12423	RTI	Ti	22	0.411	0.042	0.013	0.298	0.017	0.003	0.299
112-hr event	T08-12423	RTI	V	23	0.121	0.008	0.009	0.033	0.005	0.002	-----
112-hr event	T08-12423	RTI	Cr	24	4.702	0.397	0.007	0.005	0.001	0.002	-----
112-hr event	T08-12423	RTI	Mn	25	0.014	0.002	0.006	0.110	0.007	0.002	0.113
112-hr event	T08-12423	RTI	Fe	26	0.195	0.030	0.007	3.919	0.198	0.002	3.937
112-hr event	T08-12423	RTI	Ni	28	0.235	0.020	0.004	0.006	0.001	0.002	-----
112-hr event	T08-12423	RTI	Cu	29	0.014	0.005	0.006	0.102	0.006	0.002	-----
112-hr event	T08-12423	RTI	Zn	30	53.399	2.674	0.006	0.629	0.032	0.002	0.635
112-hr event	T08-12423	RTI	As	33	0.033	0.005	0.008	0.049	0.005	0.009	-----
112-hr event	T08-12423	RTI	Se	34	11.173	0.739	0.009	0.034	0.002	0.001	-----
112-hr event	T08-12423	RTI	Br	35	0.024	0.006	0.008	0.224	0.012	0.001	0.210
112-hr event	T08-12423	RTI	Rb	37	0.303	0.020	0.009	0.014	0.003	0.002	-----
112-hr event	T08-12423	RTI	Sr	38	0.046	0.007	0.011	0.037	0.003	0.003	-----
112-hr event	T08-12423	RTI	Zr	40	0.680	0.035	0.080	0.000	0.000	0.006	-----
112-hr event	T08-12423	RTI	Pb	82	0.022	0.033	0.017	0.246	0.014	0.002	0.251
100-hr event	T08-12424	DRI	Na	11	4.019	0.474	0.270	0.000	0.000	1.079	-----
100-hr event	T08-12424	DRI	Mg	12	0.753	0.217	0.103	0.000	0.000	0.560	-----
100-hr event	T08-12424	DRI	Al	13	2.227	0.046	0.023	2.771	0.210	0.178	3.153
100-hr event	T08-12424	DRI	Si	14	5.554	0.071	0.027	10.517	0.547	0.088	9.272
100-hr event	T08-12424	DRI	P	15	1.796	0.019	0.008	0.000	0.000	0.054	-----
100-hr event	T08-12424	DRI	S	16	49.255	0.321	0.022	53.862	2.705	0.033	58.031
100-hr event	T08-12424	DRI	Cl	17	0.148	0.008	0.006	0.000	0.000	0.020	-----
100-hr event	T08-12424	DRI	K	19	2.449	0.013	0.005	2.669	0.138	0.009	2.880
100-hr event	T08-12424	DRI	Ca	20	2.012	0.012	0.006	2.345	0.121	0.005	2.278
100-hr event	T08-12424	DRI	Ti	22	0.243	0.006	0.020	0.245	0.014	0.003	0.253
100-hr event	T08-12424	DRI	V	23	0.019	0.000	0.004	0.015	0.004	0.002	-----
100-hr event	T08-12424	DRI	Cr	24	0.009	0.005	0.000	0.018	0.002	0.001	-----
100-hr event	T08-12424	DRI	Mn	25	0.075	0.011	0.003	0.078	0.005	0.001	-----
100-hr event	T08-12424	DRI	Fe	26	2.933	0.019	0.007	2.926	0.148	0.002	2.932
100-hr event	T08-12424	DRI	Ni	28	0.010	0.002	0.009	0.007	0.001	0.002	-----
100-hr event	T08-12424	DRI	Cu	29	0.065	0.005	0.000	0.064	0.004	0.002	-----
100-hr event	T08-12424	DRI	Zn	30	0.708	0.006	0.002	0.684	0.035	0.002	0.691
100-hr event	T08-12424	DRI	As	33	0.000	0.000	0.003	0.040	0.004	0.006	-----
100-hr event	T08-12424	DRI	Se	34	0.007	0.010	0.003	0.030	0.002	0.001	-----
100-hr event	T08-12424	DRI	Br	35	0.105	0.008	0.011	0.146	0.008	0.001	0.136
100-hr event	T08-12424	DRI	Rb	37	0.013	0.005	0.000	0.014	0.003	0.002	-----
100-hr event	T08-12424	DRI	Sr	38	0.024	0.010	0.007	0.027	0.002	0.003	-----

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12424	DRI	Zr	40	0.023	0.017	0.005	0.010	0.003	0.005	-----
100-hr event	T08-12424	DRI	Pb	82	0.135	0.013	0.004	0.097	0.007	0.002	-----
100-hr event	T08-12425	RTI	Na	11	2.955	0.212	0.007	0.000	0.000	1.017	-----
100-hr event	T08-12425	RTI	Mg	12	0.039	0.006	0.005	0.000	0.000	0.540	-----
100-hr event	T08-12425	RTI	Al	13	0.134	0.009	0.012	2.623	0.197	0.174	3.153
100-hr event	T08-12425	RTI	Si	14	2.002	0.101	0.009	10.224	0.532	0.086	9.272
100-hr event	T08-12425	RTI	P	15	0.282	0.019	0.008	0.000	0.000	0.053	-----
100-hr event	T08-12425	RTI	S	16	0.011	0.003	0.014	51.285	2.576	0.033	58.031
100-hr event	T08-12425	RTI	Cl	17	0.070	0.005	0.018	0.000	0.000	0.020	-----
100-hr event	T08-12425	RTI	K	19	2.786	0.140	0.011	2.549	0.132	0.009	2.880
100-hr event	T08-12425	RTI	Ca	20	2.726	0.137	0.013	2.285	0.118	0.005	2.278
100-hr event	T08-12425	RTI	Ti	22	0.136	0.030	0.025	0.234	0.013	0.003	0.253
100-hr event	T08-12425	RTI	V	23	0.085	0.006	0.004	0.019	0.004	0.002	-----
100-hr event	T08-12425	RTI	Cr	24	2.810	0.244	0.002	0.005	0.001	0.001	-----
100-hr event	T08-12425	RTI	Mn	25	0.008	0.002	0.003	0.070	0.004	0.001	-----
100-hr event	T08-12425	RTI	Fe	26	0.155	0.028	0.004	2.855	0.144	0.002	2.932
100-hr event	T08-12425	RTI	Ni	28	0.076	0.013	0.006	0.005	0.001	0.002	-----
100-hr event	T08-12425	RTI	Cu	29	0.005	0.004	0.022	0.064	0.004	0.002	-----
100-hr event	T08-12425	RTI	Zn	30	49.481	2.478	0.008	0.686	0.035	0.002	0.691
100-hr event	T08-12425	RTI	As	33	0.035	0.005	0.049	0.038	0.004	0.006	-----
100-hr event	T08-12425	RTI	Se	34	9.044	0.599	0.041	0.030	0.002	0.001	-----
100-hr event	T08-12425	RTI	Br	35	0.015	0.005	0.050	0.153	0.008	0.001	0.136
100-hr event	T08-12425	RTI	Rb	37	0.256	0.017	0.013	0.009	0.002	0.002	-----
100-hr event	T08-12425	RTI	Sr	38	0.014	0.006	0.027	0.020	0.002	0.003	-----
100-hr event	T08-12425	RTI	Zr	40	0.717	0.036	0.008	0.000	0.000	0.005	-----
100-hr event	T08-12425	RTI	Pb	82	0.000	0.020	0.009	0.100	0.007	0.002	-----
100-hr event	T08-12426	RTI	Na	11	3.302	0.235	0.065	2.448	1.109	1.062	-----
100-hr event	T08-12426	RTI	Mg	12	0.035	0.006	0.024	0.000	0.000	0.558	-----
100-hr event	T08-12426	RTI	Al	13	0.138	0.009	0.051	2.784	0.203	0.179	3.153
100-hr event	T08-12426	RTI	Si	14	2.199	0.111	0.027	10.930	0.567	0.089	9.272
100-hr event	T08-12426	RTI	P	15	0.311	0.020	0.010	0.000	0.000	0.054	-----
100-hr event	T08-12426	RTI	S	16	0.012	0.003	0.013	53.268	2.675	0.033	58.031
100-hr event	T08-12426	RTI	Cl	17	0.077	0.005	0.009	0.000	0.000	0.021	-----
100-hr event	T08-12426	RTI	K	19	2.981	0.150	0.009	2.701	0.139	0.009	2.880
100-hr event	T08-12426	RTI	Ca	20	2.910	0.146	0.010	2.420	0.124	0.005	2.278
100-hr event	T08-12426	RTI	Ti	22	0.166	0.032	0.013	0.257	0.015	0.003	0.253
100-hr event	T08-12426	RTI	V	23	0.087	0.006	0.009	0.019	0.004	0.002	-----
100-hr event	T08-12426	RTI	Cr	24	2.797	0.244	0.007	0.007	0.001	0.001	-----
100-hr event	T08-12426	RTI	Mn	25	0.007	0.002	0.006	0.081	0.005	0.001	-----
100-hr event	T08-12426	RTI	Fe	26	0.122	0.028	0.007	3.007	0.152	0.002	2.932
100-hr event	T08-12426	RTI	Ni	28	0.093	0.014	0.004	0.006	0.001	0.002	-----
100-hr event	T08-12426	RTI	Cu	29	0.000	0.002	0.006	0.065	0.004	0.002	-----
100-hr event	T08-12426	RTI	Zn	30	52.935	2.651	0.006	0.690	0.035	0.002	0.691

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
100-hr event	T08-12426	RTI	As	33	0.036	0.005	0.008	0.035	0.004	0.006	-----
100-hr event	T08-12426	RTI	Se	34	9.629	0.637	0.009	0.031	0.002	0.001	-----
100-hr event	T08-12426	RTI	Br	35	0.017	0.005	0.008	0.152	0.008	0.001	0.136
100-hr event	T08-12426	RTI	Rb	37	0.261	0.017	0.009	0.011	0.003	0.002	-----
100-hr event	T08-12426	RTI	Sr	38	0.029	0.006	0.011	0.025	0.002	0.003	-----
100-hr event	T08-12426	RTI	Zr	40	0.755	0.038	0.080	0.000	0.000	0.005	-----
100-hr event	T08-12426	RTI	Pb	82	0.002	0.032	0.017	0.103	0.007	0.002	-----
100-hr event	T08-12431	DRI	Na	11	4.765	0.491	0.270	0.000	0.000	1.104	-----
100-hr event	T08-12431	DRI	Mg	12	0.806	0.218	0.103	0.000	0.000	0.576	-----
100-hr event	T08-12431	DRI	Al	13	2.379	0.047	0.023	2.956	0.219	0.183	3.153
100-hr event	T08-12431	DRI	Si	14	7.299	0.081	0.027	14.249	0.733	0.091	9.272
100-hr event	T08-12431	DRI	P	15	1.802	0.019	0.008	0.000	0.000	0.056	-----
100-hr event	T08-12431	DRI	S	16	50.514	0.329	0.022	54.741	2.749	0.034	58.031
100-hr event	T08-12431	DRI	Cl	17	0.148	0.008	0.006	0.000	0.000	0.021	-----
100-hr event	T08-12431	DRI	K	19	2.568	0.013	0.005	2.771	0.143	0.009	2.880
100-hr event	T08-12431	DRI	Ca	20	2.205	0.013	0.006	2.555	0.131	0.006	2.278
100-hr event	T08-12431	DRI	Ti	22	0.288	0.006	0.020	0.280	0.016	0.003	0.253
100-hr event	T08-12431	DRI	V	23	0.024	0.000	0.004	0.015	0.004	0.002	-----
100-hr event	T08-12431	DRI	Cr	24	0.010	0.005	0.000	0.005	0.001	0.001	-----
100-hr event	T08-12431	DRI	Mn	25	0.083	0.011	0.003	0.086	0.005	0.001	-----
100-hr event	T08-12431	DRI	Fe	26	3.145	0.019	0.007	3.071	0.155	0.002	2.932
100-hr event	T08-12431	DRI	Ni	28	0.004	0.002	0.009	0.004	0.001	0.002	-----
100-hr event	T08-12431	DRI	Cu	29	0.065	0.005	0.000	0.063	0.004	0.002	-----
100-hr event	T08-12431	DRI	Zn	30	1.343	0.008	0.002	1.593	0.080	0.002	0.691
100-hr event	T08-12431	DRI	As	33	0.000	0.000	0.003	0.040	0.004	0.006	-----
100-hr event	T08-12431	DRI	Se	34	0.030	0.010	0.003	0.032	0.002	0.001	-----
100-hr event	T08-12431	DRI	Br	35	0.107	0.008	0.011	0.151	0.008	0.001	0.136
100-hr event	T08-12431	DRI	Rb	37	0.001	0.005	0.000	0.014	0.003	0.002	-----
100-hr event	T08-12431	DRI	Sr	38	0.025	0.010	0.007	0.024	0.002	0.003	-----
100-hr event	T08-12431	DRI	Zr	40	0.031	0.017	0.005	0.000	0.000	0.005	-----
100-hr event	T08-12431	DRI	Pb	82	0.102	0.013	0.004	0.096	0.007	0.002	-----
blank filter	T08-12427	DRI	Na	11	0.000	0.388	0.007	0.000	0.000	0.249	-----
blank filter	T08-12427	DRI	Mg	12	0.000	0.212	0.005	0.000	0.000	0.132	-----
blank filter	T08-12427	DRI	Al	13	0.012	0.034	0.012	0.000	0.000	0.043	-----
blank filter	T08-12427	DRI	Si	14	0.016	0.040	0.009	0.000	0.000	0.022	-----
blank filter	T08-12427	DRI	P	15	0.000	0.011	0.008	0.000	0.000	0.013	-----
blank filter	T08-12427	DRI	S	16	0.000	0.032	0.014	0.000	0.000	0.008	-----
blank filter	T08-12427	DRI	Cl	17	0.003	0.008	0.018	0.000	0.000	0.006	-----
blank filter	T08-12427	DRI	K	19	0.011	0.007	0.011	0.000	0.000	0.004	-----
blank filter	T08-12427	DRI	Ca	20	0.012	0.009	0.013	0.000	0.000	0.002	-----
blank filter	T08-12427	DRI	Ti	22	0.001	0.005	0.025	0.002	0.001	0.001	-----
blank filter	T08-12427	DRI	V	23	0.000	0.000	0.004	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Cr	24	0.000	0.005	0.002	0.000	0.000	0.001	-----

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12427	DRI	Mn	25	0.002	0.010	0.003	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Fe	26	0.010	0.013	0.004	0.003	0.001	0.001	-----
blank filter	T08-12427	DRI	Ni	28	0.000	0.002	0.006	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Cu	29	0.000	0.004	0.022	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Zn	30	0.013	0.004	0.008	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	As	33	0.000	0.000	0.049	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Se	34	0.006	0.010	0.041	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Br	35	0.003	0.007	0.050	0.000	0.000	0.001	-----
blank filter	T08-12427	DRI	Rb	37	0.000	0.005	0.013	0.000	0.000	0.002	-----
blank filter	T08-12427	DRI	Sr	38	0.000	0.010	0.027	0.000	0.000	0.002	-----
blank filter	T08-12427	DRI	Zr	40	0.001	0.017	0.008	0.000	0.000	0.004	-----
blank filter	T08-12427	DRI	Pb	82	0.000	0.013	0.009	0.006	0.002	0.001	-----
blank filter	T08-12428	DRI	Na	11	0.000	0.388	0.270	0.299	0.111	0.249	-----
blank filter	T08-12428	DRI	Mg	12	0.000	0.211	0.103	0.000	0.000	0.127	-----
blank filter	T08-12428	DRI	Al	13	0.000	0.034	0.023	0.000	0.000	0.041	-----
blank filter	T08-12428	DRI	Si	14	0.000	0.040	0.027	0.053	0.014	0.021	-----
blank filter	T08-12428	DRI	P	15	0.000	0.011	0.008	0.000	0.000	0.013	-----
blank filter	T08-12428	DRI	S	16	0.006	0.032	0.022	0.015	0.004	0.008	-----
blank filter	T08-12428	DRI	Cl	17	0.002	0.008	0.006	0.025	0.006	0.006	-----
blank filter	T08-12428	DRI	K	19	0.000	0.007	0.005	0.000	0.000	0.004	-----
blank filter	T08-12428	DRI	Ca	20	0.000	0.009	0.006	0.013	0.002	0.002	-----
blank filter	T08-12428	DRI	Ti	22	0.003	0.005	0.020	0.000	0.000	0.001	-----
blank filter	T08-12428	DRI	V	23	0.000	0.000	0.004	0.000	0.000	0.001	-----
blank filter	T08-12428	DRI	Cr	24	0.000	0.005	0.000	0.000	0.000	0.000	-----
blank filter	T08-12428	DRI	Mn	25	0.003	0.010	0.003	0.000	0.000	0.001	-----
blank filter	T08-12428	DRI	Fe	26	0.000	0.013	0.007	0.004	0.002	0.001	-----
blank filter	T08-12428	DRI	Ni	28	0.000	0.002	0.009	0.003	0.001	0.001	-----
blank filter	T08-12428	DRI	Cu	29	0.012	0.004	0.000	0.005	0.001	0.001	-----
blank filter	T08-12428	DRI	Zn	30	0.006	0.004	0.002	0.007	0.001	0.001	-----
blank filter	T08-12428	DRI	As	33	0.000	0.000	0.003	0.000	0.000	0.001	-----
blank filter	T08-12428	DRI	Se	34	0.000	0.010	0.003	0.000	0.000	0.001	-----
blank filter	T08-12428	DRI	Br	35	0.000	0.007	0.011	0.001	0.000	0.001	-----
blank filter	T08-12428	DRI	Rb	37	0.004	0.005	0.000	0.000	0.000	0.002	-----
blank filter	T08-12428	DRI	Sr	38	0.001	0.010	0.007	0.000	0.000	0.002	-----
blank filter	T08-12428	DRI	Zr	40	0.000	0.017	0.005	0.000	0.000	0.004	-----
blank filter	T08-12428	DRI	Pb	82	0.000	0.013	0.004	0.004	0.002	0.001	-----
blank filter	T08-12429	RTI	Na	11	0.000	0.020	0.007	0.000	0.000	0.239	-----
blank filter	T08-12429	RTI	Mg	12	0.001	0.003	0.005	0.000	0.000	0.122	-----
blank filter	T08-12429	RTI	Al	13	0.000	0.002	0.012	0.000	0.000	0.037	-----
blank filter	T08-12429	RTI	Si	14	0.003	0.003	0.009	0.000	0.000	0.019	-----
blank filter	T08-12429	RTI	P	15	0.003	0.003	0.008	0.000	0.000	0.012	-----
blank filter	T08-12429	RTI	S	16	0.000	0.002	0.014	0.000	0.000	0.007	-----
blank filter	T08-12429	RTI	Cl	17	0.000	0.002	0.018	0.000	0.000	0.005	-----

Table 15. XRF PT Results (25-mm Filters)

Sample Description	Sample ID	Test Lab	Element	Z	Test Lab (µg/filter)			UCD (µg/filter)			Median* (µg/filter)
					Result	Uncert.	MDL	Result	Uncert.	MDL	
blank filter	T08-12429	RTI	K	19	0.003	0.002	0.011	0.000	0.000	0.004	-----
blank filter	T08-12429	RTI	Ca	20	0.003	0.003	0.013	0.017	0.002	0.002	-----
blank filter	T08-12429	RTI	Ti	22	0.002	0.008	0.025	0.003	0.001	0.001	-----
blank filter	T08-12429	RTI	V	23	0.000	0.002	0.004	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Cr	24	0.000	0.032	0.002	0.000	0.000	0.000	-----
blank filter	T08-12429	RTI	Mn	25	0.000	0.001	0.003	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Fe	26	0.000	0.005	0.004	0.014	0.002	0.001	-----
blank filter	T08-12429	RTI	Ni	28	0.000	0.005	0.006	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Cu	29	0.000	0.002	0.022	0.003	0.001	0.001	-----
blank filter	T08-12429	RTI	Zn	30	0.002	0.004	0.008	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	As	33	0.000	0.002	0.049	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Se	34	0.005	0.009	0.041	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Br	35	0.000	0.002	0.050	0.000	0.000	0.001	-----
blank filter	T08-12429	RTI	Rb	37	0.001	0.004	0.013	0.002	0.001	0.002	-----
blank filter	T08-12429	RTI	Sr	38	0.000	0.003	0.027	0.000	0.000	0.002	-----
blank filter	T08-12429	RTI	Zr	40	0.000	0.001	0.008	0.004	0.002	0.004	-----
blank filter	T08-12429	RTI	Pb	82	0.000	0.020	0.009	0.008	0.002	0.001	-----
blank filter	T08-12430	RTI	Na	11	0.000	0.020	0.065	0.000	0.000	0.230	-----
blank filter	T08-12430	RTI	Mg	12	0.000	0.001	0.024	0.000	0.000	0.117	-----
blank filter	T08-12430	RTI	Al	13	0.003	0.003	0.051	0.000	0.000	0.037	-----
blank filter	T08-12430	RTI	Si	14	0.000	0.003	0.027	0.000	0.000	0.019	-----
blank filter	T08-12430	RTI	P	15	0.000	0.003	0.010	0.000	0.000	0.011	-----
blank filter	T08-12430	RTI	S	16	0.000	0.002	0.013	0.000	0.000	0.007	-----
blank filter	T08-12430	RTI	Cl	17	0.002	0.002	0.009	0.000	0.000	0.005	-----
blank filter	T08-12430	RTI	K	19	0.000	0.002	0.009	0.011	0.003	0.004	-----
blank filter	T08-12430	RTI	Ca	20	0.000	0.003	0.010	0.000	0.000	0.002	-----
blank filter	T08-12430	RTI	Ti	22	0.000	0.007	0.013	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	V	23	0.000	0.002	0.009	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	Cr	24	0.007	0.019	0.007	0.000	0.000	0.000	-----
blank filter	T08-12430	RTI	Mn	25	0.001	0.001	0.006	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	Fe	26	0.000	0.005	0.007	0.002	0.001	0.001	-----
blank filter	T08-12430	RTI	Ni	28	0.006	0.008	0.004	0.002	0.001	0.001	-----
blank filter	T08-12430	RTI	Cu	29	0.000	0.002	0.006	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	Zn	30	0.000	0.005	0.006	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	As	33	0.002	0.003	0.008	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	Se	34	0.000	0.011	0.009	0.001	0.000	0.001	-----
blank filter	T08-12430	RTI	Br	35	0.000	0.002	0.008	0.000	0.000	0.001	-----
blank filter	T08-12430	RTI	Rb	37	0.000	0.004	0.009	0.001	0.001	0.002	-----
blank filter	T08-12430	RTI	Sr	38	0.000	0.003	0.011	0.000	0.000	0.002	-----
blank filter	T08-12430	RTI	Zr	40	0.000	0.001	0.080	0.000	0.000	0.004	-----
blank filter	T08-12430	RTI	Pb	82	0.000	0.020	0.017	0.006	0.002	0.001	-----

**** Median was calculated only when the result from all reporting labs was greater than three times the uncertainty.***

Table 16. XRF Analysis at the CARB Laboratory						
Instrument: Thermo QuanX EC Software: WinTrace 3.0.2						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	10	30	50	50		
Tube current (mA)	1.98	1.66	1.00	1.00		
Tube anode material	Rhodium	Rhodium	Rhodium	Rhodium		
Direct excitation of sample: Filter material	Cellulose	Palladium	Palladium	Copper		
Filter thickness (mm)	unknown	0.025 mm	0.125 mm	0.377 mm		
Secondary excitation of sample: Secondary fluorescor	none	none	none	none		
Filter material						
Filter thickness (mm)						
Acquisition time (seconds)	800	400	400	800		
Energy range acquired (keV)	0-10	0-20	0-40	0-40		
Number of [MCA] channels	512	1024	2048	2048		
Sample rotation (yes/no)	yes	yes	yes	yes		
Beam spot size, diameter (mm)	unknown	unknown	unknown	unknown		
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum		
Elements Reported	Al Si P S Cl K Ca	Ti V Cr Mn Fe Co Ni Ba	Cu Zn As Se Br Rb Sr Y Mo Hg Pb	Sn Sb		

Table 17. XRF Analysis at the DRI Laboratory						
Instrument: PanAnalytical Epsilon 5 Software: E5 Version 2.0C						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	40	40	75	100	100	100
Tube current (mA)	15	15	8	6	6	6
Tube anode material	Gd	Gd	Gd	Gd	Gd	Gd
Direct excitation of sample: Filter material						
Filter thickness (mm)						
Secondary excitation of sample: Secondary fluorescor	Ti	Fe	Ge	Zr	Mo	Ag
Filter material						
Filter thickness (mm)						
Acquisition time (seconds)	400	400	400	200	200	200
Energy range acquired (keV)	0-20	0-20	0-20	0-20	0-20	0-40
Number of [MCA] channels	2048	2048	2048	2048	2048	4096
Sample rotation (yes/no)	yes	yes	yes	yes	yes	yes
Beam spot size, diameter (mm)	20	20	20	20	20	20
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum	vacuum	vacuum
Elements Reported	Na Mg Al Si P S Cl K Ca Sc	Ti V Cr	Mn Fe Co Ni Cu Zn	Ga As Se Br Rb Hf Ta W Ir Au Hg Tl Pb	Sr Y	Zr Nb Mo
Parameter (repeated)	#7	#8	#9	#10	#11	#12
X-ray tube parameters: Tube voltage (kV)	100	100				
Tube current (mA)	6	6				
Tube anode material	Gd	Gd				
Direct excitation of sample: Filter material						
Filter thickness (mm)						
Secondary excitation of sample: Secondary fluorescor	BaF_2	Al_2O_3				
Filter material						
Filter thickness (mm)						
Acquisition time (seconds)	200	100				
Energy range acquired (keV)	0-80	0-80				
Number of [MCA] channels	8192	8192				
Sample rotation (yes/no)	yes	yes				
Beam spot size, diameter (mm)	20	20				
Atmosphere (vacuum, He, air)	vacuum	vacuum				
Elements Reported	Pd Ag Cd In Sn Sb	Cs Ba La Ce Sm Eu Tb				

Table 18. XRF Analysis at the ODEQ Laboratory						
Instrument: Kevex771 Software: WinXRF V2.41						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	7.5	35	40	45	40	58
Tube current (mA)	0.9	2.1	2.1	2.1	0.9	1.5
Tube anode material	Rh	Rh	Rh	Rh	Rh	Rh
Direct excitation of sample: Filter material	Whatman 41	na	na	na	Rh	W
Filter thickness (mm)	1 layer	na	na	na	0.1	0.1
Secondary excitation of sample: Secondary fluorescor	none	Ti	Fe	Ge	none	none
Filter material	na	none	none	none	na	na
Filter thickness (mm)	na	na	na	na	na	na
Acquisition time (seconds)	400	400	400	400	400	400
Energy range acquired (keV)	10	10	10	10	20	80
Number of [MCA] channels	1024	1024	1024	1024	2048	4096
Sample rotation (yes/no)	no	no	no	no	no	no
Beam spot size, diameter (mm)	unknown	unknown	unknown	unknown	unknown	unknown
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum	vacuum	vacuum
Elements Reported	Al Si P	S Cl K Ca	Ti V Cr	Mn Fe Co Ni Cu Zn	As Se Br Rb Sr Zr Pb	Ag Cd In Sn Sb Cs Ba Ce

Table 19. XRF Analysis at the RTI Laboratory (47-mm filters)						
Instrument: XRF #3 Make and Model: Thermo Electron Corporation ARL Quant'X						
Instrument Processing Software: Wintrace 4.1 Build 9 (Patch 1)						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	4	10	30	50	50	
Tube current (mA)	1.98	1.98	1.66	1.00	1.00	
Tube anode material	Rh	Rh	Rh	Rh	Rh	
Direct excitation of sample: Filter material	No filter	Graphite	Pd Thin	Pd Thick	Cu Thin	
Filter thickness (**g/cm^2**)	na	0.06	0.03	0.15	0.338	
Secondary excitation of sample: Secondary fluorescor	na	na	na	na	na	
Filter material	na	na	na	na	na	
Filter thickness (mm)	na	na	na	na	na	
Acquisition time (seconds)	300	300	250	200	200	
Energy range acquired (keV)	0-10	0-10	0-20	0-40	0-40	
Number of [MCA] channels	500	500	1000	2000	2000	
Sample rotation (yes/no)	no	no	no	no	no	
Beam spot size, diameter (mm)	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum	vacuum	
Elements Reported	Na Mg	Al Si P S Cl K Ca Sc	Ti V Cr Mn Fe Co Ni Cu Zn Cs Ba La Ce Sm Eu Tb Hf	Ga As Se Br Rb Sr Y Nb Mo Ta W Ir Au Hg Pb	Zr Ag Cd In Sn Sb	

Table 20. XRF Analysis at the RTI Laboratory (25-mm filters)						
Instrument: XRF #4 Make and Model: Thermo Electron Corporation ARL Quant'X						
Instrument Processing Software: Wintrace 4.1 Build 9 (Patch 1)						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	4	10	30	50	50	
Tube current (mA)	1.98	1.98	1.66	1.00	1.00	
Tube anode material	Rh	Rh	Rh	Rh	Rh	
Direct excitation of sample: Filter material	No Filter	Graphite	Pd Thin	Pd Thick	Cu Thin	
Filter thickness (**g/cm^2**)	na	0.06	0.03	0.15	0.338	
Secondary excitation of sample: Secondary fluorescor	na	na	na	na	na	
Filter material	na	na	na	na	na	
Filter thickness (mm)	na	na	na	na	na	
Acquisition time (seconds)	300	300	250	200	200	
Energy range acquired (keV)	0-10	0-10	0-20	0-40	0-40	
Number of [MCA] channels	20eV per channel	20eV per channel	20eV per channel	20eV per channel	20eV per channel	
Sample rotation (yes/no)	No	No	No	No	No	
Beam spot size, diameter (mm)	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	9.5 x 11mm elipse	
Atmosphere (vacuum, He, air)	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	
Elements Reported	Na Mg	Al Si P S Cl K Ca	Ti V Cr Mn Fe Co Ni Cu Zn Cs Ba Ce	As Se Br Rb Sr Pb	Zr Ag Cd In Sn Sb	

Table 21. XRF Analysis at the South Coast AQMD Laboratory						
Instrument: PanAnalytical Epsilon 5, PW5000 Software: Epsilon 5, Version 2.0C						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	25	25	50	75	100	100
Tube current (mA)	24	24	12	8	6	6
Tube anode material	W	W	W	W	W	W
Direct excitation of sample: Filter material	na	na	na	na	na	na
Filter thickness (mm)	na	na	na	na	na	na
Secondary excitation of sample: Secondary fluorescor	Al	CaF_2	Fe	Ge	Zr	Mo
Filter material	na	na	na	na	na	na
Filter thickness (mm)	na	na	na	na	na	na
Acquisition time (seconds)	400	200	200	200	200	200
Energy range acquired (keV)	25	25	50	75	100	100
Number of [MCA] channels	16384	16384	16384	16384	16384	16384
Sample rotation (yes/no)	yes	yes	yes	yes	yes	yes
Beam spot size, diameter (mm)	22	22	22	22	22	22
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum	vacuum	vacuum
Elements Reported	Mg	Al Si P S Cl K	Ca Sc Ti V Cr	Mn Fe Co Ni Cu Zn	Ga Ge As Se Br Rb Pt Au Tl Pb	Sr Y
Parameter (repeated)	#7	#8	#9	#10	#11	#12
X-ray tube parameters: Tube voltage (kV)	100	100	100	100		
Tube current (mA)	6	6	6	6		
Tube anode material	W	W	W	W		
Direct excitation of sample: Filter material	na	na	na	na		
Filter thickness (mm)	na	na	na	na		
Secondary excitation of sample: Secondary fluorescor	Ag	CsI	BaF_2	Al_2O_3		
Filter material	na	na	na	na		
Filter thickness (mm)	na	na	na	na		
Acquisition time (seconds)	200	200	200	200		
Energy range acquired (keV)	100	100	100	100		
Number of [MCA] channels	16384	16384	16384	16384		
Sample rotation (yes/no)	yes	yes	yes	yes		
Beam spot size, diameter (mm)	22	22	22	22		
Atmosphere (vacuum, He, air)	vacuum	vacuum	vacuum	vacuum		
Elements Reported	Nb Mo	Rh Pd Ag Cd In	Sn Sb Sm	Cs Ba La Ce		

Table 22. XRF Analysis at the UCD Laboratory						
Instrument: UCD design and build Software: RACE (Rapid Analysis of Composition by Elements)						
Parameter	Instrument Conditions for Routine Sample Analysis					
	#1	#2	#3	#4	#5	#6
X-ray tube parameters: Tube voltage (kV)	35	20				
Tube current (mA)	23	10				
Tube anode material	Molybdenum	Copper				
Direct excitation of sample: Filter material	Mo	Cu				
Filter thickness (mm)	0.152 mm	0.051 mm thick integrated Cu collimator				
Secondary excitation of sample: Secondary fluorescor	na	na				
Filter material	na	na				
Filter thickness (mm)	na	na				
Acquisition time (seconds)	1000	1000				
Energy range acquired (keV)	2-16	1-8				
Number of [MCA] channels	512	512				
Sample rotation (yes/no)	no	no				
Beam spot size, diameter (mm)	~0.7 cm^2	~0.785 cm^2				
Atmosphere (vacuum, He, air)	air	vacuum				
Elements Reported	Ni Cu Zn Ga As Se Br Rb Sr Pb	Na Mg Al Si P S Cl K Ca Ti V Cr Mn Fe				