TECHNICAL MEMORANDUM

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DATE: May 30, 2014

SUBJECT: Experimental Inter-comparison of Speciation Laboratories – Study#9

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 Analytical 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 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 Elements by XRF (47-mm filters)
Desert Research Institute (DRI)	Reno, NV	Gravimetric mass IC analysis, Nylon® & Teflon® filters TOA carbon Elements by XRF (25- & 47-mm filters)
Oregon Dept. of Environmental Quality (ODEQ)	Hillsboro, 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 (two sets) TOA carbon 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 Elements by XRF (47-mm filters)
University of California / Davis (UCD)	Davis, CA	Gravimetric mass Elements by XRF (25-mm filters)
EPA's National Analytical Radiation Environmental Laboratory (NAREL)	Montgomery, AL	Gravimetric mass IC analysis, Teflon® filters IC analysis, Nylon® filters (two sets) TOA carbon

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. The IMPROVE_A analytical method was used to analyze samples during this study. A more detailed description of the 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
T13-14695	T3617063	21-Jan-2014	42-hour	CARB
T13-14696	T3617064	21-Jan-2014	42-hour	CARB
T13-14697	T3617065	23-Jan-2014	36-hour	CARB
T13-14698	T3617066	23-Jan-2014	36-hour	CARB
T13-14699	T3617067	25-Jan-2014	24-hour	CARB
T13-14700	T3617068	25-Jan-2014	24-hour	CARB
T13-14701	T3617069	26-Jan-2014	20-hour	CARB
T13-14705	T3617073	21-Jan-2014	42-hour	DRI
T13-14706	T3617074	21-Jan-2014	42-hour	DRI
T13-14707	T3617075	23-Jan-2014	36-hour	DRI
T13-14708	T3617076	23-Jan-2014	36-hour	DRI
T13-14709	T3617077	25-Jan-2014	24-hour	DRI
T13-14710	T3617078	25-Jan-2014	24-hour	DRI
T13-14711	T3617079	26-Jan-2014	20-hour	DRI
T13-14715	T3617083	21-Jan-2014	42-hour	ODEQ
T13-14716	T3617084	21-Jan-2014	42-hour	ODEQ
T13-14717	T3617085	23-Jan-2014	36-hour	ODEQ
T13-14718	T3617086	23-Jan-2014	36-hour	ODEQ
T13-14719	T3617087	25-Jan-2014	24-hour	ODEQ
T13-14720	T3617088	25-Jan-2014	24-hour	ODEQ
T13-14721	T3617089	26-Jan-2014	20-hour	ODEQ
T13-14725	T3617093	21-Jan-2014	42-hour	RTI
T13-14726	T3617094	21-Jan-2014	42-hour	RTI
T13-14727	T3617095	23-Jan-2014	36-hour	RTI

Filter ID	Serial Number	Sample Start	Event Duration	Receiving Lab
T13-14728	T3617096	23-Jan-2014	36-hour	RTI
T13-14729	T3617097	25-Jan-2014	24-hour	RTI
T13-14730	T3617098	25-Jan-2014	24-hour	RTI
T13-14731	T3617099	26-Jan-2014	20-hour	RTI
T13-14735	T3617103	21-Jan-2014	42-hour	AQMD
T13-14736	T3617104	21-Jan-2014	42-hour	AQMD
T13-14737	T3617105	23-Jan-2014	36-hour	AQMD
T13-14738	T3617106	23-Jan-2014	36-hour	AQMD
T13-14739	T3617107	25-Jan-2014	24-hour	AQMD
T13-14740	T3617108	25-Jan-2014	24-hour	AQMD
T13-14741	T3617109	26-Jan-2014	20-hour	AQMD
T13-14745	none	21-Jan-2014	42-hour	UCD
T13-14747	none	21-Jan-2014	42-hour	UCD
T13-14748	none	23-Jan-2014	36-hour	UCD
T13-14749	none	23-Jan-2014	36-hour	UCD
T13-14750	none	25-Jan-2014	24-hour	UCD
T13-14751	none	25-Jan-2014	24-hour	UCD
T13-14752	none	26-Jan-2014	20-hour	UCD

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 42-hour collection event that started on January 21, and two of these replicates were submitted to each lab for analysis. Similarly, twelve replicates were created during a 36-hour collection event that started on January 23, 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 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 figures 1 and 2 on the next page. 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 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 test 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.

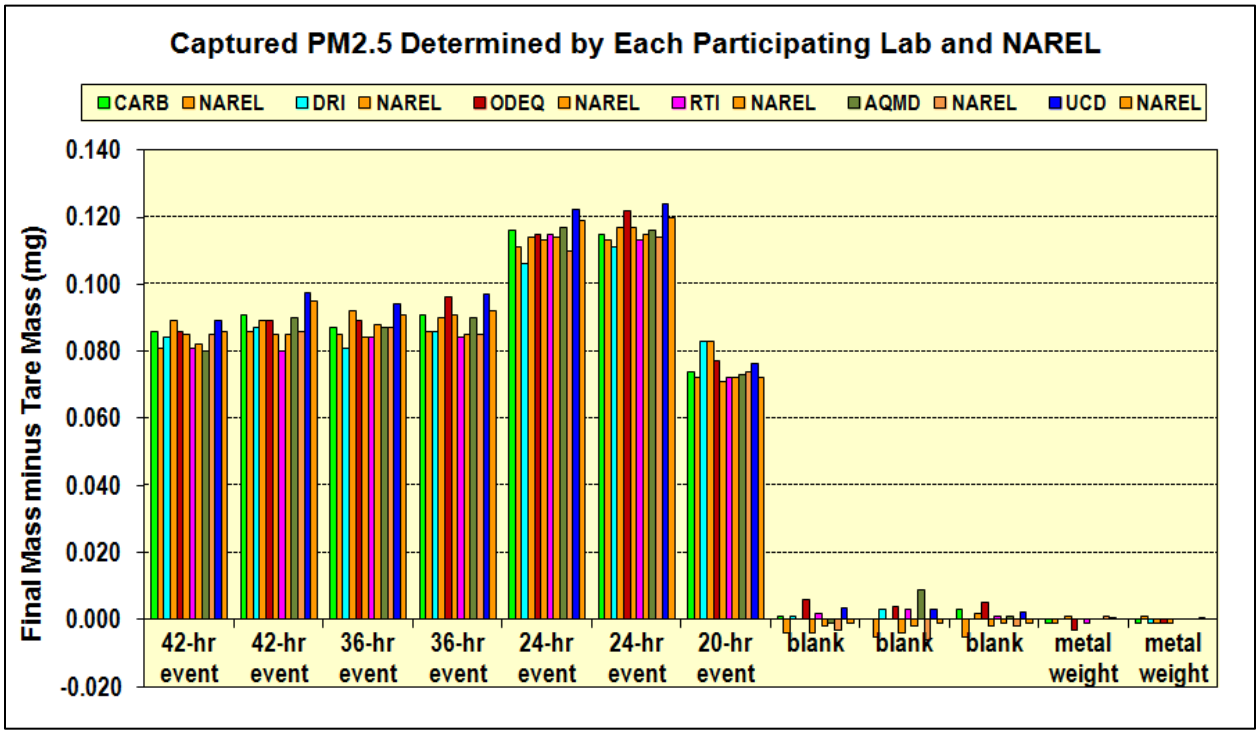


Figure 1

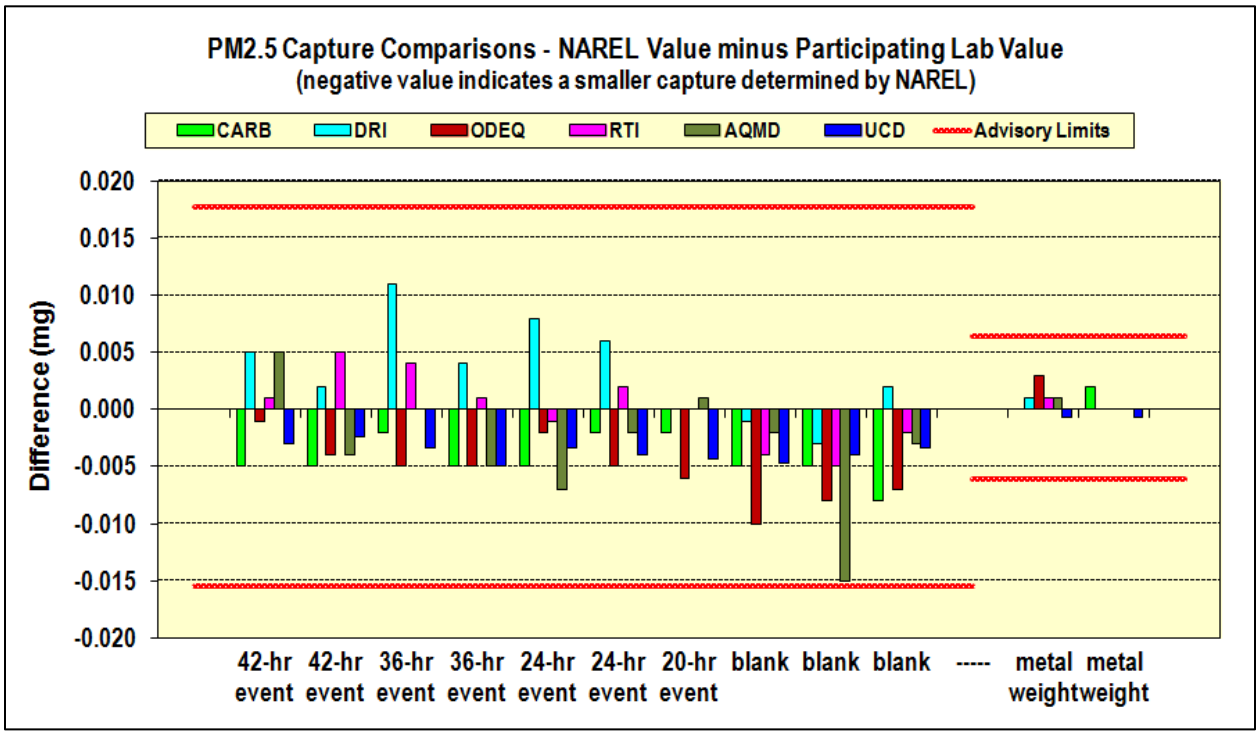


Figure 2

Reasonably good agreement is observed between the capture value determined at NAREL and the capture value reported by the test lab. Results from all of the samples are within the 3-sigma advisory limits. The raw data reported from all of the gravimetric labs are presented in table 9 at the end of this report. Table 9 includes the tare mass, the POST-mass, and the calculated $PM_{2.5}$ capture for each sample. Table 9 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 (reference 1 through 7).

IC Analysis

This study included the analysis of selected ions using two slightly different IC methods and two different filter media. Six labs analyzed a set of Nylon® filters using the CSN method, two labs analyzed a set of Nylon® filters using the IMPROVE method, two labs analyzed a set of MTL Teflon® filters using the CSN method.

NAREL provided each lab with a set of six filters for each method and filter medium that was 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 to the sampling schedule presented in table 3.

Table 3. Sampling Schedule for Ion Chromatography PT Filters

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
N13-14767	Nylon®	08-Feb-2013	200-hour	CARB	CSN
N13-14768	Nylon®	08-Feb-2013	200-hour	CARB	CSN
N13-14787	Nylon®	05-May-2013	192-hour	CARB	CSN
N13-14788	Nylon®	05-May-2013	192-hour	CARB	CSN
N13-14769	Nylon®	08-Feb-2013	200-hour	DRI	CSN
N13-14770	Nylon®	08-Feb-2013	200-hour	DRI	CSN
N13-14789	Nylon®	05-May-2013	192-hour	DRI	CSN
N13-14790	Nylon®	05-May-2013	192-hour	DRI	CSN
N13-14771	Nylon®	08-Feb-2013	200-hour	ODEQ	CSN
N13-14772	Nylon®	08-Feb-2013	200-hour	ODEQ	CSN
N13-14791	Nylon®	05-May-2013	192-hour	ODEQ	CSN
N13-14792	Nylon®	05-May-2013	192-hour	ODEQ	CSN
N13-14773	Nylon®	08-Feb-2013	200-hour	RTI	CSN
N13-14774	Nylon®	08-Feb-2013	200-hour	RTI	CSN
N13-14793	Nylon®	05-May-2013	192-hour	RTI	CSN
N13-14794	Nylon®	05-May-2013	192-hour	RTI	CSN
N13-14775	Nylon®	08-Feb-2013	200-hour	AQMD	CSN
N13-14776	Nylon®	08-Feb-2013	200-hour	AQMD	CSN
N13-14795	Nylon®	05-May-2013	192-hour	AQMD	CSN
N13-14796	Nylon®	05-May-2013	192-hour	AQMD	CSN
N13-14777	Nylon®	08-Feb-2013	200-hour	NAREL	CSN
N13-14778	Nylon®	08-Feb-2013	200-hour	NAREL	CSN
N13-14797	Nylon®	05-May-2013	192-hour	NAREL	CSN
N13-14798	Nylon®	05-May-2013	192-hour	NAREL	CSN
N13-14779	Nylon®	19-Feb-2013	192-hour	RTI	IMPROVE
N13-14780	Nylon®	19-Feb-2013	192-hour	RTI	IMPROVE
N13-14799	Nylon®	16-May-2013	164-hour	RTI	IMPROVE
N13-14800	Nylon®	16-May-2013	164-hour	RTI	IMPROVE
N13-14781	Nylon®	19-Feb-2013	192-hour	NAREL	IMPROVE
N13-14782	Nylon®	19-Feb-2013	192-hour	NAREL	IMPROVE
N13-14801	Nylon®	16-May-2013	164-hour	NAREL	IMPROVE
N13-14802	Nylon®	16-May-2013	164-hour	NAREL	IMPROVE
T13-14783	MTL Teflon®	19-Feb-2013	192-hour	DRI	CSN
T13-14784	MTL Teflon®	19-Feb-2013	192-hour	DRI	CSN
T13-14803	MTL Teflon®	16-May-2013	164-hour	DRI	CSN
T13-14804	MTL Teflon®	16-May-2013	164-hour	DRI	CSN

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
T13-14785	MTL Teflon®	19-Feb-2013	192-hour	NAREL	CSN
T13-14786	MTL Teflon®	19-Feb-2013	192-hour	NAREL	CSN
T13-14805	MTL Teflon®	16-May-2013	164-hour	NAREL	CSN
T13-14806	MTL Teflon®	16-May-2013	164-hour	NAREL	CSN

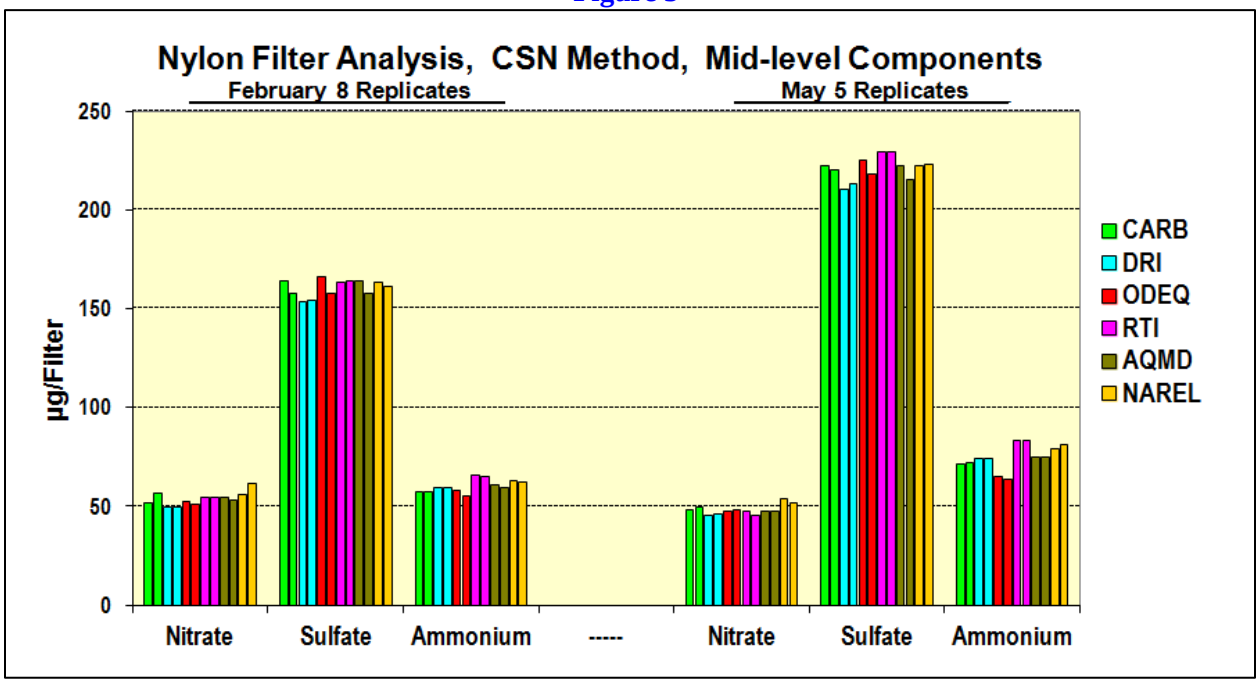
Table 3 shows forty filters that were loaded during four separate collection events. Several replicates were prepared during each event, creating a pool of replicates which were available for distribution among the participating labs. Careful inspection of table 3 will show that two replicates from each event were distributed to each participating lab for analysis. 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 3 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 8 through 18).

IC Results

Results from the analysis of twenty-four Nylon® filters using the CSN method are presented as bar graphs in figures 3 and 4. These results were derived from analyzing the replicates sampled on February 8 and May 5.

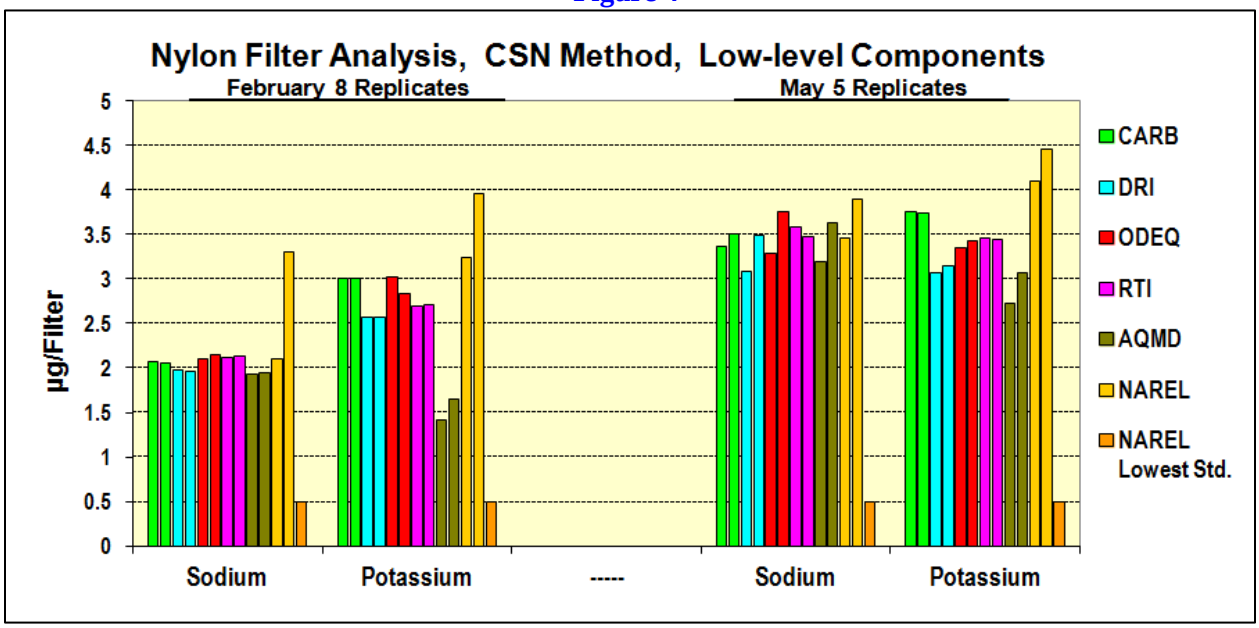
Figure 3



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.

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. One of the February 8 replicates analyzed at NAREL shows suspiciously high results for sodium and potassium. The chromatograms and other supporting data were inspected for anomalies, but none were discovered. NAREL's results in figure 4 were supported by the raw data.

Figure 4



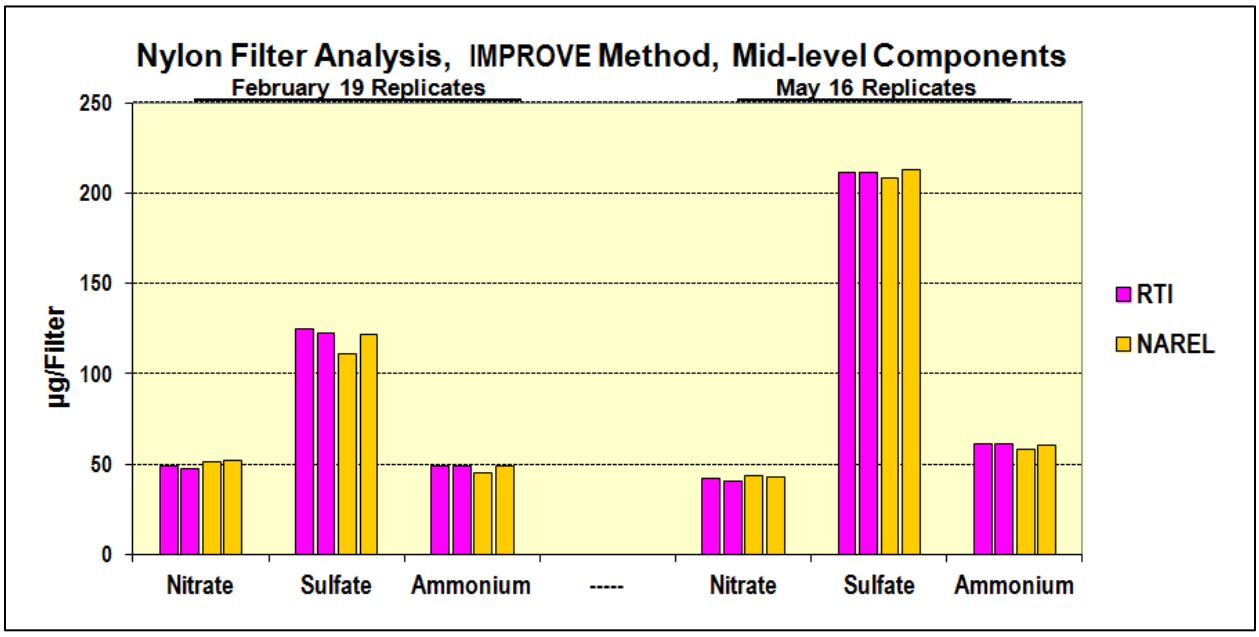


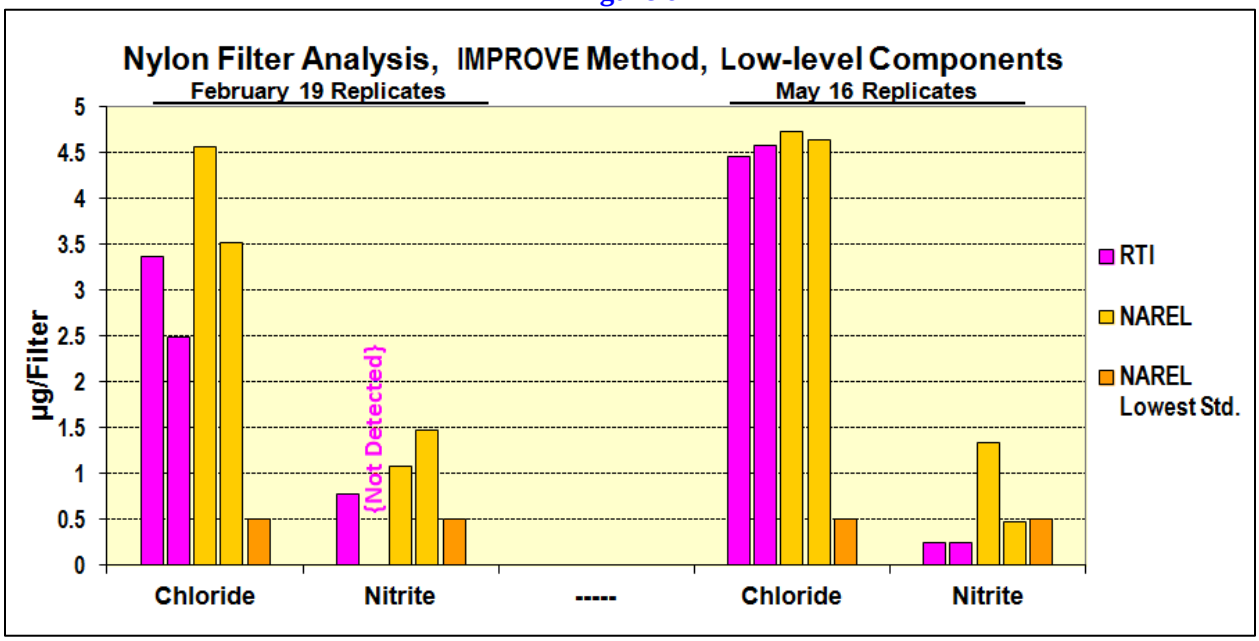
Figure 5

Figures 5 and 6 show more results for Nylon® filters using the IMPROVE method. Results are presented from two labs that analyzed replicates sampled on February 19 and May 16. 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 5, and good agreement between labs was demonstrated for the mid-level ions.

Figure 6 shows two low-level anions, chloride and nitrite, that are routinely determined using the IMPROVE method, even though they are not reported for the CSN method. Also note that potassium and sodium are not reported for the IMPROVE method.

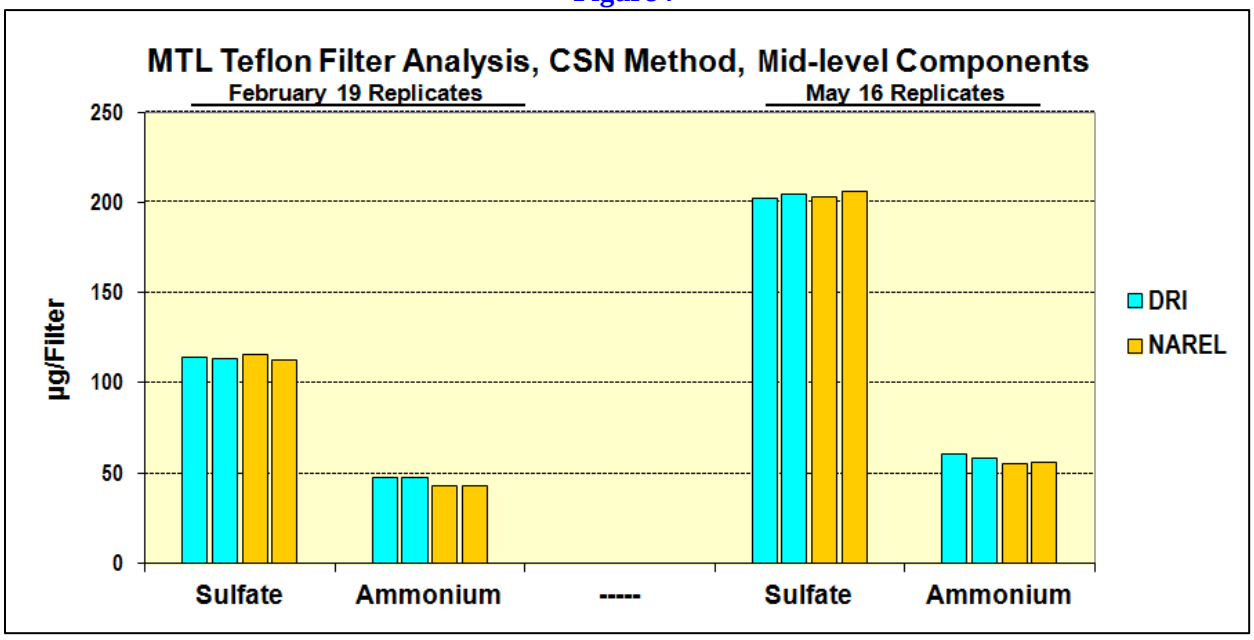
Figure 6 shows reasonably good agreement between labs for the low-level anions especially when one considers that low-level nitrite is often observed from blanks. Filter blank results from this study are available in table 10 at the end of this report.

Figure 6



According to table 3, both Nylon® and Teflon® filter media were loaded during the February 19 and May 16 sampling events. Results from the Nylon® filters were presented previously in figures 5 and 6. Results from the Teflon® filters are presented in Figures 7 and 8. Figure 7 shows the mid-level ions that were extracted from the Teflon® filters, and please note that nitrate is not among the mid-level ions in Figure 7.

Figure 7



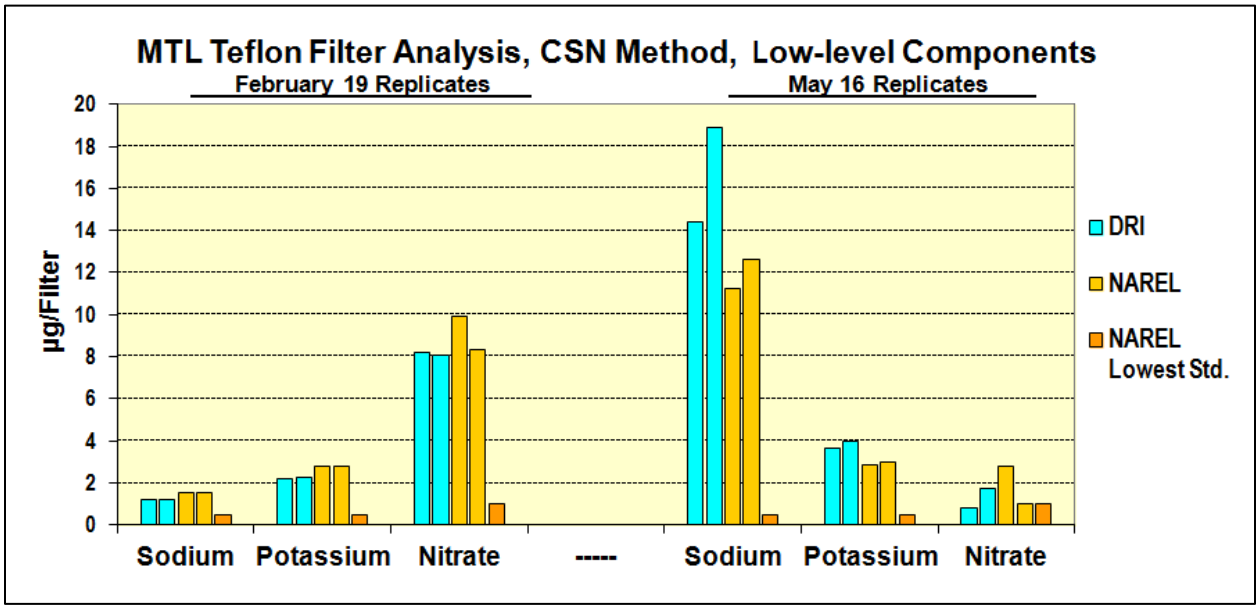


Figure 8

Nitrate is presented along with the other low-level ions in figure 8. The nitrate values shown in figure 8 from the Teflon® filters are much lower than the nitrate values from the Nylon® filters shown previously in figure 5. This dramatic decrease in nitrate level is due to a known sampling artifact associated with the Teflon® filter.

Good agreement between labs can be seen in figure 7 for the mid-level ions, and reasonably good agreement in figure 8 for the low-level ions. It should be stated that the Nylon® filters were cleaned and dried before they were used for sampling, but the Teflon® filters were not cleaned before sampling. It is possible that some of the Teflon® filters were slightly contaminated before they were used for sampling. All of the IC results, including results from the blank filters, are presented in table 10 at the end of this report.

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 4.

Table 4. Sampling Schedule for TOA Carbon PT Filters

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
Q13-14827	quartz	23-Oct-2012	216-hour	CARB	IMPROVE_A
Q13-14828	quartz	23-Oct-2012	216-hour	CARB	IMPROVE_A
Q13-14837	quartz	25-Apr-2013	232-hour	CARB	IMPROVE_A
Q13-14838	quartz	25-Apr-2013	232-hour	CARB	IMPROVE_A
Q13-14829	quartz	23-Oct-2012	216-hour	DRI	IMPROVE_A
Q13-14830	quartz	23-Oct-2012	216-hour	DRI	IMPROVE_A
Q13-14839	quartz	25-Apr-2013	232-hour	DRI	IMPROVE_A
Q13-14840	quartz	25-Apr-2013	232-hour	DRI	IMPROVE_A
Q13-14831	quartz	23-Oct-2012	216-hour	RTI	IMPROVE_A
Q13-14832	quartz	23-Oct-2012	216-hour	RTI	IMPROVE_A
Q13-14841	quartz	25-Apr-2013	232-hour	RTI	IMPROVE_A
Q13-14842	quartz	25-Apr-2013	232-hour	RTI	IMPROVE_A

Filter ID	Filter Medium	Sample Start	Event Duration	Receiving Lab	Method
Q13-14833	quartz	23-Oct-2012	216-hour	AQMD	IMPROVE_A
Q13-14834	quartz	23-Oct-2012	216-hour	AQMD	IMPROVE_A
Q13-14843	quartz	25-Apr-2013	232-hour	AQMD	IMPROVE_A
Q13-14844	quartz	25-Apr-2013	232-hour	AQMD	IMPROVE_A
Q13-14835	quartz	23-Oct-2012	216-hour	NAREL	IMPROVE_A
Q13-14836	quartz	23-Oct-2012	216-hour	NAREL	IMPROVE_A
Q13-14845	quartz	25-Apr-2013	232-hour	NAREL	IMPROVE_A
Q13-14846	quartz	25-Apr-2013	232-hour	NAREL	IMPROVE_A

Table 4 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 216-hour autumn event that started on October 23, and two of these replicates were submitted to each lab for analysis. Likewise, ten replicates were created during the 232-hour spring event that started on April 25, 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 4 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 routinely shipped to DRI for analysis. The DRI lab is set up to analyze a large volume of samples and routinely operates several TOA instruments. The results were reported for each sample based upon the amount of carbon per square centimeter of deposit area (µg C/cm^2).

Only one analytical method, the IMPROVE_A method, was requested for this study. Previous studies have included the CSN analytical method, but a decision was made to limit the scope of this study to one TOA method. Table 5 shows the temperature protocol that is used by the IMPROVE_A method.

Table 5. Temperature Protocol for the IMPROVE_A Method

Temperature Control	Carrier Gas	Carbon Fraction*
heater off (90s)**	He Purge	-----
140°C (150-580s)	He	OC1
280°C (150-580s)	He	OC2
480°C (150-580s)	He	OC3
580°C (150-580s)	He	OC4
580°C (150-580s)	He/O_2	EC1
740°C (150-580s)	He/O_2	EC2
840°C (150-580s)	He/O_2	EC3
heater off (200s)**	He/O_2 + Internal Std.	-----

**** The Carbon fractions are defined by the analytical method. 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 5, the 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 beam. 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 instruments used in this study were able to use either TOT or TOR to evaluate the PyrolC. Instruments from two different manufacturers were used for this study. The DRI Model 2001 instruments and the Sunset Dual Mode instruments are designs that are capable of measuring the transmitted and the reflected light simultaneously. These instruments give the user a choice of the TOR or the TOT analysis. Table 6 shows specifically how the different instruments were used for analyzing the samples in this study.

Table 6. Summary of Report Packages for the TOA Analyses

Temperature Protocol	Optical Analysis	Instrument Model	Specific Instrument Reporting	Parameters Reported	Report Package Count
IMPROVE_A	TOR	DRI Model 2001	CARB Instr. #1	OC, EC, TC, OCsub, ECsub	1
			DRI Instr. #8, #9, #10	OC, EC, TC, OCsub, ECsub	2
			AQMD Instr. #3	OC, EC, TC, OCsub, ECsub	3
		Sunset (dual-mode)	RTI Instr. T	OC, EC, TC, OCsub, ECsub	4
			RTI Instr. #4	OC, EC, TC, OCsub, ECsub	5
			NAREL Instr. #2	OC, EC, TC, OCsub, ECsub	6

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. 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 9.

Figure 9

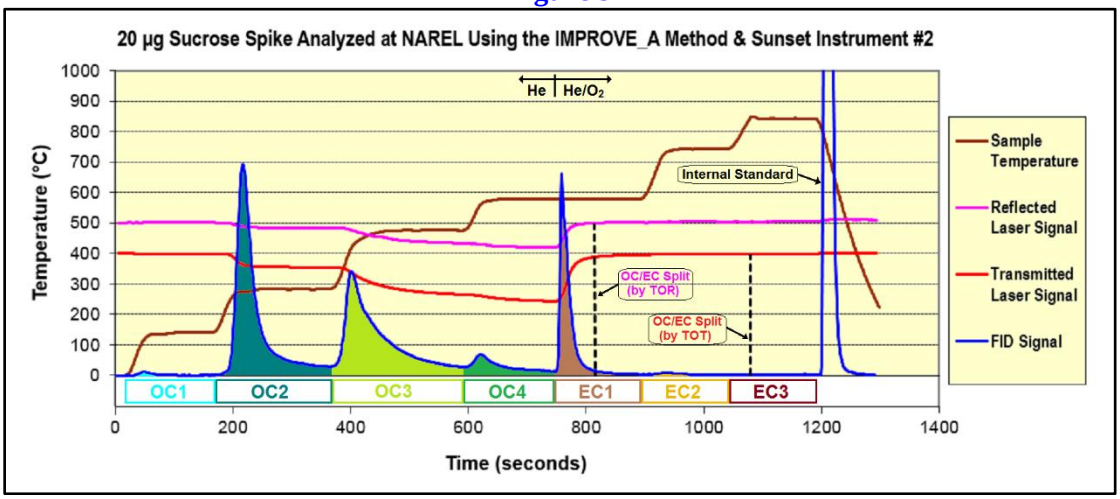


Figure 9 is a thermogram of a sucrose spike which was analyzed at NAREL using the IMPROVE_A heating profile. Sucrose is a good calibration check sample because it has a strong tendency to char creating PyrolC during the analysis, yet it contains no EC. Figure 9 shows suppression of both laser signals as char forms during the first stage of the analysis. Both laser signals recover during the second stage of the analysis as the char is released from the sample. It is normal for the reflected laser signal to recover slightly ahead of the transmitted signal. The FID signal represents all of the carbon released from the sample as well as the internal standard injected near the end of the run.

Raw data in 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.

$$TC = OC + EC \qquad \textbf{Equation 1}$$

Furthermore, OC and EC subfractions may be reported to offer a more detailed fingerprint of the sample. For example, figure 9 shows seven subfractions that are defined by the IMPROVE_A method which also may be used to calculate the total carbon.

$$TC = OC1 + OC2 + OC3 + OC4 + EC1 + EC2 + EC3 \qquad \textbf{Equation 2}$$

Notice that equation 1 requires knowledge of the OC/EC split point, but equation 2 does not. All of the seven subfractions identified in figure 9 and equation 2 are related to the heating profile (see table 5). For example, 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 5). 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 carbon fractions. Consequently EPA decided to migrate to a single TOA carbon method. The three-year implementation plan included 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 has replaced the CSN TOT method at those field sites that received a URG-3000N monitor. Currently, DRI is subcontracted by RTI to analyze samples requiring the IMPROVE_A analysis for the CSN contract. More information regarding the transition and 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. Each of the participating labs has an SOP for the TOA analysis performed at that laboratory. Many SOP's are currently available on the web (see reference 19 through 25).

Carbon Results

Results from the analysis of replicate quartz filters using 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 10

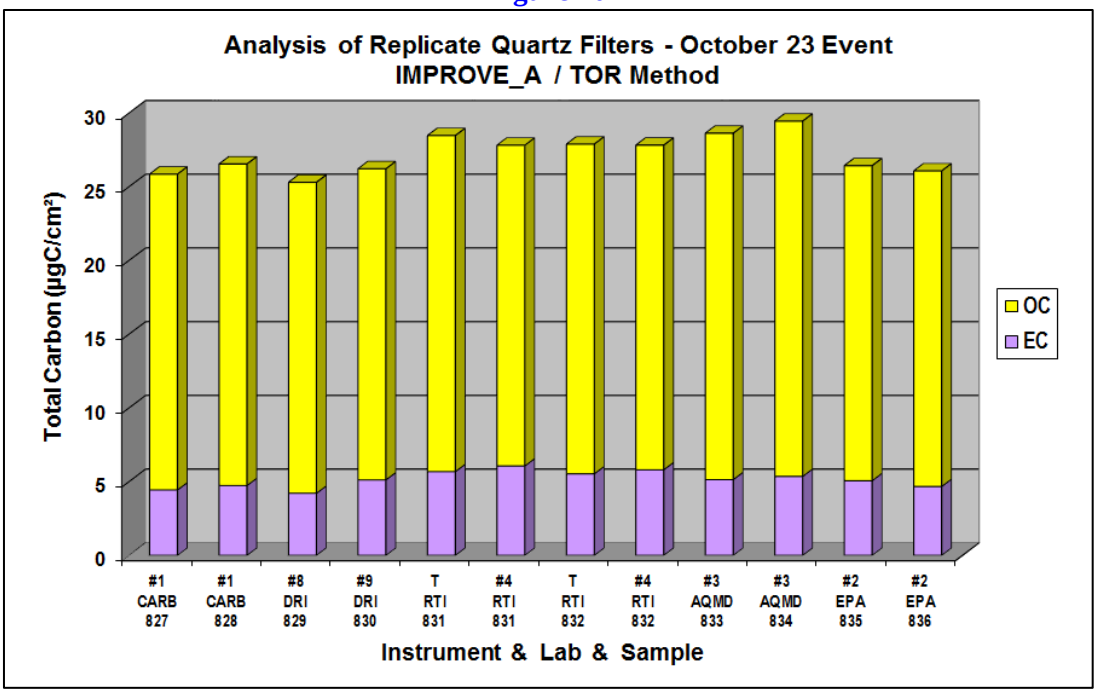
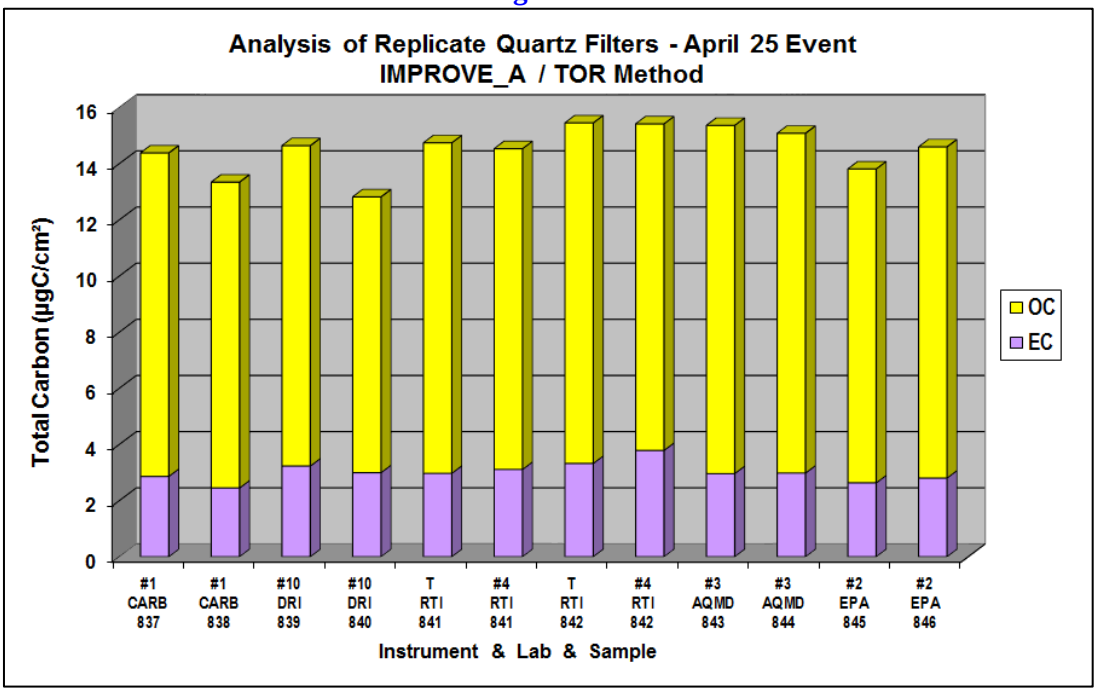


Figure 10 shows results from replicates that were created on October 23, and figure 11 shows the results from replicates created on April 25. The bar segments show the OC and EC components of the total carbon but do not show the more detailed fractions. Notice that each filter submitted to RTI was analyzed more than once using different instruments.

Figure 11



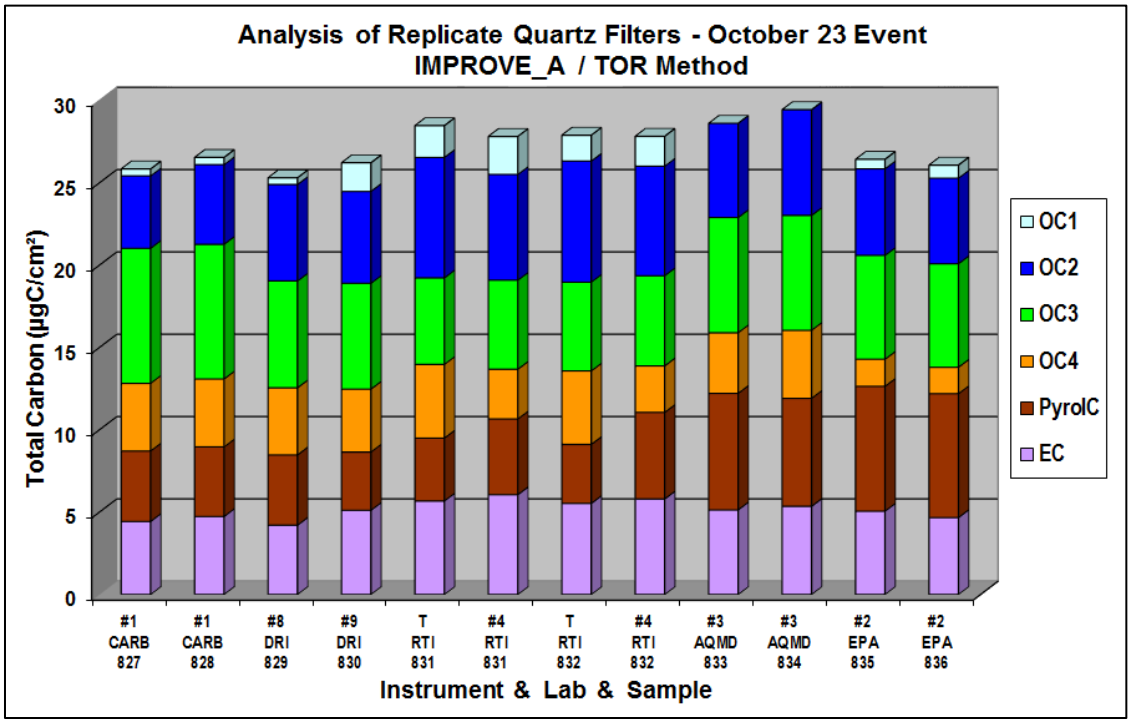
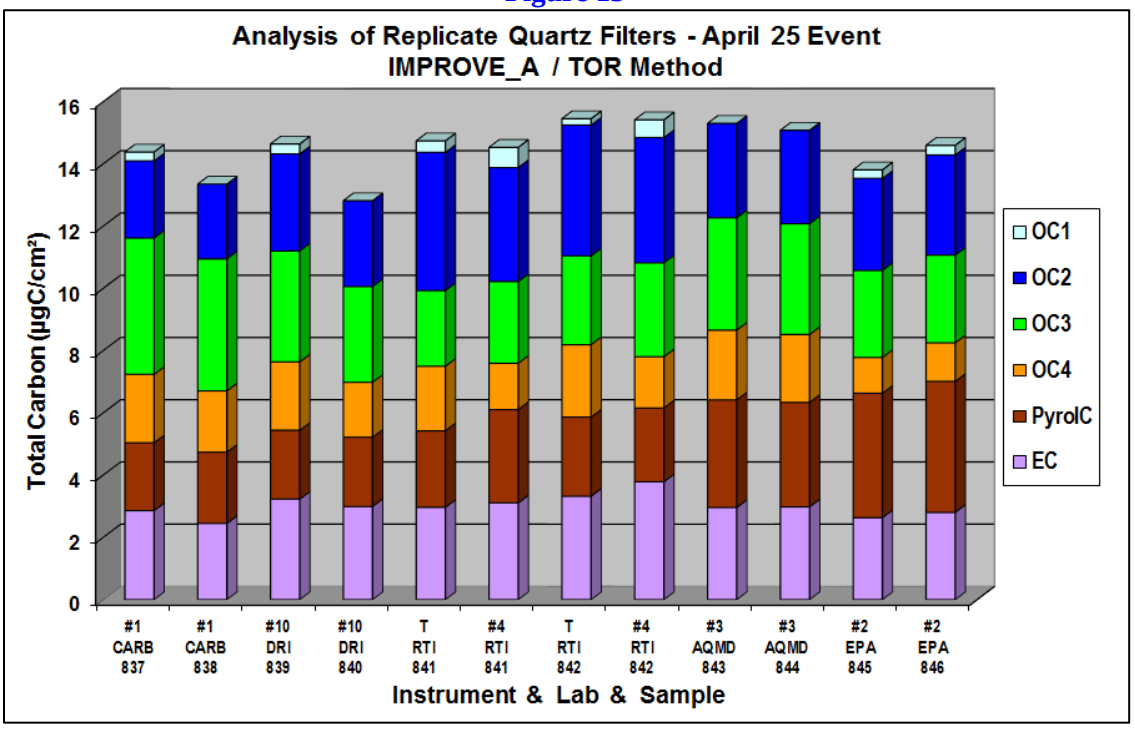


Figure 12

The results are presented again in figures 12 and 13 with more detail, and this time the OC subfractions are revealed. Both figures show relatively good agreement for the carbon fractions with perhaps the greatest variability in the OC1 subfraction.

Figure 13



Results from all of the quartz filters are presented in table 11 at the end of this report. This table includes the uncertainty of measurement when it was available. Table 11 also contains results from the blank filters that were part of each sample set of quartz filters.

XRF analysis

NAREL provided each participating laboratory with at least one set of six 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 simultaneously load both 47-mm and 25-mm filters during each sampling event and create replicates in each sample set according to the sampling schedule presented in table 7. It is important to note that during each sampling event replicates were prepared using both filter sizes.

Table 7. Sampling Schedule for XRF PT Filters

Filter ID	Filter Size	Sample Start	Event Duration	Test Lab	Reference Lab
T13-14857	47-mm Teflon®	28-Jan-2013	152-hour event	CARB	RTI
T13-14858	47-mm Teflon®	28-Jan-2013	152-hour event	CARB	RTI
T13-14873	47-mm Teflon®	29-May-2013	162-hour event	CARB	RTI
T13-14874	47-mm Teflon®	29-May-2013	162-hour event	CARB	RTI
T13-14859	47-mm Teflon®	28-Jan-2013	152-hour event	DRI	RTI
T13-14860	47-mm Teflon®	28-Jan-2013	152-hour event	DRI	RTI
T13-14875	47-mm Teflon®	29-May-2013	162-hour event	DRI	RTI
T13-14876	47-mm Teflon®	29-May-2013	162-hour event	DRI	RTI
T13-14861	47-mm Teflon®	28-Jan-2013	152-hour event	ODEQ	RTI
T13-14862	47-mm Teflon®	28-Jan-2013	152-hour event	ODEQ	RTI
T13-14877	47-mm Teflon®	29-May-2013	162-hour event	ODEQ	RTI
T13-14878	47-mm Teflon®	29-May-2013	162-hour event	ODEQ	RTI
T13-14863	47-mm Teflon®	28-Jan-2013	152-hour event	AQMD	RTI
T13-14864	47-mm Teflon®	28-Jan-2013	152-hour event	AQMD	RTI
T13-14879	47-mm Teflon®	29-May-2013	162-hour event	AQMD	RTI
T13-14880	47-mm Teflon®	29-May-2013	162-hour event	AQMD	RTI
T13-14867	25-mm Teflon®	28-Jan-2013	152-hour event	DRI	UCD
T13-14868	25-mm Teflon®	28-Jan-2013	152-hour event	DRI	UCD
T13-14883	25-mm Teflon®	29-May-2013	162-hour event	DRI	UCD
T13-14884	25-mm Teflon®	29-May-2013	162-hour event	DRI	UCD
T13-14869	25-mm Teflon®	28-Jan-2013	152-hour event	RTI	UCD
T13-14870	25-mm Teflon®	28-Jan-2013	152-hour event	RTI	UCD
T13-14885	25-mm Teflon®	29-May-2013	162-hour event	RTI	UCD
T13-14886	25-mm Teflon®	29-May-2013	162-hour event	RTI	UCD

The quality of the replicates described in table 7 was first tested at NAREL by measuring the gravimetric mass of $PM_{2.5}$ captured by each exposed filter. Table 8 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 8. 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
152-hr event starting on 28-Jan-2013	25-mm	T13-14867	DRI	UCD	413	419	-1%
		T13-14868	DRI	UCD	437	419	4%
		T13-14869	RTI	UCD	407	419	-3%
		T13-14870	RTI	UCD	420	419	0%
	47-mm	T13-14857	CARB	RTI	415	419	-1%
		T13-14858	CARB	RTI	417	419	0%
		T13-14859	DRI	RTI	421	419	0%
		T13-14860	DRI	RTI	410	419	-2%
		T13-14861	ODEQ	RTI	412	419	-2%
		T13-14862	ODEQ	RTI	423	419	1%
		T13-14863	AQMD	RTI	425	419	1%
		T13-14864	AQMD	RTI	423	419	1%
162-hr event starting on 29-May-2013	25-mm	T13-14883	DRI	UCD	440	450	-2%
		T13-14884	DRI	UCD	465	450	3%
		T13-14885	RTI	UCD	486	450	8%
		T13-14886	RTI	UCD	437	450	-3%
	47-mm	T13-14873	CARB	RTI	439	450	-2%
		T13-14874	CARB	RTI	434	450	-4%
		T13-14875	DRI	RTI	443	450	-2%
		T13-14876	DRI	RTI	449	450	0%
		T13-14877	ODEQ	RTI	444	450	-1%
		T13-14878	ODEQ	RTI	469	450	4%
		T13-14879	AQMD	RTI	443	450	-2%
		T13-14880	AQMD	RTI	447	450	-1%

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 remaining XRF 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 other participating 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 at least one set of filters for XRF analysis that included two blank filters and four exposed filters described previously in tables 7 and 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 do not routinely use the same deposit area for a given filter size. This small source of inter-laboratory bias would be eliminated if all labs agreed to use a consistent deposit area for each filter size.

Most 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 25 through 31).

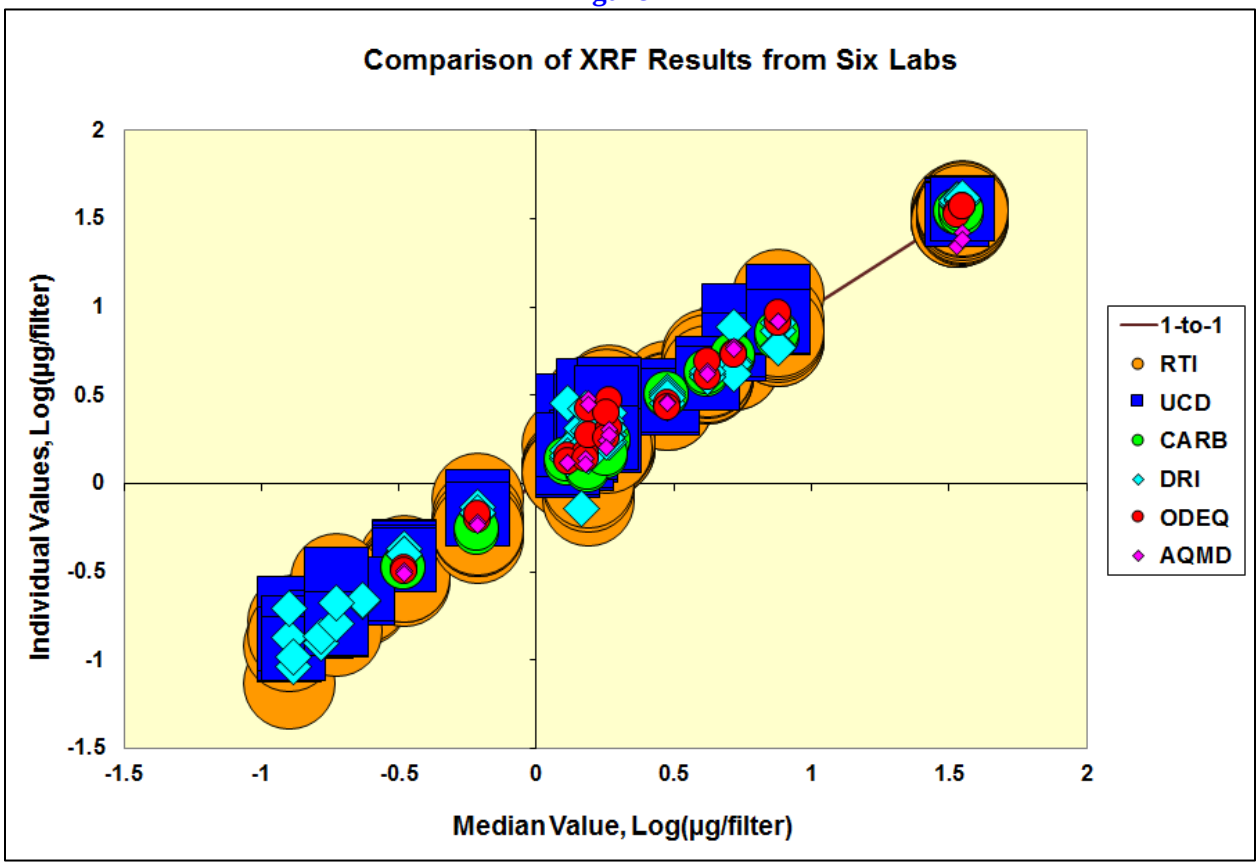
XRF Results

Most of the labs participating in this study were able to report results from a set of 47-mm filters with RTI serving as the reference lab. DRI and RTI also reported results from 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 reported a set of twenty-four elements that are routinely reported for the IMPROVE program. RTI reported a set of thirty-three elements currently required for their contract with EPA to serve as the national lab for the CSN network. A decision was made for this report to include only those elements that are normally reported for these programs. Accordingly, this report includes results for thirty-three elements from the 47-mm filters and twenty-four elements 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 14. 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 14 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 14



The more significant results are presented again as stacked-bar graphs in figures 15 and 16. 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.

Figure 15

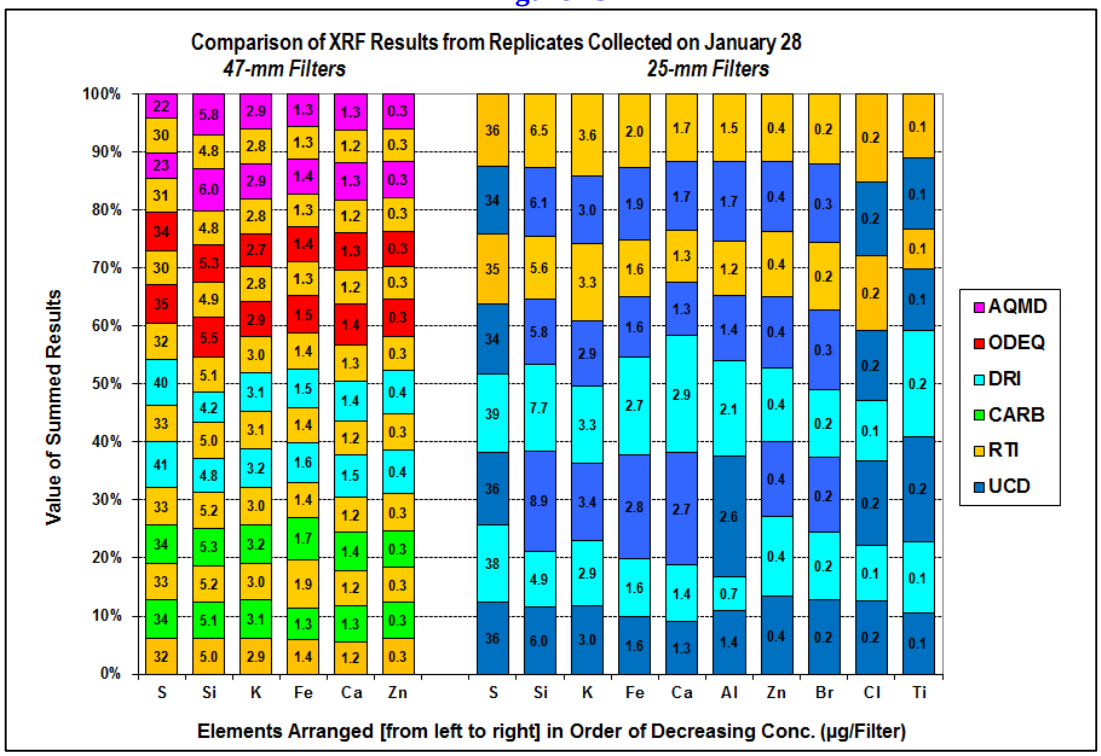
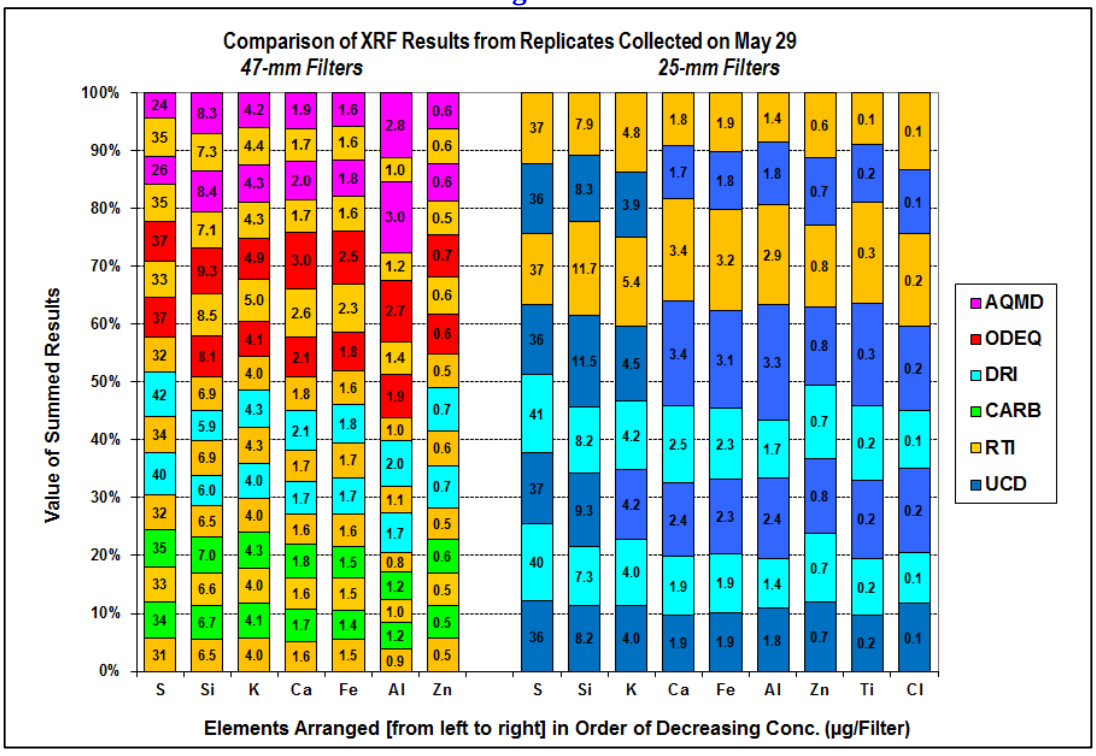


Figure 16



The normalized stacked-bar graphs presented in figures 15 and 16 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 12 and 13 by looking for a calculated median.

Figures 17 through 27 present another view of the XRF results which allows us to examine the uncertainties reported by most labs. The error bars represent a 3-sigma uncertainty. 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. Notice in figures 17 through 27 that the result from the reference lab is always presented immediately to the left of the test lab result.

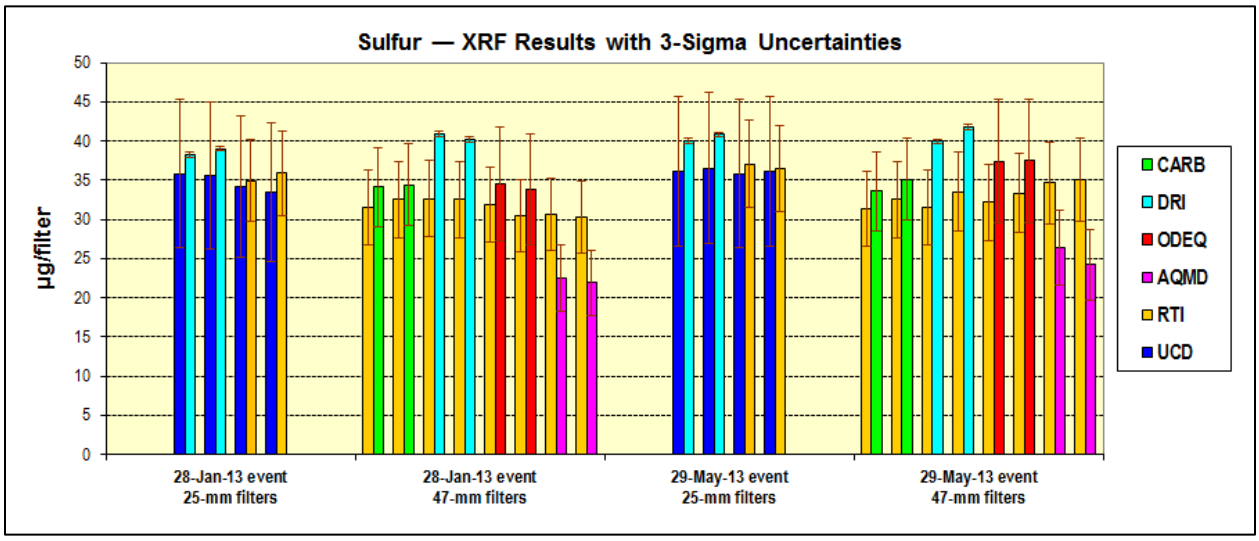
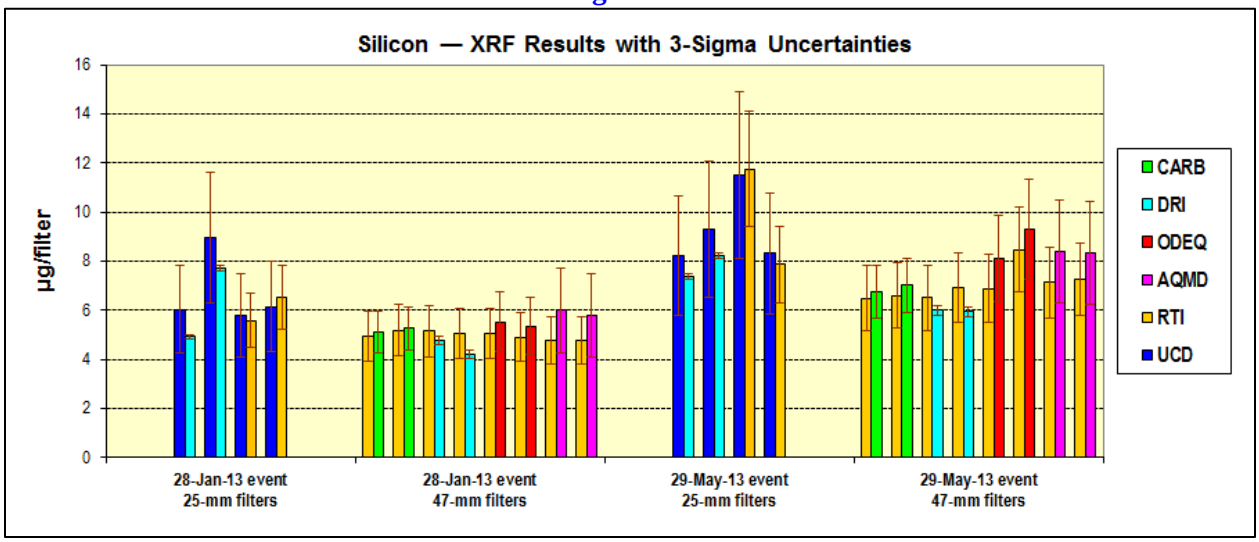


Figure 17

Results for sulfur are presented in figure 17. It was the most abundant element reported by all of the labs, and sulfur is a large peak in the analytical spectrum. It is interesting to note that DRI reported noticeably smaller uncertainties than the other labs. Figure 17 shows reasonably good agreement among all of the labs for the sulfur concentration.

Figure 18



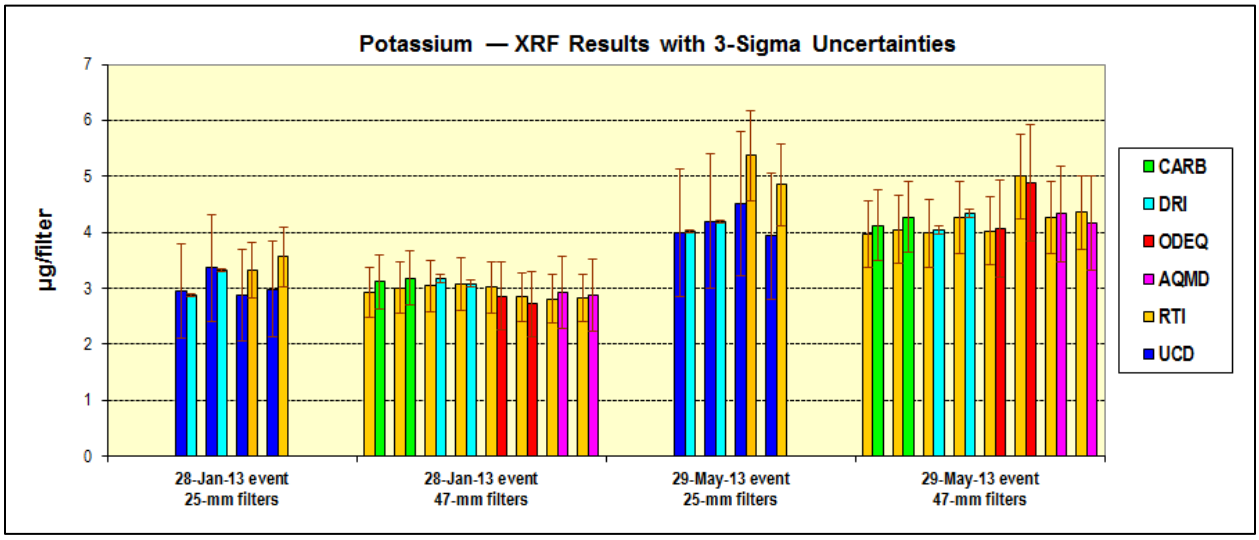


Figure 19

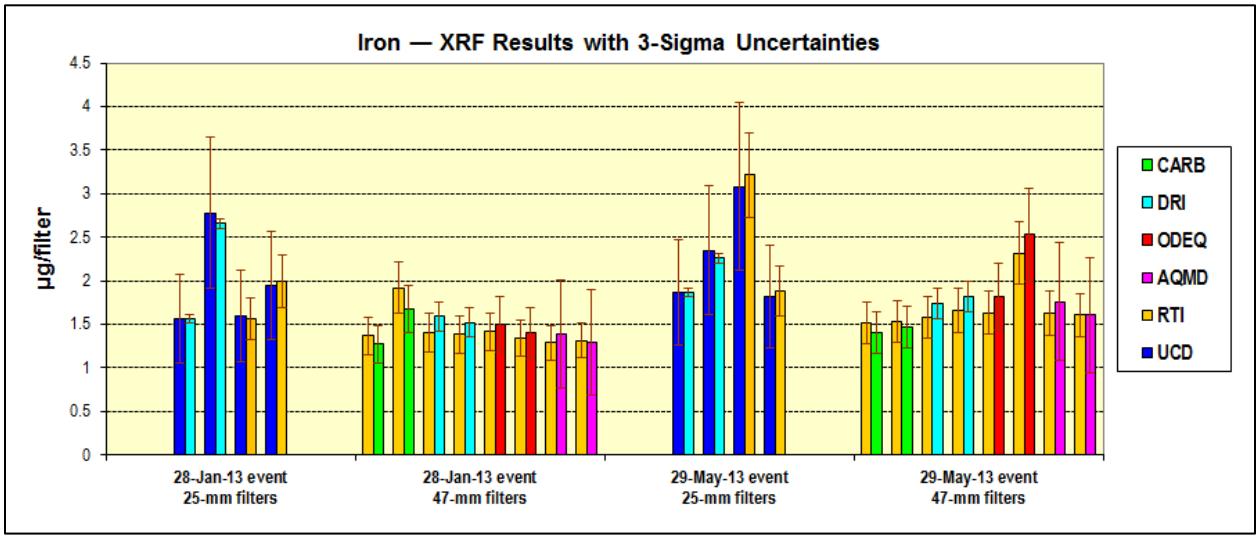


Figure 20

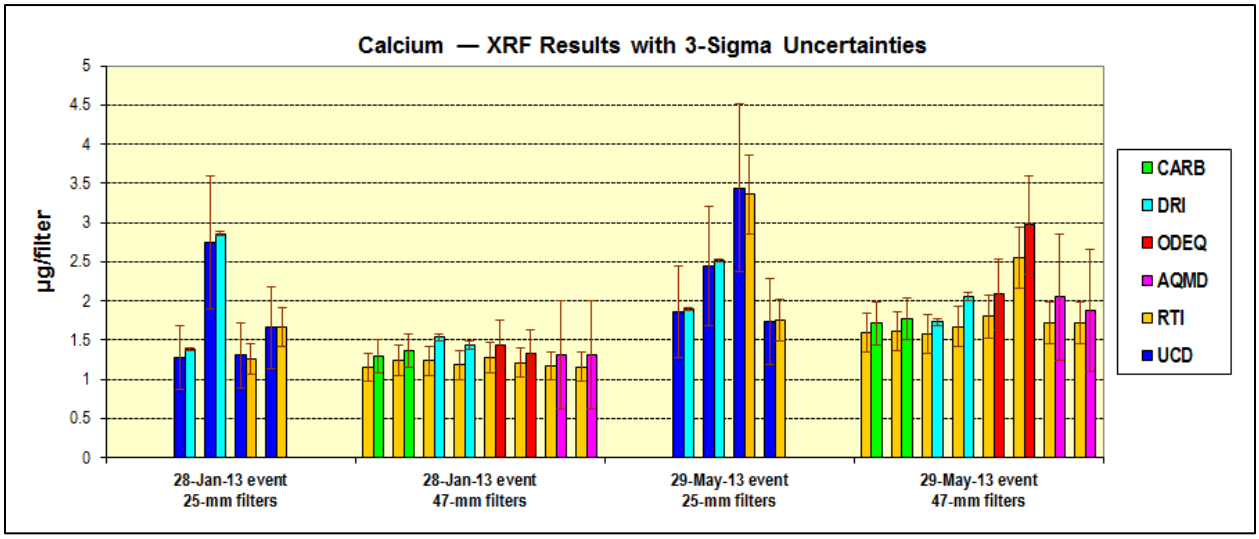


Figure 21

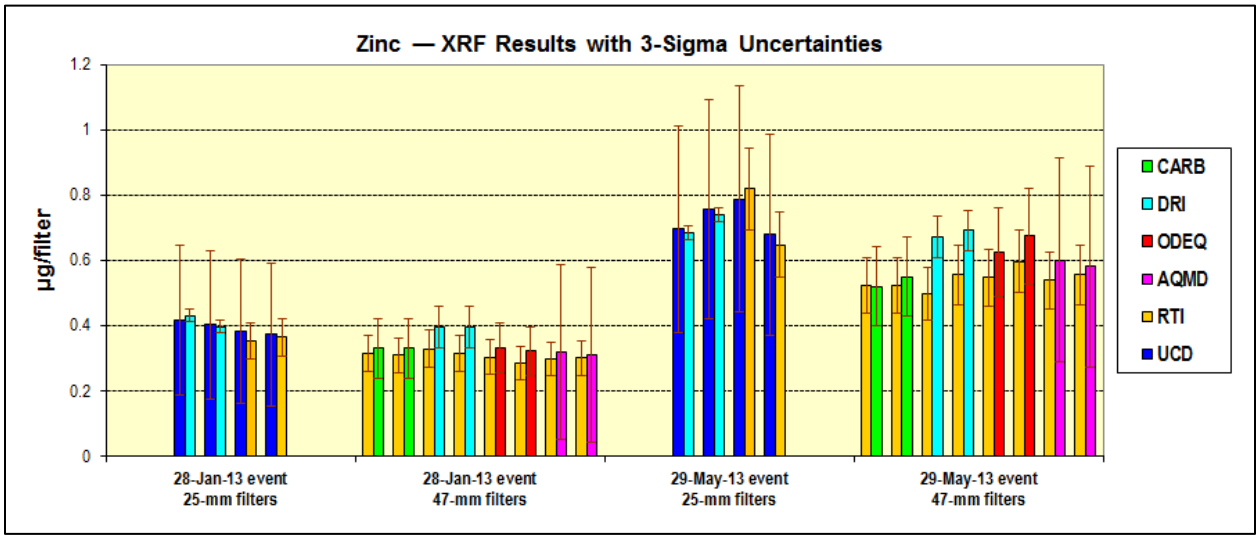


Figure 22

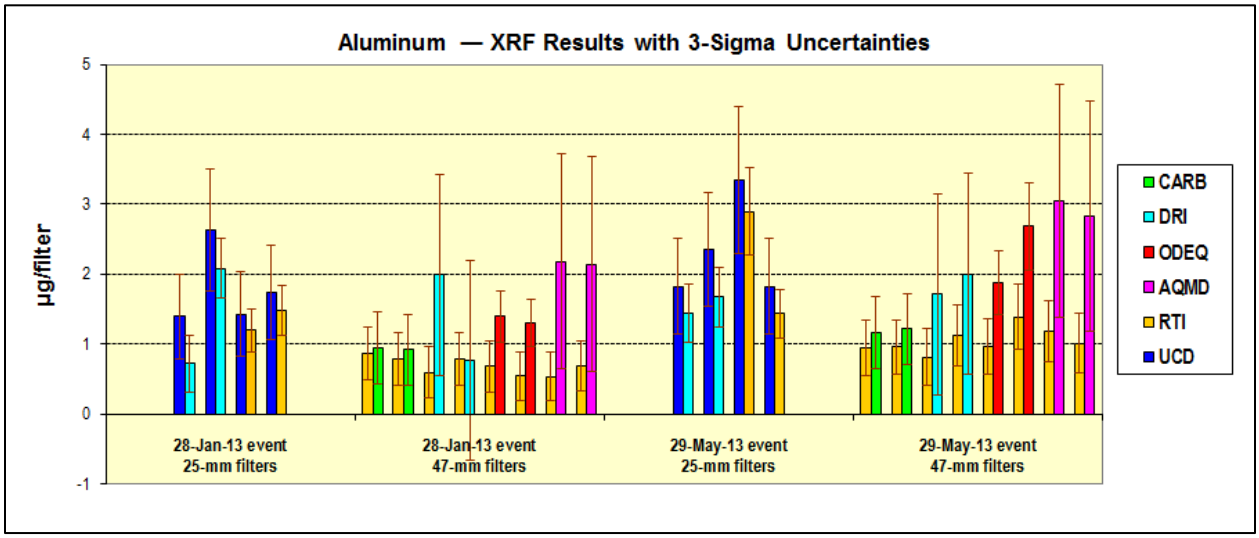


Figure 23

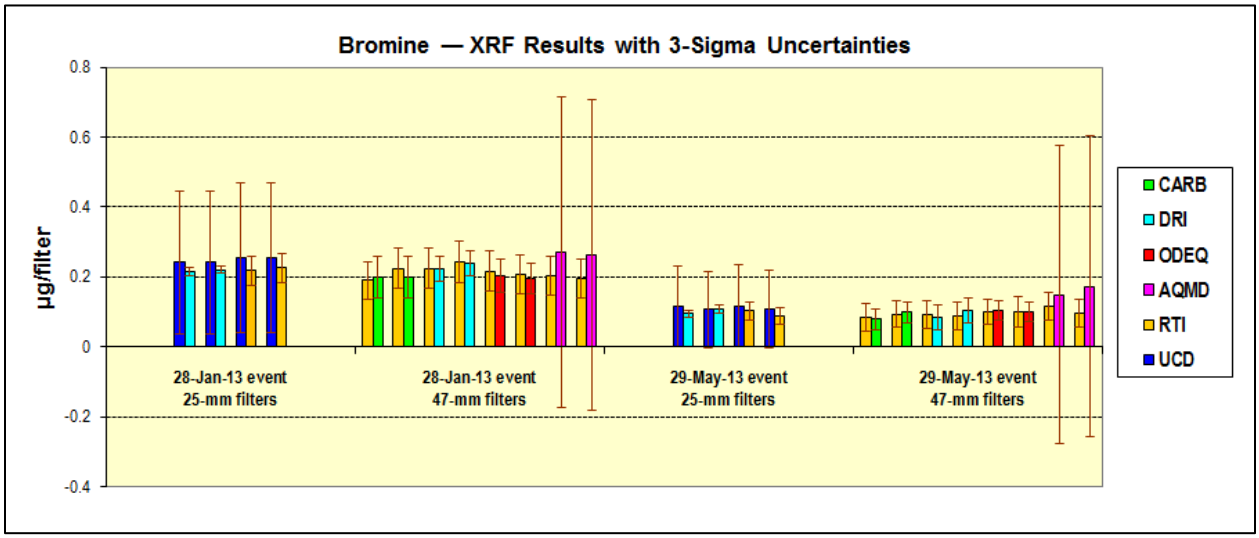


Figure 24

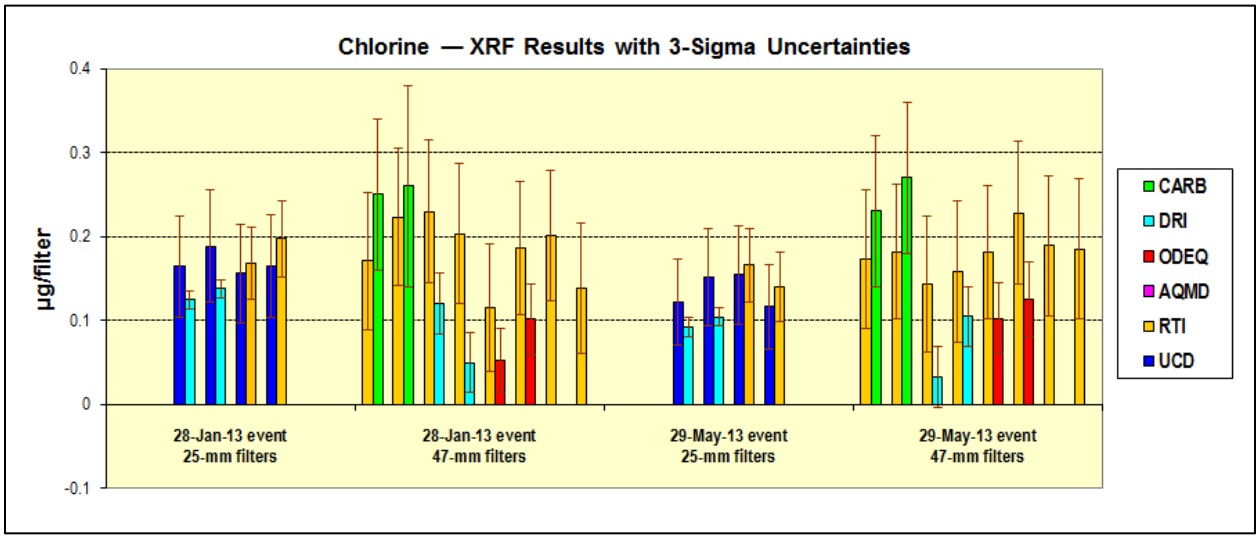


Figure 25

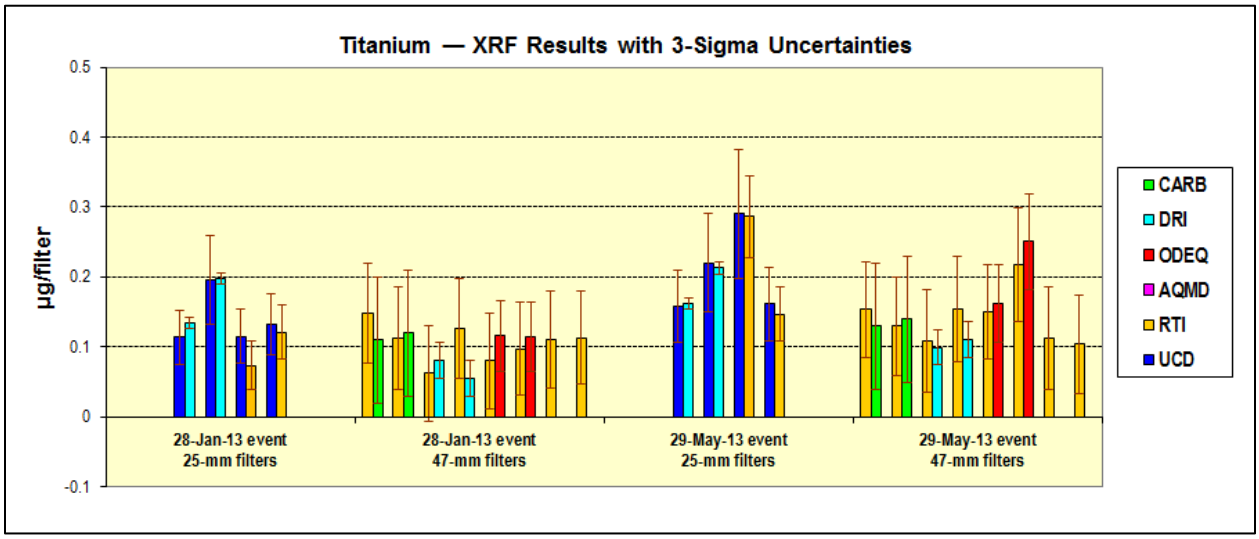


Figure 26

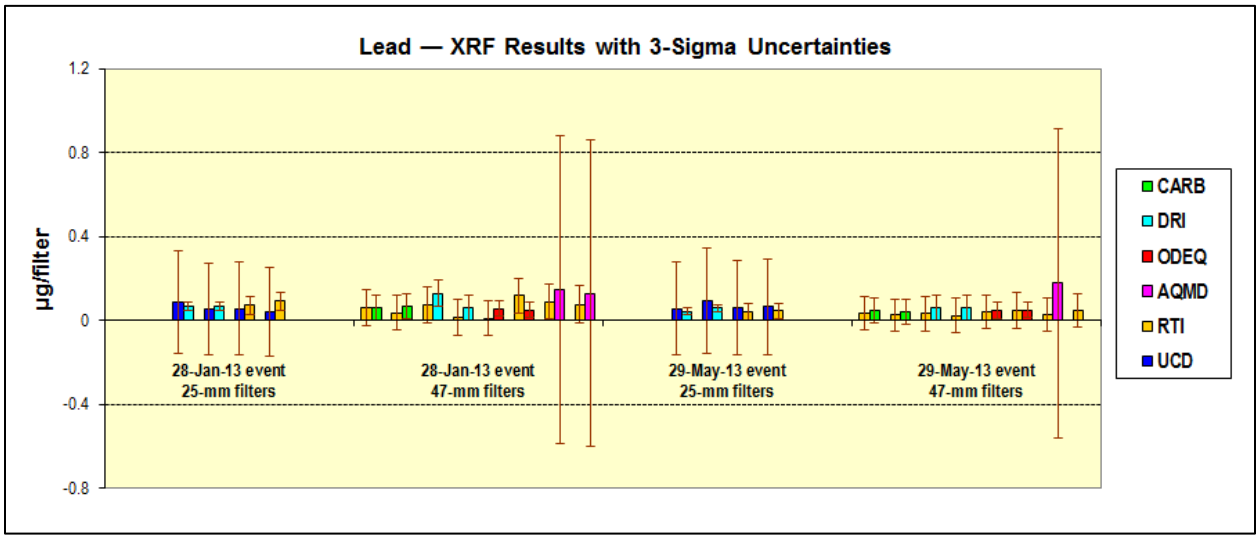


Figure 27

All of the elements plotted in figures 17 through 22 produced analytical results that were larger than the associated 3-sigma uncertainty. However, a close inspection of figures 23 through 27 will reveal at least one result in each figure that was smaller than the 3-sigma uncertainty or at least one result that was zero (not detected).

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 12, and results from the 25-mm filters are presented in table 13. 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 14 through 16.

Conclusions

This study was designed to evaluate the analytical performance of several $PM_{2.5}$ speciation labs. The approach was similar to the previous study (see reference 32). 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: micro-gravimetric mass, IC, TOA carbon, and XRF.

Six gravimetric test labs participated in this study by weighing a set of PT samples that were also weighed at NAREL. Each sample set contained ten Teflon® filters and two metallic weights. All of the test lab results showed good agreement with results produced at NAREL. All of the test lab results were within the 3-sigma advisory limit established by several years of gravimetric testing.

Six different IC labs participated in this study. All of the labs reported results from a set of Nylon® filters using the CSN method. RTI and NAREL also reported results from an additional set of Nylon® filters using the IMPROVE method. DRI and NAREL reported results from a set of MTL Teflon® filters. Very good agreement among labs was observed in results from the mid-level ions that were present in the hidden replicates, and reasonable agreement was observed in the results from the low-level ions.

Five labs analyzed a set of quartz PT filters, and one lab, RTI, analyzed each filter using two different instruments. All five labs reported results using the IMPROVE_A method. Each lab received a set of six quartz filters that contained hidden replicates, and therefore similar results were expected from the hidden replicate samples. Good agreement was observed for the total carbon (TC) values reported from hidden replicates. This is an improvement over previous studies that showed between-lab bias in the TC results. This study did not include carbon analysis using the CSN method since all of the network monitoring sites have been converted to the IMPROVE_A method.

This is the sixth annual study supported by NAREL that includes both 25-mm and 47-mm filters for XRF analysis. 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 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 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 aspect of this study.

The XRF results in this report were produced by a variety of instruments and methods. Each XRF lab utilized a unique set of conditions to excite the sample, collect raw data spectra, process the spectra, and calculate the analytical results using the available hardware and software components. Furthermore, since two different filter sizes were used in this study, additional factors have potential to affect the analytical results in this report.

- different filter face velocity during sampling

- different thickness of filter 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 UCD, RTI, and DRI. UCD and RTI were willing to serve as the XRF reference lab for the 25-mm and 47-mm filters respectively. DRI and RTI made extra effort to report results from both filter sizes.

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Table 9. 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)		
T13-14695	42-hr event 21-Jan-2014	369.679	369.685	369.765	369.766	0.086	0.081	-0.005	CARB
T13-14696	42-hr event 21-Jan-2014	374.076	374.083	374.167	374.169	0.091	0.086	-0.005	CARB
T13-14697	36-hr event 23-Jan-2014	370.415	370.421	370.502	370.506	0.087	0.085	-0.002	CARB
T13-14698	36-hr event 23-Jan-2014	366.018	366.027	366.109	366.113	0.091	0.086	-0.005	CARB
T13-14699	24-hr event 25-Jan-2014	367.319	367.327	367.435	367.438	0.116	0.111	-0.005	CARB
T13-14700	24-hr event 25-Jan-2014	364.213	364.220	364.328	364.333	0.115	0.113	-0.002	CARB
T13-14701	20-hr event 26-Jan-2014	367.513	367.520	367.587	367.592	0.074	0.072	-0.002	CARB
T13-14702	blank	362.788	362.794	362.789	362.790	0.001	-0.004	-0.005	CARB
T13-14703	blank	364.541	364.548	364.541	364.543	0.000	-0.005	-0.005	CARB
T13-14704	blank	370.611	370.618	370.614	370.613	0.003	-0.005	-0.008	CARB
MW13-14755	metallic transfer weight	474.036	474.038	474.035	474.037	-0.001	-0.001	0.000	CARB
MW13-14756	metallic transfer weight	94.831	94.832	94.830	94.833	-0.001	0.001	0.002	CARB
T13-14705	42-hr event 21-Jan-2014	367.103	367.077	367.187	367.166	0.084	0.089	0.005	DRI
T13-14706	42-hr event 21-Jan-2014	370.775	370.752	370.862	370.841	0.087	0.089	0.002	DRI
T13-14707	36-hr event 23-Jan-2014	372.152	372.126	372.233	372.218	0.081	0.092	0.011	DRI
T13-14708	36-hr event 23-Jan-2014	372.636	372.612	372.722	372.702	0.086	0.090	0.004	DRI
T13-14709	24-hr event 25-Jan-2014	371.003	370.977	371.109	371.091	0.106	0.114	0.008	DRI
T13-14710	24-hr event 25-Jan-2014	368.367	368.347	368.478	368.464	0.111	0.117	0.006	DRI
T13-14711	20-hr event 26-Jan-2014	364.075	364.054	364.158	364.137	0.083	0.083	0.000	DRI
T13-14712	blank	370.162	370.137	370.163	370.137	0.001	0.000	-0.001	DRI
T13-14713	blank	367.785	367.759	367.788	367.759	0.003	0.000	-0.003	DRI
T13-14714	blank	367.610	367.582	367.610	367.584	0.000	0.002	0.002	DRI
MW13-14757	metallic transfer weight	469.850	469.849	469.850	469.850	0.000	0.001	0.001	DRI
MW13-14758	metallic transfer weight	99.714	99.715	99.713	99.714	-0.001	-0.001	0.000	DRI
T13-14715	42-hr event 21-Jan-2014	365.720	365.730	365.806	365.815	0.086	0.085	-0.001	ODEQ
T13-14716	42-hr event 21-Jan-2014	370.320	370.331	370.409	370.416	0.089	0.085	-0.004	ODEQ

Table 9. 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)		
T13-14717	36-hr event 23-Jan-2014	369.272	369.284	369.361	369.368	0.089	0.084	-0.005	ODEQ
T13-14718	36-hr event 23-Jan-2014	365.253	365.264	365.349	365.355	0.096	0.091	-0.005	ODEQ
T13-14719	24-hr event 25-Jan-2014	366.966	366.977	367.081	367.090	0.115	0.113	-0.002	ODEQ
T13-14720	24-hr event 25-Jan-2014	364.471	364.482	364.593	364.599	0.122	0.117	-0.005	ODEQ
T13-14721	20-hr event 26-Jan-2014	369.435	369.446	369.512	369.517	0.077	0.071	-0.006	ODEQ
T13-14722	blank	369.694	369.707	369.700	369.703	0.006	-0.004	-0.010	ODEQ
T13-14723	blank	371.086	371.098	371.090	371.094	0.004	-0.004	-0.008	ODEQ
T13-14724	blank	371.998	372.010	372.003	372.008	0.005	-0.002	-0.007	ODEQ
MW13-14759	metallic transfer weight	495.542	495.545	495.539	495.545	-0.003	0.000	0.003	ODEQ
MW13-14760	metallic transfer weight	84.754	84.757	84.753	84.756	-0.001	-0.001	0.000	ODEQ
T13-14725	42-hr event 21-Jan-2014	371.202	371.206	371.283	371.288	0.081	0.082	0.001	RTI
T13-14726	42-hr event 21-Jan-2014	369.888	369.893	369.968	369.978	0.080	0.085	0.005	RTI
T13-14727	36-hr event 23-Jan-2014	371.031	371.036	371.115	371.124	0.084	0.088	0.004	RTI
T13-14728	36-hr event 23-Jan-2014	370.744	370.750	370.828	370.835	0.084	0.085	0.001	RTI
T13-14729	24-hr event 25-Jan-2014	365.597	365.601	365.712	365.715	0.115	0.114	-0.001	RTI
T13-14730	24-hr event 25-Jan-2014	370.116	370.122	370.229	370.237	0.113	0.115	0.002	RTI
T13-14731	20-hr event 26-Jan-2014	363.466	363.473	363.538	363.545	0.072	0.072	0.000	RTI
T13-14732	blank	362.959	362.965	362.961	362.963	0.002	-0.002	-0.004	RTI
T13-14733	blank	365.777	365.783	365.780	365.781	0.003	-0.002	-0.005	RTI
T13-14734	blank	365.164	365.168	365.165	365.167	0.001	-0.001	-0.002	RTI
MW13-14761	metallic transfer weight	479.567	479.568	479.566	479.568	-0.001	0.000	0.001	RTI
MW13-14762	metallic transfer weight	96.351	96.353	96.351	96.353	0.000	0.000	0.000	RTI
T13-14735	42-hr event 21-Jan-2014	363.497	363.493	363.577	363.578	0.080	0.085	0.005	AQMD
T13-14736	42-hr event 21-Jan-2014	364.973	364.976	365.063	365.062	0.090	0.086	-0.004	AQMD
T13-14737	36-hr event 23-Jan-2014	365.070	365.069	365.157	365.156	0.087	0.087	0.000	AQMD
T13-14738	36-hr event 23-Jan-2014	366.422	366.429	366.512	366.514	0.090	0.085	-0.005	AQMD

Table 9. 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)		
T13-14739	24-hr event 25-Jan-2014	368.130	368.132	368.247	368.242	0.117	0.110	-0.007	AQMD
T13-14740	24-hr event 25-Jan-2014	369.771	369.771	369.887	369.885	0.116	0.114	-0.002	AQMD
T13-14741	20-hr event 26-Jan-2014	367.672	367.671	367.745	367.745	0.073	0.074	0.001	AQMD
T13-14742	blank	367.052	367.052	367.051	367.049	-0.001	-0.003	-0.002	AQMD
T13-14743	blank	371.321	371.327	371.330	371.321	0.009	-0.006	-0.015	AQMD
T13-14744	blank	367.085	367.086	367.086	367.084	0.001	-0.002	-0.003	AQMD
MW13-14763	metallic transfer weight	484.900	484.901	484.900	484.902	0.000	0.001	0.001	AQMD
MW13-14764	metallic transfer weight	87.548	87.550	87.548	87.550	0.000	0.000	0.000	AQMD
T13-14745	42-hr event 21-Jan-2014	41.516	41.521	41.605	41.607	0.089	0.086	-0.003	UCD
T13-14747	42-hr event 21-Jan-2014	43.162	43.167	43.259	43.262	0.097	0.095	-0.002	UCD
T13-14748	36-hr event 23-Jan-2014	42.571	42.576	42.665	42.667	0.094	0.091	-0.003	UCD
T13-14749	36-hr event 23-Jan-2014	41.740	41.745	41.837	41.837	0.097	0.092	-0.005	UCD
T13-14750	24-hr event 25-Jan-2014	42.116	42.121	42.238	42.240	0.122	0.119	-0.003	UCD
T13-14751	24-hr event 25-Jan-2014	42.813	42.818	42.937	42.938	0.124	0.120	-0.004	UCD
T13-14752	20-hr event 26-Jan-2014	42.169	42.174	42.245	42.246	0.076	0.072	-0.004	UCD
T13-14746	blank	44.715	44.722	44.719	44.721	0.004	-0.001	-0.005	UCD
T13-14753	blank	46.826	46.831	46.829	46.830	0.003	-0.001	-0.004	UCD
T13-14754	blank	41.250	41.254	41.252	41.253	0.002	-0.001	-0.003	UCD
MW13-14765	metallic transfer weight	90.600	90.603	90.601	90.603	0.001	0.000	-0.001	UCD
MW13-14766	metallic transfer weight	38.533	38.535	38.534	38.535	0.001	0.000	-0.001	UCD

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

Table 10. Ion Chromatography PT Results

Sample ID	Filter Medium	Sample Description	Lab	Method	Concentration (µg/filter)						
					Chloride	Nitrite	Nitrate	Sulfate	Sodium	Ammonium	Potassium
N13-14767	Nylon®	200-hr event 02/08/13	CARB	CSN	-----	-----	51.8	164.0	2.07	57.0	3.00
N13-14768	Nylon®	200-hr event 02/08/13	CARB	CSN	-----	-----	56.7	158.0	2.05	57.5	3.00
N13-14787	Nylon®	192-hr event 05/05/13	CARB	CSN	-----	-----	48.1	222.0	3.37	71.2	3.76
N13-14788	Nylon®	192-hr event 05/05/13	CARB	CSN	-----	-----	49.3	220.0	3.50	72.3	3.74
N13-14807	Nylon®	filter blank	CARB	CSN	-----	-----	<0.5	<1.75	<0.75	<0.5	<1.25
N13-14808	Nylon®	filter blank	CARB	CSN	-----	-----	0.6	<1.75	<0.75	<0.5	<1.25
N13-14769	Nylon®	200-hr event 02/08/13	DRI	CSN	-----	-----	49.8	153.8	1.97	59.6	2.57
N13-14770	Nylon®	200-hr event 02/08/13	DRI	CSN	-----	-----	49.3	154.3	1.96	59.1	2.57
N13-14789	Nylon®	192-hr event 05/05/13	DRI	CSN	-----	-----	45.2	210.3	3.09	74.3	3.07
N13-14790	Nylon®	192-hr event 05/05/13	DRI	CSN	-----	-----	45.8	213.1	3.49	74.3	3.15
N13-14809	Nylon®	filter blank	DRI	CSN	-----	-----	0.0	0.3	0.00	0.0	0.00
N13-14810	Nylon®	filter blank	DRI	CSN	-----	-----	0.0	0.0	0.00	0.0	0.00
N13-14771	Nylon®	200-hr event 02/08/13	ODEQ	CSN	-----	-----	52.1	166	2.1	57.9	3.03
N13-14772	Nylon®	200-hr event 02/08/13	ODEQ	CSN	-----	-----	50.6	158	2.15	55.3	2.84
N13-14791	Nylon®	192-hr event 05/05/13	ODEQ	CSN	-----	-----	47.5	225	3.29	65.2	3.35
N13-14792	Nylon®	192-hr event 05/05/13	ODEQ	CSN	-----	-----	47.8	218	3.75	63.8	3.43
N13-14811	Nylon®	filter blank	ODEQ	CSN	-----	-----	<0.40	<0.29	<0.21	<0.10	<0.31
N13-14812	Nylon®	filter blank	ODEQ	CSN	-----	-----	<0.40	<0.29	<0.21	<0.10	<0.31
N13-14773	Nylon®	200-hr event 02/08/13	RTI	CSN	-----	-----	54.5	163.5	2.12	65.6	2.69
N13-14774	Nylon®	200-hr event 02/08/13	RTI	CSN	-----	-----	54.7	164.0	2.13	65.2	2.71
N13-14793	Nylon®	192-hr event 05/05/13	RTI	CSN	-----	-----	47.7	229.0	3.58	83.1	3.46
N13-14794	Nylon®	192-hr event 05/05/13	RTI	CSN	-----	-----	45.2	229.3	3.47	82.9	3.44
N13-14813	Nylon®	filter blank	RTI	CSN	-----	-----	0.0	0.0	0.00	0.0	0.00
N13-14814	Nylon®	filter blank	RTI	CSN	-----	-----	0.0	0.0	0.00	0.0	0.00
N13-14775	Nylon®	200-hr event 02/08/13	AQMD	CSN	2.90	-----	54.6	163.7	1.94	60.9	1.41
N13-14776	Nylon®	200-hr event 02/08/13	AQMD	CSN	2.90	-----	53.0	158.0	1.95	59.3	1.65
N13-14795	Nylon®	192-hr event 05/05/13	AQMD	CSN	3.70	-----	47.4	222.4	3.20	74.9	2.73
N13-14796	Nylon®	192-hr event 05/05/13	AQMD	CSN	3.70	-----	47.6	215.3	3.63	74.5	3.08
N13-14815	Nylon®	filter blank	AQMD	CSN	<1.5	-----	<1.5	<1.5	0.00	0.2	0.00
N13-14816	Nylon®	filter blank	AQMD	CSN	<1.5	-----	<1.5	<1.5	0.00	0.0	0.00
N13-14777	Nylon®	200-hr event 02/08/13	NAREL	CSN	-----	-----	56.0	163.3	2.10	62.7	3.24
N13-14778	Nylon®	200-hr event 02/08/13	NAREL	CSN	-----	-----	61.2	161.4	3.31	61.9	3.96

Table 10. Ion Chromatography PT Results

Sample ID	Filter Medium	Sample Description	Lab	Method	Concentration (µg/filter)						
					Chloride	Nitrite	Nitrate	Sulfate	Sodium	Ammonium	Potassium
N13-14797	Nylon®	192-hr event 05/05/13	NAREL	CSN	-----	-----	53.5	222.3	3.46	79.3	4.10
N13-14798	Nylon®	192-hr event 05/05/13	NAREL	CSN	-----	-----	51.9	223.1	3.89	81.4	4.45
N13-14817	Nylon®	filter blank	NAREL	CSN	-----	-----	ND	ND	ND	-0.3	ND
N13-14818	Nylon®	filter blank	NAREL	CSN	-----	-----	0.6	ND	ND	-0.3	ND
N13-14779	Nylon®	192-hr event 02/19/13	RTI	IMPROVE	3.37	0.77	49.2	125.1	-----	48.6	-----
N13-14780	Nylon®	192-hr event 02/19/13	RTI	IMPROVE	2.48	0.00	47.2	122.5	-----	49.1	-----
N13-14799	Nylon®	164-hr event 05/16/13	RTI	IMPROVE	4.46	0.24	42.2	211.3	-----	61.4	-----
N13-14800	Nylon®	164-hr event 05/16/13	RTI	IMPROVE	4.57	0.24	40.6	211.8	-----	61.3	-----
N13-14819	Nylon®	filter blank	RTI	IMPROVE	0.00	0.52	0.0	0.0	-----	0.0	-----
N13-14820	Nylon®	filter blank	RTI	IMPROVE	0.00	0.36	0.0	0.0	-----	0.0	-----
N13-14781	Nylon®	192-hr event 02/19/13	NAREL	IMPROVE	4.56	1.08	51.5	110.7	-----	45.2	-----
N13-14782	Nylon®	192-hr event 02/19/13	NAREL	IMPROVE	3.52	1.48	52.0	121.6	-----	49.0	-----
N13-14801	Nylon®	164-hr event 05/16/13	NAREL	IMPROVE	4.72	1.34	43.6	208.8	-----	58.1	-----
N13-14802	Nylon®	164-hr event 05/16/13	NAREL	IMPROVE	4.64	0.47	42.5	213.2	-----	60.1	-----
N13-14821	Nylon®	filter blank	NAREL	IMPROVE	0.36	0.18	ND	0.1	-----	-0.3	-----
N13-14822	Nylon®	filter blank	NAREL	IMPROVE	ND	0.70	ND	ND	-----	-0.3	-----
T13-14783	MTL Teflon®	192-hr event 02/19/13	DRI	CSN	-----	-----	8.2	114.2	1.22	47.4	2.18
T13-14784	MTL Teflon®	192-hr event 02/19/13	DRI	CSN	-----	-----	8.1	113.2	1.19	47.5	2.24
T13-14803	MTL Teflon®	164-hr event 05/16/13	DRI	CSN	-----	-----	0.8	202.3	14.39	60.5	3.65
T13-14804	MTL Teflon®	164-hr event 05/16/13	DRI	CSN	-----	-----	1.7	204.5	18.88	58.0	3.98
T13-14823	MTL Teflon®	filter blank	DRI	CSN	-----	-----	0.0	0.0	0.00	0.0	0.00
T13-14824	MTL Teflon®	filter blank	DRI	CSN	-----	-----	0.0	0.0	0.00	0.0	0.00
T13-14785	MTL Teflon®	192-hr event 02/19/13	NAREL	CSN	-----	-----	9.9	116.0	1.52	43.2	2.76
T13-14786	MTL Teflon®	192-hr event 02/19/13	NAREL	CSN	-----	-----	8.3	112.9	1.51	42.6	2.81
T13-14805	MTL Teflon®	164-hr event 05/16/13	NAREL	CSN	-----	-----	2.8	203.0	11.23	55.4	2.86
T13-14806	MTL Teflon®	164-hr event 05/16/13	NAREL	CSN	-----	-----	1.0	206.4	12.62	55.7	2.96
T13-14825	MTL Teflon®	filter blank	NAREL	CSN	-----	-----	ND	ND	0.24	-0.3	ND
T13-14826	MTL Teflon®	filter blank	NAREL	CSN	-----	-----	ND	ND	0.25	-0.3	ND

Table 11. 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
Q13-14827	216-hr event 10/23/12	CARB	#1	IMPROVE_A	21.4	4.4	25.9	0.4	4.4	8.2	4.1	4.3
Q13-14828	216-hr event 10/23/12	CARB	#1	IMPROVE_A	21.8	4.7	26.6	0.4	4.8	8.2	4.1	4.2
Q13-14829	216-hr event 10/23/12	DRI	#8	IMPROVE_A	21.1 ± 1.3	4.2 ± 0.5	25.3 ± 0.7	0.4 ± 0.0	5.9 ± 0.5	6.5 ± 0.6	4.1 ± 0.6	4.3 ± 0.5
Q13-14830	216-hr event 10/23/12	DRI	#9	IMPROVE_A	21.1 ± 1.3	5.1 ± 0.6	26.2 ± 0.7	1.7 ± 0.0	5.6 ± 0.5	6.4 ± 0.6	3.8 ± 0.6	3.5 ± 0.4
Q13-14831	216-hr event 10/23/12	RTI	T	IMPROVE_A	22.8 ± 1.7	5.7 ± 0.9	28.5 ± 2.3	1.9 ± 0.7	7.3 ± 1.0	5.3 ± 1.2	4.5 ± 2.7	3.8 ± 2.0
Q13-14831	216-hr event 10/23/12	RTI	#4	IMPROVE_A	21.8 ± 1.7	6.1 ± 0.9	27.8 ± 2.3	2.3 ± 0.7	6.4 ± 0.9	5.4 ± 1.2	3.0 ± 2.1	4.6 ± 2.3
Q13-14832	216-hr event 10/23/12	RTI	T	IMPROVE_A	22.4 ± 1.7	5.5 ± 0.9	27.9 ± 2.3	1.6 ± 0.7	7.4 ± 1.0	5.4 ± 1.2	4.5 ± 2.7	3.6 ± 2.0
Q13-14832	216-hr event 10/23/12	RTI	#4	IMPROVE_A	22.0 ± 1.7	5.8 ± 0.9	27.8 ± 2.3	1.8 ± 0.7	6.7 ± 0.9	5.5 ± 1.2	2.8 ± 2.0	5.3 ± 2.5
Q13-14833	216-hr event 10/23/12	AQMD	#3	IMPROVE_A	23.5 ± 2.0	5.1 ± 0.2	28.6 ± 2.0	0.0	5.7	7.0	3.7	7.1
Q13-14834	216-hr event 10/23/12	AQMD	#3	IMPROVE_A	24.1 ± 2.2	5.4 ± 0.6	29.5 ± 2.2	0.0	6.4	7.0	4.1	6.6
Q13-14835	216-hr event 10/23/12	NAREL	#2	IMPROVE_A	21.4 ± 1.2	5.1 ± 0.4	26.4 ± 1.5	0.6	5.3	6.3	1.6	7.6
Q13-14836	216-hr event 10/23/12	NAREL	#2	IMPROVE_A	21.4 ± 1.2	4.7 ± 0.3	26.1 ± 1.5	0.8	5.2	6.3	1.6	7.5
Q13-14837	232-hr event 04/25/13	CARB	#1	IMPROVE_A	11.5	2.9	14.4	0.3	2.5	4.4	2.2	2.2
Q13-14838	232-hr event 04/25/13	CARB	#1	IMPROVE_A	10.9	2.5	13.3	0.0	2.4	4.2	2.0	2.3
Q13-14839	232-hr event 04/25/13	DRI	#10	IMPROVE_A	11.4 ± 0.7	3.2 ± 0.4	14.6 ± 0.5	0.3 ± 0.0	3.1 ± 0.3	3.6 ± 0.3	2.2 ± 0.3	2.2 ± 0.3
Q13-14840	232-hr event 04/25/13	DRI	#10	IMPROVE_A	9.8 ± 0.7	3.0 ± 0.4	12.8 ± 0.4	0.0 ± 0.0	2.8 ± 0.2	3.1 ± 0.3	1.8 ± 0.3	2.2 ± 0.3
Q13-14841	232-hr event 04/25/13	RTI	T	IMPROVE_A	11.8 ± 1.2	3.0 ± 0.7	14.7 ± 1.6	0.4 ± 0.6	4.4 ± 0.8	2.4 ± 1.0	2.1 ± 1.7	2.5 ± 1.6
Q13-14841	232-hr event 04/25/13	RTI	#4	IMPROVE_A	11.4 ± 1.2	3.1 ± 0.8	14.5 ± 1.6	0.6 ± 0.6	3.7 ± 0.8	2.6 ± 1.0	1.5 ± 1.5	3.0 ± 1.8
Q13-14842	232-hr event 04/25/13	RTI	T	IMPROVE_A	12.1 ± 1.2	3.3 ± 0.8	15.5 ± 1.7	0.2 ± 0.6	4.2 ± 0.8	2.9 ± 1.0	2.3 ± 1.8	2.5 ± 1.7
Q13-14842	232-hr event 04/25/13	RTI	#4	IMPROVE_A	11.6 ± 1.2	3.8 ± 0.8	15.4 ± 1.7	0.6 ± 0.6	4.0 ± 0.8	3.0 ± 1.1	1.6 ± 1.6	2.4 ± 1.6
Q13-14843	232-hr event 04/25/13	AQMD	#3	IMPROVE_A	12.4 ± 2.0	3.0 ± 0.4	15.3 ± 2.1	0.0	3.0	3.6	2.2	3.5
Q13-14844	232-hr event 04/25/13	AQMD	#3	IMPROVE_A	12.1 ± 2.1	3.0 ± 0.2	15.1 ± 2.1	0.0	3.0	3.6	2.2	3.4
Q13-14845	232-hr event 04/25/13	NAREL	#2	IMPROVE_A	11.2 ± 0.7	2.6 ± 0.2	13.8 ± 0.9	0.3	3.0	2.8	1.1	4.0
Q13-14846	232-hr event 04/25/13	NAREL	#2	IMPROVE_A	11.8 ± 0.7	2.8 ± 0.2	14.6 ± 0.9	0.3	3.2	2.8	1.2	4.2
Q13-14847	filter blank	CARB	#1	IMPROVE_A	<0.8	<0.8	<0.8	0.2	0.1	0.2	0.0	0.0
Q13-14848	filter blank	CARB	#1	IMPROVE_A	<0.8	<0.8	<0.8	0.1	0.0	0.1	0.0	0.0
Q13-14849	filter blank	DRI	#9	IMPROVE_A	0.0 ± 0.3	0.0 ± 0.1	0.0 ± 0.3	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.2	0.0 ± 0.1	0.0 ± 0.1
Q13-14850	filter blank	DRI	#10	IMPROVE_A	0.0 ± 0.3	0.0 ± 0.1	0.0 ± 0.3	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.2	0.0 ± 0.1	0.0 ± 0.1
Q13-14851	filter blank	RTI	T	IMPROVE_A	0.0 ± 0.6	0.0 ± 0.6	0.0 ± 0.9	0.0 ± 0.6	0.0 ± 0.6	0.0 ± 0.9	0.0 ± 0.9	0.0 ± 0.9
Q13-14851	filter blank	RTI	#4	IMPROVE_A	0.3 ± 0.6	0.0 ± 0.6	0.3 ± 0.9	0.0 ± 0.6	0.0 ± 0.6	0.1 ± 0.9	0.0 ± 0.9	0.0 ± 0.9
Q13-14852	filter blank	RTI	T	IMPROVE_A	0.6 ± 0.6	0.0 ± 0.6	0.6 ± 0.9	0.0 ± 0.6	0.0 ± 0.6	0.5 ± 0.9	0.0 ± 0.9	0.1 ± 0.9
Q13-14852	filter blank	RTI	#4	IMPROVE_A	0.1 ± 0.6	0.0 ± 0.6	0.1 ± 0.9	0.0 ± 0.6	0.0 ± 0.6	0.1 ± 0.9	0.0 ± 0.9	0.0 ± 0.9

Table 11. 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
Q13-14853	filter blank	AQMD	#3	IMPROVE_A	ND	ND	ND	0.0	0.0	0.1	0	-0.04
Q13-14854	filter blank	AQMD	#3	IMPROVE_A	ND	ND	ND	0.0	0.0	0.0	0	0
Q13-14855	filter blank	NAREL	#2	IMPROVE_A	0.1 ± 0.1	0.0 ± 0.1	0.1 ± 0.2	0.0	0.0	0.1	0.0	0.0
Q13-14856	filter blank	NAREL	#2	IMPROVE_A	0.1 ± 0.1	0.0 ± 0.1	0.1 ± 0.2	0.0	0.0	0.0	0.0	0.0

Table 12. 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	
152-hr. event 01/28/13	T13-14857	CARB	Na	11	-----	-----	-----	6.622	0.558	0.302	-----
152-hr. event 01/28/13	T13-14857	CARB	Mg	12	-----	-----	-----	1.199	0.094	0.114	-----
152-hr. event 01/28/13	T13-14857	CARB	Al	13	0.95	0.170	0.200	0.870	0.127	0.129	-----
152-hr. event 01/28/13	T13-14857	CARB	Si	14	5.12	0.280	0.060	4.955	0.338	0.093	5.223
152-hr. event 01/28/13	T13-14857	CARB	P	15	0.1	0.060	0.040	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14857	CARB	S	16	34.1	1.690	0.050	31.572	1.586	0.095	33.923
152-hr. event 01/28/13	T13-14857	CARB	Cl	17	0.25	0.030	0.060	0.171	0.027	0.075	-----
152-hr. event 01/28/13	T13-14857	CARB	K	19	3.12	0.160	0.070	2.933	0.149	0.070	2.995
152-hr. event 01/28/13	T13-14857	CARB	Ca	20	1.29	0.070	0.060	1.154	0.061	0.073	1.305
152-hr. event 01/28/13	T13-14857	CARB	Ti	22	0.11	0.030	0.040	0.149	0.024	0.051	-----
152-hr. event 01/28/13	T13-14857	CARB	V	23	0.03	0.020	0.030	0.035	0.015	0.037	-----
152-hr. event 01/28/13	T13-14857	CARB	Cr	24	<0.03	ND	0.030	0.020	0.009	0.025	-----
152-hr. event 01/28/13	T13-14857	CARB	Mn	25	0.07	0.010	0.030	0.052	0.010	0.018	-----
152-hr. event 01/28/13	T13-14857	CARB	Fe	26	1.27	0.070	0.040	1.364	0.071	0.016	1.510
152-hr. event 01/28/13	T13-14857	CARB	Co	27	0.03	0.010	0.030	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14857	CARB	Ni	28	<0.03	ND	0.030	0.013	0.004	0.012	-----
152-hr. event 01/28/13	T13-14857	CARB	Cu	29	0.07	0.020	0.040	0.042	0.006	0.016	-----
152-hr. event 01/28/13	T13-14857	CARB	Zn	30	0.33	0.030	0.020	0.314	0.018	0.017	0.330
152-hr. event 01/28/13	T13-14857	CARB	As	33	0.04	0.010	0.020	0.018	0.016	0.009	-----
152-hr. event 01/28/13	T13-14857	CARB	Se	34	0.02	0.010	0.020	0.015	0.010	0.013	-----
152-hr. event 01/28/13	T13-14857	CARB	Br	35	0.2	0.020	0.020	0.190	0.018	0.013	-----
152-hr. event 01/28/13	T13-14857	CARB	Rb	37	<0.02	ND	0.020	0.015	0.011	0.019	-----
152-hr. event 01/28/13	T13-14857	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14857	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14857	CARB	Ag	47	-----	-----	-----	0.023	0.136	0.125	-----
152-hr. event 01/28/13	T13-14857	CARB	Cd	48	-----	-----	-----	0.215	0.181	0.166	-----
152-hr. event 01/28/13	T13-14857	CARB	In	49	-----	-----	-----	0.057	0.003	0.154	-----
152-hr. event 01/28/13	T13-14857	CARB	Sn	50	<0.02	ND	0.020	0.000	0.086	0.197	-----
152-hr. event 01/28/13	T13-14857	CARB	Sb	51	0.26	0.140	0.020	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14857	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14857	CARB	Ba	56	0.24	0.070	0.020	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14857	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14857	CARB	Pb	82	0.06	0.020	0.030	0.060	0.028	0.025	-----
152-hr. event 01/28/13	T13-14858	CARB	Na	11	-----	-----	-----	6.983	0.587	0.302	-----
152-hr. event 01/28/13	T13-14858	CARB	Mg	12	-----	-----	-----	1.346	0.103	0.114	-----
152-hr. event 01/28/13	T13-14858	CARB	Al	13	0.92	0.170	0.200	0.791	0.125	0.129	-----
152-hr. event 01/28/13	T13-14858	CARB	Si	14	5.26	0.290	0.060	5.187	0.353	0.093	5.223
152-hr. event 01/28/13	T13-14858	CARB	P	15	0.07	0.060	0.040	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14858	CARB	S	16	34.43	1.720	0.050	32.510	1.632	0.095	33.923
152-hr. event 01/28/13	T13-14858	CARB	Cl	17	0.26	0.040	0.060	0.223	0.027	0.075	-----
152-hr. event 01/28/13	T13-14858	CARB	K	19	3.18	0.160	0.070	3.010	0.153	0.070	2.995
152-hr. event 01/28/13	T13-14858	CARB	Ca	20	1.36	0.070	0.060	1.242	0.065	0.073	1.305
152-hr. event 01/28/13	T13-14858	CARB	Ti	22	0.12	0.030	0.040	0.113	0.024	0.051	-----
152-hr. event 01/28/13	T13-14858	CARB	V	23	0.04	0.020	0.030	0.053	0.015	0.037	-----
152-hr. event 01/28/13	T13-14858	CARB	Cr	24	0.15	0.020	0.030	0.216	0.016	0.025	-----
152-hr. event 01/28/13	T13-14858	CARB	Mn	25	0.08	0.010	0.030	0.060	0.009	0.018	-----
152-hr. event 01/28/13	T13-14858	CARB	Fe	26	1.67	0.090	0.040	1.916	0.098	0.016	1.510
152-hr. event 01/28/13	T13-14858	CARB	Co	27	0.05	0.010	0.030	0.000	0.007	0.013	-----
152-hr. event 01/28/13	T13-14858	CARB	Ni	28	0.05	0.010	0.030	0.045	0.005	0.012	-----
152-hr. event 01/28/13	T13-14858	CARB	Cu	29	0.07	0.020	0.040	0.063	0.007	0.016	-----
152-hr. event 01/28/13	T13-14858	CARB	Zn	30	0.33	0.030	0.020	0.309	0.018	0.017	0.330
152-hr. event 01/28/13	T13-14858	CARB	As	33	0.03	0.010	0.020	0.046	0.016	0.009	-----
152-hr. event 01/28/13	T13-14858	CARB	Se	34	0.02	0.010	0.020	0.004	0.009	0.013	-----
152-hr. event 01/28/13	T13-14858	CARB	Br	35	0.2	0.020	0.020	0.225	0.019	0.013	-----
152-hr. event 01/28/13	T13-14858	CARB	Rb	37	<0.02	ND	0.020	0.000	0.004	0.019	-----
152-hr. event 01/28/13	T13-14858	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14858	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14858	CARB	Ag	47	-----	-----	-----	0.000	0.046	0.125	-----
152-hr. event 01/28/13	T13-14858	CARB	Cd	48	-----	-----	-----	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14858	CARB	In	49	-----	-----	-----	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14858	CARB	Sn	50	<0.02	ND	0.020	0.000	0.086	0.197	-----
152-hr. event 01/28/13	T13-14858	CARB	Sb	51	<0.02	ND	0.020	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14858	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14858	CARB	Ba	56	<0.02	ND	0.020	0.000	0.032	0.105	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14858	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14858	CARB	Pb	82	0.07	0.020	0.030	0.037	0.028	0.025	-----
162-hr. event 05/29/13	T13-14873	CARB	Na	11	-----	-----	-----	8.769	0.733	0.302	-----
162-hr. event 05/29/13	T13-14873	CARB	Mg	12	-----	-----	-----	1.565	0.117	0.114	-----
162-hr. event 05/29/13	T13-14873	CARB	Al	13	1.17	0.170	0.200	0.949	0.130	0.129	1.555
162-hr. event 05/29/13	T13-14873	CARB	Si	14	6.74	0.360	0.060	6.488	0.437	0.093	7.604
162-hr. event 05/29/13	T13-14873	CARB	P	15	0.19	0.060	0.040	0.000	0.068	0.155	-----
162-hr. event 05/29/13	T13-14873	CARB	S	16	33.58	1.670	0.050	31.358	1.575	0.095	35.464
162-hr. event 05/29/13	T13-14873	CARB	Cl	17	0.23	0.030	0.060	0.173	0.027	0.075	-----
162-hr. event 05/29/13	T13-14873	CARB	K	19	4.12	0.210	0.070	3.963	0.201	0.070	4.196
162-hr. event 05/29/13	T13-14873	CARB	Ca	20	1.71	0.090	0.060	1.589	0.082	0.073	1.831
162-hr. event 05/29/13	T13-14873	CARB	Ti	22	0.13	0.030	0.040	0.154	0.023	0.051	-----
162-hr. event 05/29/13	T13-14873	CARB	V	23	<0.03	ND	0.030	0.016	0.014	0.037	-----
162-hr. event 05/29/13	T13-14873	CARB	Cr	24	<0.03	ND	0.030	0.008	0.009	0.025	-----
162-hr. event 05/29/13	T13-14873	CARB	Mn	25	0.08	0.010	0.030	0.062	0.008	0.018	-----
162-hr. event 05/29/13	T13-14873	CARB	Fe	26	1.41	0.080	0.040	1.514	0.078	0.016	1.790
162-hr. event 05/29/13	T13-14873	CARB	Co	27	0.03	0.010	0.030	0.004	0.007	0.013	-----
162-hr. event 05/29/13	T13-14873	CARB	Ni	28	<0.03	ND	0.030	0.000	0.003	0.012	-----
162-hr. event 05/29/13	T13-14873	CARB	Cu	29	0.05	0.020	0.040	0.024	0.006	0.016	-----
162-hr. event 05/29/13	T13-14873	CARB	Zn	30	0.52	0.040	0.020	0.523	0.028	0.017	0.613
162-hr. event 05/29/13	T13-14873	CARB	As	33	0.02	0.010	0.020	0.012	0.015	0.009	-----
162-hr. event 05/29/13	T13-14873	CARB	Se	34	<0.02	ND	0.020	0.006	0.009	0.013	-----
162-hr. event 05/29/13	T13-14873	CARB	Br	35	0.08	0.010	0.020	0.085	0.013	0.013	-----
162-hr. event 05/29/13	T13-14873	CARB	Rb	37	<0.02	ND	0.020	0.000	0.004	0.019	-----
162-hr. event 05/29/13	T13-14873	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14873	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14873	CARB	Ag	47	-----	-----	-----	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14873	CARB	Cd	48	-----	-----	-----	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14873	CARB	In	49	-----	-----	-----	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14873	CARB	Sn	50	<0.02	ND	0.020	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14873	CARB	Sb	51	<0.02	ND	0.020	0.000	0.100	0.376	-----
162-hr. event 05/29/13	T13-14873	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14873	CARB	Ba	56	0.24	0.070	0.020	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14873	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14873	CARB	Pb	82	0.05	0.020	0.030	0.034	0.026	0.025	-----
162-hr. event 05/29/13	T13-14874	CARB	Na	11	-----	-----	-----	9.108	0.761	0.302	-----
162-hr. event 05/29/13	T13-14874	CARB	Mg	12	-----	-----	-----	1.651	0.123	0.114	-----
162-hr. event 05/29/13	T13-14874	CARB	Al	13	1.22	0.170	0.200	0.961	0.130	0.129	1.555
162-hr. event 05/29/13	T13-14874	CARB	Si	14	7.02	0.370	0.060	6.586	0.444	0.093	7.604
162-hr. event 05/29/13	T13-14874	CARB	P	15	0.18	0.050	0.040	0.000	0.068	0.155	-----
162-hr. event 05/29/13	T13-14874	CARB	S	16	35.08	1.740	0.050	32.533	1.634	0.095	35.464
162-hr. event 05/29/13	T13-14874	CARB	Cl	17	0.27	0.030	0.060	0.182	0.026	0.075	-----
162-hr. event 05/29/13	T13-14874	CARB	K	19	4.27	0.210	0.070	4.048	0.205	0.070	4.196
162-hr. event 05/29/13	T13-14874	CARB	Ca	20	1.77	0.090	0.060	1.616	0.083	0.073	1.831
162-hr. event 05/29/13	T13-14874	CARB	Ti	22	0.14	0.030	0.040	0.130	0.024	0.051	-----
162-hr. event 05/29/13	T13-14874	CARB	V	23	<0.03	ND	0.030	0.026	0.014	0.037	-----
162-hr. event 05/29/13	T13-14874	CARB	Cr	24	<0.03	ND	0.030	0.006	0.008	0.025	-----
162-hr. event 05/29/13	T13-14874	CARB	Mn	25	0.09	0.010	0.030	0.061	0.008	0.018	-----
162-hr. event 05/29/13	T13-14874	CARB	Fe	26	1.47	0.080	0.040	1.532	0.079	0.016	1.790
162-hr. event 05/29/13	T13-14874	CARB	Co	27	0.04	0.010	0.030	0.005	0.000	0.013	-----
162-hr. event 05/29/13	T13-14874	CARB	Ni	28	<0.03	ND	0.030	0.003	0.004	0.012	-----
162-hr. event 05/29/13	T13-14874	CARB	Cu	29	0.04	0.020	0.040	0.036	0.005	0.016	-----
162-hr. event 05/29/13	T13-14874	CARB	Zn	30	0.55	0.040	0.020	0.524	0.028	0.017	0.613
162-hr. event 05/29/13	T13-14874	CARB	As	33	0.03	0.010	0.020	0.019	0.015	0.009	-----
162-hr. event 05/29/13	T13-14874	CARB	Se	34	<0.02	ND	0.020	0.013	0.009	0.013	-----
162-hr. event 05/29/13	T13-14874	CARB	Br	35	0.1	0.010	0.020	0.094	0.012	0.013	-----
162-hr. event 05/29/13	T13-14874	CARB	Rb	37	<0.02	ND	0.020	0.005	0.000	0.019	-----
162-hr. event 05/29/13	T13-14874	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14874	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14874	CARB	Ag	47	-----	-----	-----	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14874	CARB	Cd	48	-----	-----	-----	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14874	CARB	In	49	-----	-----	-----	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14874	CARB	Sn	50	<0.02	ND	0.020	0.124	0.006	0.197	-----
162-hr. event 05/29/13	T13-14874	CARB	Sb	51	<0.02	ND	0.020	0.000	0.083	0.376	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14874	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14874	CARB	Ba	56	0.22	0.070	0.020	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14874	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14874	CARB	Pb	82	0.04	0.020	0.030	0.026	0.025	0.025	-----
blank filter	T13-14889	CARB	Na	11	-----	-----	-----	0.000	0.095	0.302	-----
blank filter	T13-14889	CARB	Mg	12	-----	-----	-----	0.000	0.032	0.114	-----
blank filter	T13-14889	CARB	Al	13	<0.20	ND	0.200	0.000	0.085	0.129	-----
blank filter	T13-14889	CARB	Si	14	<0.06	ND	0.060	0.000	0.042	0.093	-----
blank filter	T13-14889	CARB	P	15	<0.04	ND	0.040	0.000	0.031	0.155	-----
blank filter	T13-14889	CARB	S	16	<0.05	ND	0.050	0.000	0.021	0.095	-----
blank filter	T13-14889	CARB	Cl	17	<0.06	ND	0.060	0.006	0.015	0.075	-----
blank filter	T13-14889	CARB	K	19	<0.07	ND	0.070	0.000	0.017	0.070	-----
blank filter	T13-14889	CARB	Ca	20	<0.06	ND	0.060	0.000	0.016	0.073	-----
blank filter	T13-14889	CARB	Ti	22	<0.04	ND	0.040	0.000	0.013	0.051	-----
blank filter	T13-14889	CARB	V	23	<0.03	ND	0.030	0.000	0.011	0.037	-----
blank filter	T13-14889	CARB	Cr	24	<0.03	ND	0.030	0.000	0.008	0.025	-----
blank filter	T13-14889	CARB	Mn	25	<0.03	ND	0.030	0.000	0.006	0.018	-----
blank filter	T13-14889	CARB	Fe	26	<0.04	ND	0.040	0.000	0.005	0.016	-----
blank filter	T13-14889	CARB	Co	27	<0.03	ND	0.030	0.000	0.004	0.013	-----
blank filter	T13-14889	CARB	Ni	28	<0.03	ND	0.030	0.000	0.003	0.012	-----
blank filter	T13-14889	CARB	Cu	29	<0.04	ND	0.040	0.000	0.004	0.016	-----
blank filter	T13-14889	CARB	Zn	30	<0.02	ND	0.020	0.000	0.004	0.017	-----
blank filter	T13-14889	CARB	As	33	<0.02	ND	0.020	0.000	0.006	0.009	-----
blank filter	T13-14889	CARB	Se	34	<0.02	ND	0.020	0.000	0.006	0.013	-----
blank filter	T13-14889	CARB	Br	35	<0.02	ND	0.020	0.000	0.005	0.013	-----
blank filter	T13-14889	CARB	Rb	37	<0.02	ND	0.020	0.000	0.004	0.019	-----
blank filter	T13-14889	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
blank filter	T13-14889	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
blank filter	T13-14889	CARB	Ag	47	-----	-----	-----	0.000	0.046	0.125	-----
blank filter	T13-14889	CARB	Cd	48	-----	-----	-----	0.000	0.048	0.166	-----
blank filter	T13-14889	CARB	In	49	-----	-----	-----	0.000	0.050	0.154	-----
blank filter	T13-14889	CARB	Sn	50	<0.02	ND	0.020	0.000	0.086	0.197	-----

Table 12. 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	T13-14889	CARB	Sb	51	<0.02	ND	0.020	0.000	0.100	0.376	-----
blank filter	T13-14889	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----
blank filter	T13-14889	CARB	Ba	56	<0.02	ND	0.020	0.000	0.032	0.105	-----
blank filter	T13-14889	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----
blank filter	T13-14889	CARB	Pb	82	<0.03	ND	0.030	0.000	0.013	0.025	-----
blank filter	T13-14890	CARB	Na	11	-----	-----	-----	0.000	0.095	0.302	-----
blank filter	T13-14890	CARB	Mg	12	-----	-----	-----	0.000	0.032	0.114	-----
blank filter	T13-14890	CARB	Al	13	<0.20	ND	0.200	0.000	0.085	0.129	-----
blank filter	T13-14890	CARB	Si	14	<0.06	ND	0.060	0.000	0.042	0.093	-----
blank filter	T13-14890	CARB	P	15	<0.04	ND	0.040	0.000	0.031	0.155	-----
blank filter	T13-14890	CARB	S	16	<0.05	ND	0.050	0.000	0.021	0.095	-----
blank filter	T13-14890	CARB	Cl	17	<0.06	ND	0.060	0.006	0.015	0.075	-----
blank filter	T13-14890	CARB	K	19	<0.07	ND	0.070	0.000	0.015	0.070	-----
blank filter	T13-14890	CARB	Ca	20	<0.06	ND	0.060	0.002	0.014	0.073	-----
blank filter	T13-14890	CARB	Ti	22	<0.04	ND	0.040	0.028	0.019	0.051	-----
blank filter	T13-14890	CARB	V	23	<0.03	ND	0.030	0.000	0.011	0.037	-----
blank filter	T13-14890	CARB	Cr	24	<0.03	ND	0.030	0.000	0.008	0.025	-----
blank filter	T13-14890	CARB	Mn	25	<0.03	ND	0.030	0.000	0.006	0.018	-----
blank filter	T13-14890	CARB	Fe	26	<0.04	ND	0.040	0.003	0.006	0.016	-----
blank filter	T13-14890	CARB	Co	27	<0.03	ND	0.030	0.000	0.004	0.013	-----
blank filter	T13-14890	CARB	Ni	28	<0.03	ND	0.030	0.000	0.003	0.012	-----
blank filter	T13-14890	CARB	Cu	29	<0.04	ND	0.040	0.000	0.004	0.016	-----
blank filter	T13-14890	CARB	Zn	30	<0.02	ND	0.020	0.000	0.004	0.017	-----
blank filter	T13-14890	CARB	As	33	<0.02	ND	0.020	0.010	0.007	0.009	-----
blank filter	T13-14890	CARB	Se	34	<0.02	ND	0.020	0.000	0.008	0.013	-----
blank filter	T13-14890	CARB	Br	35	<0.02	ND	0.020	0.000	0.005	0.013	-----
blank filter	T13-14890	CARB	Rb	37	<0.02	ND	0.020	0.000	0.004	0.019	-----
blank filter	T13-14890	CARB	Sr	38	<0.03	ND	0.030	0.000	0.081	0.023	-----
blank filter	T13-14890	CARB	Zr	40	-----	-----	-----	0.000	0.085	0.032	-----
blank filter	T13-14890	CARB	Ag	47	-----	-----	-----	0.000	0.046	0.125	-----
blank filter	T13-14890	CARB	Cd	48	-----	-----	-----	0.000	0.048	0.166	-----
blank filter	T13-14890	CARB	In	49	-----	-----	-----	0.102	0.237	0.154	-----

Table 12. 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	T13-14890	CARB	Sn	50	<0.02	ND	0.020	0.000	0.086	0.197	-----
blank filter	T13-14890	CARB	Sb	51	<0.02	ND	0.020	0.000	0.100	0.376	-----
blank filter	T13-14890	CARB	Cs	55	-----	-----	-----	0.000	0.039	0.110	-----
blank filter	T13-14890	CARB	Ba	56	<0.02	ND	0.020	0.000	0.032	0.105	-----
blank filter	T13-14890	CARB	Ce	58	-----	-----	-----	0.000	0.026	0.094	-----
blank filter	T13-14890	CARB	Pb	82	<0.03	ND	0.030	0.000	0.013	0.025	-----
152-hr. event 01/28/13	T13-14859	DRI	Na	11	0.000	8.840	4.597	6.859	0.577	0.302	-----
152-hr. event 01/28/13	T13-14859	DRI	Mg	12	0.000	1.915	1.133	1.184	0.093	0.114	-----
152-hr. event 01/28/13	T13-14859	DRI	Al	13	1.995	0.479	0.572	0.599	0.120	0.129	-----
152-hr. event 01/28/13	T13-14859	DRI	Si	14	4.763	0.065	0.207	5.154	0.351	0.093	5.223
152-hr. event 01/28/13	T13-14859	DRI	P	15	0.000	0.027	0.073	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14859	DRI	S	16	40.875	0.115	0.140	32.646	1.639	0.095	33.923
152-hr. event 01/28/13	T13-14859	DRI	Cl	17	0.120	0.012	0.040	0.229	0.028	0.075	-----
152-hr. event 01/28/13	T13-14859	DRI	K	19	3.171	0.024	0.061	3.044	0.155	0.070	2.995
152-hr. event 01/28/13	T13-14859	DRI	Ca	20	1.536	0.016	0.100	1.233	0.065	0.073	1.305
152-hr. event 01/28/13	T13-14859	DRI	Ti	22	0.081	0.009	0.060	0.062	0.023	0.051	-----
152-hr. event 01/28/13	T13-14859	DRI	V	23	0.009	0.003	0.007	0.021	0.015	0.037	-----
152-hr. event 01/28/13	T13-14859	DRI	Cr	24	0.000	0.014	0.030	0.020	0.009	0.025	-----
152-hr. event 01/28/13	T13-14859	DRI	Mn	25	0.059	0.034	0.074	0.038	0.008	0.018	-----
152-hr. event 01/28/13	T13-14859	DRI	Fe	26	1.588	0.057	0.090	1.405	0.073	0.016	1.510
152-hr. event 01/28/13	T13-14859	DRI	Co	27	0.000	0.003	0.012	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14859	DRI	Ni	28	0.011	0.007	0.018	0.011	0.004	0.012	-----
152-hr. event 01/28/13	T13-14859	DRI	Cu	29	0.080	0.012	0.041	0.048	0.006	0.016	-----
152-hr. event 01/28/13	T13-14859	DRI	Zn	30	0.397	0.021	0.035	0.329	0.019	0.017	0.330
152-hr. event 01/28/13	T13-14859	DRI	As	33	0.000	0.007	0.028	0.041	0.016	0.009	-----
152-hr. event 01/28/13	T13-14859	DRI	Se	34	0.024	0.015	0.037	0.012	0.010	0.013	-----
152-hr. event 01/28/13	T13-14859	DRI	Br	35	0.225	0.012	0.042	0.225	0.019	0.013	-----
152-hr. event 01/28/13	T13-14859	DRI	Rb	37	0.000	0.003	0.027	0.000	0.006	0.019	-----
152-hr. event 01/28/13	T13-14859	DRI	Sr	38	0.035	0.012	0.044	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14859	DRI	Zr	40	0.037	0.015	0.085	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14859	DRI	Ag	47	0.000	0.034	0.114	0.000	0.046	0.125	-----
152-hr. event 01/28/13	T13-14859	DRI	Cd	48	0.000	0.068	0.116	0.102	0.192	0.166	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14859	DRI	In	49	0.000	0.032	0.104	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14859	DRI	Sn	50	0.015	0.061	0.130	0.000	0.086	0.197	-----
152-hr. event 01/28/13	T13-14859	DRI	Sb	51	0.038	0.085	0.182	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14859	DRI	Cs	55	0.054	0.172	0.175	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14859	DRI	Ba	56	0.000	0.121	0.273	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14859	DRI	Ce	58	0.118	0.475	0.407	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14859	DRI	Pb	82	0.130	0.020	0.079	0.073	0.028	0.025	-----
152-hr. event 01/28/13	T13-14860	DRI	Na	11	0.000	9.570	4.597	6.859	0.577	0.302	-----
152-hr. event 01/28/13	T13-14860	DRI	Mg	12	0.000	1.907	1.133	1.122	0.090	0.114	-----
152-hr. event 01/28/13	T13-14860	DRI	Al	13	0.766	0.476	0.572	0.791	0.125	0.129	-----
152-hr. event 01/28/13	T13-14860	DRI	Si	14	4.204	0.063	0.207	5.036	0.343	0.093	5.223
152-hr. event 01/28/13	T13-14860	DRI	P	15	0.000	0.027	0.073	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14860	DRI	S	16	40.236	0.113	0.140	32.510	1.632	0.095	33.923
152-hr. event 01/28/13	T13-14860	DRI	Cl	17	0.050	0.012	0.040	0.203	0.028	0.075	-----
152-hr. event 01/28/13	T13-14860	DRI	K	19	3.085	0.024	0.061	3.077	0.156	0.070	2.995
152-hr. event 01/28/13	T13-14860	DRI	Ca	20	1.434	0.016	0.100	1.180	0.062	0.073	1.305
152-hr. event 01/28/13	T13-14860	DRI	Ti	22	0.055	0.009	0.060	0.127	0.023	0.051	-----
152-hr. event 01/28/13	T13-14860	DRI	V	23	0.000	0.003	0.007	0.066	0.015	0.037	-----
152-hr. event 01/28/13	T13-14860	DRI	Cr	24	0.006	0.014	0.030	0.016	0.009	0.025	-----
152-hr. event 01/28/13	T13-14860	DRI	Mn	25	0.000	0.034	0.074	0.059	0.008	0.018	-----
152-hr. event 01/28/13	T13-14860	DRI	Fe	26	1.522	0.057	0.090	1.387	0.072	0.016	1.510
152-hr. event 01/28/13	T13-14860	DRI	Co	27	0.000	0.003	0.012	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14860	DRI	Ni	28	0.000	0.007	0.018	0.008	0.004	0.012	-----
152-hr. event 01/28/13	T13-14860	DRI	Cu	29	0.063	0.012	0.041	0.055	0.006	0.016	-----
152-hr. event 01/28/13	T13-14860	DRI	Zn	30	0.396	0.021	0.035	0.316	0.018	0.017	0.330
152-hr. event 01/28/13	T13-14860	DRI	As	33	0.000	0.007	0.028	0.033	0.016	0.009	-----
152-hr. event 01/28/13	T13-14860	DRI	Se	34	0.000	0.015	0.037	0.017	0.009	0.013	-----
152-hr. event 01/28/13	T13-14860	DRI	Br	35	0.241	0.012	0.042	0.242	0.020	0.013	-----
152-hr. event 01/28/13	T13-14860	DRI	Rb	37	0.011	0.003	0.027	0.000	0.006	0.019	-----
152-hr. event 01/28/13	T13-14860	DRI	Sr	38	0.034	0.012	0.044	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14860	DRI	Zr	40	0.023	0.015	0.085	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14860	DRI	Ag	47	0.000	0.034	0.114	0.000	0.046	0.125	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14860	DRI	Cd	48	0.000	0.068	0.116	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14860	DRI	In	49	0.000	0.032	0.104	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14860	DRI	Sn	50	0.000	0.061	0.130	0.000	0.086	0.197	-----
152-hr. event 01/28/13	T13-14860	DRI	Sb	51	0.011	0.085	0.182	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14860	DRI	Cs	55	0.000	0.171	0.175	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14860	DRI	Ba	56	0.000	0.122	0.273	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14860	DRI	Ce	58	0.192	0.475	0.407	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14860	DRI	Pb	82	0.062	0.020	0.079	0.015	0.029	0.025	-----
162-hr. event 05/29/13	T13-14875	DRI	Na	11	0.000	8.906	4.597	8.475	0.709	0.302	-----
162-hr. event 05/29/13	T13-14875	DRI	Mg	12	0.000	1.924	1.133	1.485	0.112	0.114	-----
162-hr. event 05/29/13	T13-14875	DRI	Al	13	1.712	0.478	0.572	0.814	0.136	0.129	1.555
162-hr. event 05/29/13	T13-14875	DRI	Si	14	5.988	0.068	0.207	6.500	0.438	0.093	7.604
162-hr. event 05/29/13	T13-14875	DRI	P	15	0.000	0.027	0.073	0.000	0.068	0.155	-----
162-hr. event 05/29/13	T13-14875	DRI	S	16	39.926	0.113	0.140	31.516	1.583	0.095	35.464
162-hr. event 05/29/13	T13-14875	DRI	Cl	17	0.033	0.012	0.040	0.144	0.027	0.075	-----
162-hr. event 05/29/13	T13-14875	DRI	K	19	4.034	0.025	0.061	3.987	0.202	0.070	4.196
162-hr. event 05/29/13	T13-14875	DRI	Ca	20	1.729	0.016	0.100	1.579	0.082	0.073	1.831
162-hr. event 05/29/13	T13-14875	DRI	Ti	22	0.100	0.009	0.060	0.108	0.024	0.051	-----
162-hr. event 05/29/13	T13-14875	DRI	V	23	0.000	0.003	0.007	0.053	0.016	0.037	-----
162-hr. event 05/29/13	T13-14875	DRI	Cr	24	0.017	0.014	0.030	0.023	0.010	0.025	-----
162-hr. event 05/29/13	T13-14875	DRI	Mn	25	0.075	0.034	0.074	0.058	0.009	0.018	-----
162-hr. event 05/29/13	T13-14875	DRI	Fe	26	1.735	0.057	0.090	1.581	0.081	0.016	1.790
162-hr. event 05/29/13	T13-14875	DRI	Co	27	0.000	0.003	0.012	0.002	0.007	0.013	-----
162-hr. event 05/29/13	T13-14875	DRI	Ni	28	0.014	0.007	0.018	0.012	0.004	0.012	-----
162-hr. event 05/29/13	T13-14875	DRI	Cu	29	0.020	0.012	0.041	0.034	0.006	0.016	-----
162-hr. event 05/29/13	T13-14875	DRI	Zn	30	0.673	0.021	0.035	0.498	0.027	0.017	0.613
162-hr. event 05/29/13	T13-14875	DRI	As	33	0.000	0.007	0.028	0.018	0.016	0.009	-----
162-hr. event 05/29/13	T13-14875	DRI	Se	34	0.013	0.015	0.037	0.003	0.009	0.013	-----
162-hr. event 05/29/13	T13-14875	DRI	Br	35	0.085	0.012	0.042	0.093	0.013	0.013	-----
162-hr. event 05/29/13	T13-14875	DRI	Rb	37	0.000	0.003	0.027	0.006	0.011	0.019	-----
162-hr. event 05/29/13	T13-14875	DRI	Sr	38	0.036	0.012	0.044	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14875	DRI	Zr	40	0.012	0.015	0.085	0.000	0.085	0.032	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14875	DRI	Ag	47	0.000	0.034	0.114	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14875	DRI	Cd	48	0.000	0.068	0.116	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14875	DRI	In	49	0.000	0.032	0.104	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14875	DRI	Sn	50	0.000	0.061	0.130	0.102	0.339	0.197	-----
162-hr. event 05/29/13	T13-14875	DRI	Sb	51	0.000	0.085	0.182	0.045	0.463	0.376	-----
162-hr. event 05/29/13	T13-14875	DRI	Cs	55	0.091	0.172	0.175	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14875	DRI	Ba	56	0.000	0.120	0.273	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14875	DRI	Ce	58	0.424	0.475	0.407	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14875	DRI	Pb	82	0.063	0.020	0.079	0.032	0.028	0.025	-----
162-hr. event 05/29/13	T13-14876	DRI	Na	11	0.000	8.638	4.597	8.984	0.750	0.302	-----
162-hr. event 05/29/13	T13-14876	DRI	Mg	12	0.000	1.896	1.133	1.706	0.126	0.114	-----
162-hr. event 05/29/13	T13-14876	DRI	Al	13	2.001	0.479	0.572	1.130	0.146	0.129	1.555
162-hr. event 05/29/13	T13-14876	DRI	Si	14	5.946	0.068	0.207	6.917	0.466	0.093	7.604
162-hr. event 05/29/13	T13-14876	DRI	P	15	0.000	0.027	0.073	0.000	0.071	0.155	-----
162-hr. event 05/29/13	T13-14876	DRI	S	16	41.691	0.117	0.140	33.527	1.683	0.095	35.464
162-hr. event 05/29/13	T13-14876	DRI	Cl	17	0.105	0.012	0.040	0.158	0.028	0.075	-----
162-hr. event 05/29/13	T13-14876	DRI	K	19	4.342	0.025	0.061	4.262	0.215	0.070	4.196
162-hr. event 05/29/13	T13-14876	DRI	Ca	20	2.059	0.017	0.100	1.670	0.086	0.073	1.831
162-hr. event 05/29/13	T13-14876	DRI	Ti	22	0.110	0.009	0.060	0.155	0.025	0.051	-----
162-hr. event 05/29/13	T13-14876	DRI	V	23	0.012	0.003	0.007	0.037	0.015	0.037	-----
162-hr. event 05/29/13	T13-14876	DRI	Cr	24	0.015	0.014	0.030	0.024	0.009	0.025	-----
162-hr. event 05/29/13	T13-14876	DRI	Mn	25	0.050	0.034	0.074	0.059	0.011	0.018	-----
162-hr. event 05/29/13	T13-14876	DRI	Fe	26	1.818	0.057	0.090	1.662	0.086	0.016	1.790
162-hr. event 05/29/13	T13-14876	DRI	Co	27	0.000	0.003	0.012	0.000	0.007	0.013	-----
162-hr. event 05/29/13	T13-14876	DRI	Ni	28	0.001	0.007	0.018	0.006	0.004	0.012	-----
162-hr. event 05/29/13	T13-14876	DRI	Cu	29	0.044	0.012	0.041	0.046	0.006	0.016	-----
162-hr. event 05/29/13	T13-14876	DRI	Zn	30	0.691	0.021	0.035	0.555	0.030	0.017	0.613
162-hr. event 05/29/13	T13-14876	DRI	As	33	0.000	0.007	0.028	0.032	0.015	0.009	-----
162-hr. event 05/29/13	T13-14876	DRI	Se	34	0.000	0.015	0.037	0.016	0.009	0.013	-----
162-hr. event 05/29/13	T13-14876	DRI	Br	35	0.105	0.012	0.042	0.089	0.013	0.013	-----
162-hr. event 05/29/13	T13-14876	DRI	Rb	37	0.014	0.003	0.027	0.002	0.011	0.019	-----
162-hr. event 05/29/13	T13-14876	DRI	Sr	38	0.030	0.012	0.044	0.051	0.106	0.023	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14876	DRI	Zr	40	0.073	0.015	0.085	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14876	DRI	Ag	47	0.000	0.034	0.114	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14876	DRI	Cd	48	0.023	0.068	0.116	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14876	DRI	In	49	0.000	0.032	0.104	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14876	DRI	Sn	50	0.018	0.061	0.130	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14876	DRI	Sb	51	0.040	0.085	0.182	0.068	0.452	0.376	-----
162-hr. event 05/29/13	T13-14876	DRI	Cs	55	0.000	0.171	0.175	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14876	DRI	Ba	56	0.000	0.122	0.273	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14876	DRI	Ce	58	0.000	0.474	0.407	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14876	DRI	Pb	82	0.059	0.020	0.079	0.023	0.027	0.025	-----
blank filter	T13-14891	DRI	Na	11	0.000	8.185	4.597	0.000	0.095	0.302	-----
blank filter	T13-14891	DRI	Mg	12	0.000	1.912	1.133	0.000	0.032	0.114	-----
blank filter	T13-14891	DRI	Al	13	0.000	0.471	0.572	0.000	0.085	0.129	-----
blank filter	T13-14891	DRI	Si	14	0.000	0.052	0.207	0.000	0.042	0.093	-----
blank filter	T13-14891	DRI	P	15	0.000	0.027	0.073	0.000	0.031	0.155	-----
blank filter	T13-14891	DRI	S	16	0.000	0.017	0.140	0.000	0.021	0.095	-----
blank filter	T13-14891	DRI	Cl	17	0.000	0.012	0.040	0.000	0.019	0.075	-----
blank filter	T13-14891	DRI	K	19	0.000	0.022	0.061	0.001	0.014	0.070	-----
blank filter	T13-14891	DRI	Ca	20	0.055	0.014	0.100	0.000	0.016	0.073	-----
blank filter	T13-14891	DRI	Ti	22	0.000	0.009	0.060	0.000	0.013	0.051	-----
blank filter	T13-14891	DRI	V	23	0.000	0.003	0.007	0.000	0.011	0.037	-----
blank filter	T13-14891	DRI	Cr	24	0.000	0.014	0.030	0.000	0.008	0.025	-----
blank filter	T13-14891	DRI	Mn	25	0.000	0.034	0.074	0.000	0.006	0.018	-----
blank filter	T13-14891	DRI	Fe	26	0.112	0.056	0.090	0.007	0.007	0.016	-----
blank filter	T13-14891	DRI	Co	27	0.000	0.003	0.012	0.000	0.004	0.013	-----
blank filter	T13-14891	DRI	Ni	28	0.000	0.007	0.018	0.000	0.003	0.012	-----
blank filter	T13-14891	DRI	Cu	29	0.004	0.012	0.041	0.000	0.004	0.016	-----
blank filter	T13-14891	DRI	Zn	30	0.000	0.020	0.035	0.000	0.004	0.017	-----
blank filter	T13-14891	DRI	As	33	0.000	0.007	0.028	0.000	0.006	0.009	-----
blank filter	T13-14891	DRI	Se	34	0.000	0.015	0.037	0.000	0.006	0.013	-----
blank filter	T13-14891	DRI	Br	35	0.012	0.012	0.042	0.000	0.005	0.013	-----
blank filter	T13-14891	DRI	Rb	37	0.000	0.003	0.027	0.000	0.004	0.019	-----

Table 12. 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	T13-14891	DRI	Sr	38	0.000	0.012	0.044	0.000	0.081	0.023	-----
blank filter	T13-14891	DRI	Zr	40	0.000	0.015	0.085	0.000	0.085	0.032	-----
blank filter	T13-14891	DRI	Ag	47	0.013	0.034	0.114	0.000	0.046	0.125	-----
blank filter	T13-14891	DRI	Cd	48	0.000	0.068	0.116	0.000	0.048	0.166	-----
blank filter	T13-14891	DRI	In	49	0.011	0.032	0.104	0.000	0.050	0.154	-----
blank filter	T13-14891	DRI	Sn	50	0.046	0.061	0.130	0.000	0.086	0.197	-----
blank filter	T13-14891	DRI	Sb	51	0.000	0.085	0.182	0.000	0.100	0.376	-----
blank filter	T13-14891	DRI	Cs	55	0.000	0.171	0.175	0.000	0.039	0.110	-----
blank filter	T13-14891	DRI	Ba	56	0.102	0.121	0.273	0.000	0.032	0.105	-----
blank filter	T13-14891	DRI	Ce	58	0.000	0.474	0.407	0.000	0.026	0.094	-----
blank filter	T13-14891	DRI	Pb	82	0.017	0.020	0.079	0.000	0.013	0.025	-----
blank filter	T13-14892	DRI	Na	11	0.000	7.608	4.597	0.000	0.095	0.302	-----
blank filter	T13-14892	DRI	Mg	12	0.000	1.912	1.133	0.000	0.032	0.114	-----
blank filter	T13-14892	DRI	Al	13	0.000	0.472	0.572	0.000	0.085	0.129	-----
blank filter	T13-14892	DRI	Si	14	0.000	0.052	0.207	0.000	0.042	0.093	-----
blank filter	T13-14892	DRI	P	15	0.047	0.027	0.073	0.000	0.031	0.155	-----
blank filter	T13-14892	DRI	S	16	0.000	0.017	0.140	0.000	0.021	0.095	-----
blank filter	T13-14892	DRI	Cl	17	0.009	0.012	0.040	0.000	0.015	0.075	-----
blank filter	T13-14892	DRI	K	19	0.000	0.022	0.061	0.000	0.015	0.070	-----
blank filter	T13-14892	DRI	Ca	20	0.000	0.014	0.100	0.002	0.014	0.073	-----
blank filter	T13-14892	DRI	Ti	22	0.000	0.009	0.060	0.008	0.017	0.051	-----
blank filter	T13-14892	DRI	V	23	0.000	0.003	0.007	0.000	0.011	0.037	-----
blank filter	T13-14892	DRI	Cr	24	0.001	0.014	0.030	0.000	0.008	0.025	-----
blank filter	T13-14892	DRI	Mn	25	0.000	0.034	0.074	0.000	0.006	0.018	-----
blank filter	T13-14892	DRI	Fe	26	0.002	0.056	0.090	0.000	0.005	0.016	-----
blank filter	T13-14892	DRI	Co	27	0.000	0.003	0.012	0.000	0.004	0.013	-----
blank filter	T13-14892	DRI	Ni	28	0.000	0.007	0.018	0.002	0.004	0.012	-----
blank filter	T13-14892	DRI	Cu	29	0.000	0.012	0.041	0.000	0.004	0.016	-----
blank filter	T13-14892	DRI	Zn	30	0.016	0.020	0.035	0.000	0.004	0.017	-----
blank filter	T13-14892	DRI	As	33	0.000	0.007	0.028	0.000	0.006	0.009	-----
blank filter	T13-14892	DRI	Se	34	0.029	0.015	0.037	0.000	0.006	0.013	-----
blank filter	T13-14892	DRI	Br	35	0.010	0.012	0.042	0.007	0.008	0.013	-----

Table 12. 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	T13-14892	DRI	Rb	37	0.001	0.003	0.027	0.000	0.004	0.019	-----
blank filter	T13-14892	DRI	Sr	38	0.000	0.012	0.044	0.000	0.081	0.023	-----
blank filter	T13-14892	DRI	Zr	40	0.018	0.015	0.085	0.000	0.085	0.032	-----
blank filter	T13-14892	DRI	Ag	47	0.000	0.034	0.114	0.000	0.046	0.125	-----
blank filter	T13-14892	DRI	Cd	48	0.000	0.068	0.116	0.000	0.048	0.166	-----
blank filter	T13-14892	DRI	In	49	0.023	0.032	0.104	0.057	0.237	0.154	-----
blank filter	T13-14892	DRI	Sn	50	0.024	0.061	0.130	0.079	0.328	0.197	-----
blank filter	T13-14892	DRI	Sb	51	0.000	0.085	0.182	0.000	0.083	0.376	-----
blank filter	T13-14892	DRI	Cs	55	0.000	0.171	0.175	0.000	0.039	0.110	-----
blank filter	T13-14892	DRI	Ba	56	0.055	0.120	0.273	0.000	0.032	0.105	-----
blank filter	T13-14892	DRI	Ce	58	0.312	0.475	0.407	0.000	0.026	0.094	-----
blank filter	T13-14892	DRI	Pb	82	0.000	0.020	0.079	0.000	0.013	0.025	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Na	11	9.187	0.907	4.597	6.430	0.543	0.302	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Mg	12	1.037	0.090	1.133	1.131	0.090	0.114	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Al	13	1.400	0.121	0.572	0.689	0.122	0.129	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Si	14	5.519	0.402	0.207	5.057	0.344	0.093	5.223
152-hr. event 01/28/13	T13-14861	ODEQ	P	15	0.057	0.024	0.073	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14861	ODEQ	S	16	34.579	2.425	0.140	31.810	1.598	0.095	33.923
152-hr. event 01/28/13	T13-14861	ODEQ	Cl	17	0.053	0.013	0.040	0.115	0.026	0.075	-----
152-hr. event 01/28/13	T13-14861	ODEQ	K	19	2.857	0.203	0.061	3.017	0.153	0.070	2.995
152-hr. event 01/28/13	T13-14861	ODEQ	Ca	20	1.440	0.108	0.100	1.276	0.067	0.073	1.305
152-hr. event 01/28/13	T13-14861	ODEQ	Ti	22	0.116	0.017	0.060	0.080	0.023	0.051	-----
152-hr. event 01/28/13	T13-14861	ODEQ	V	23	0.017	0.006	0.007	0.016	0.015	0.037	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Cr	24	0.018	0.009	0.030	0.018	0.010	0.025	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Mn	25	0.059	0.009	0.074	0.065	0.011	0.018	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Fe	26	1.497	0.106	0.090	1.414	0.073	0.016	1.510
152-hr. event 01/28/13	T13-14861	ODEQ	Co	27	0.010	0.002	0.012	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Ni	28	0.016	0.006	0.018	0.009	0.004	0.012	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Cu	29	0.054	0.009	0.041	0.053	0.007	0.016	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Zn	30	0.333	0.026	0.035	0.303	0.018	0.017	0.330
152-hr. event 01/28/13	T13-14861	ODEQ	As	33	0.042	0.009	0.028	0.035	0.016	0.009	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Se	34	0.017	0.006	0.037	0.011	0.009	0.013	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14861	ODEQ	Br	35	0.204	0.015	0.042	0.217	0.019	0.013	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Rb	37	-0.001	0.010	0.027	0.000	0.004	0.019	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Sr	38	0.008	0.010	0.044	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Zr	40	0.019	0.012	0.085	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Ag	47	0.064	0.059	0.114	0.000	0.046	0.125	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Cd	48	-0.035	0.090	0.116	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14861	ODEQ	In	49	0.035	0.047	0.104	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Sn	50	0.035	0.225	0.130	0.000	0.086	0.197	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Sb	51	0.130	0.225	0.182	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Cs	55	0.000	0.030	0.175	0.009	0.059	0.110	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Ba	56	0.058	0.024	0.273	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Ce	58	0.000	0.012	0.407	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14861	ODEQ	Pb	82	0.056	0.012	0.079	0.010	0.027	0.025	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Na	11	9.543	0.935	4.597	6.305	0.533	0.302	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Mg	12	0.952	0.084	1.133	1.066	0.086	0.114	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Al	13	1.305	0.115	0.572	0.547	0.117	0.129	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Si	14	5.346	0.390	0.207	4.895	0.334	0.093	5.223
152-hr. event 01/28/13	T13-14862	ODEQ	P	15	0.024	0.024	0.073	0.000	0.068	0.155	-----
152-hr. event 01/28/13	T13-14862	ODEQ	S	16	33.746	2.362	0.140	30.386	1.527	0.095	33.923
152-hr. event 01/28/13	T13-14862	ODEQ	Cl	17	0.101	0.014	0.040	0.186	0.027	0.075	-----
152-hr. event 01/28/13	T13-14862	ODEQ	K	19	2.717	0.193	0.061	2.841	0.144	0.070	2.995
152-hr. event 01/28/13	T13-14862	ODEQ	Ca	20	1.336	0.101	0.100	1.214	0.064	0.073	1.305
152-hr. event 01/28/13	T13-14862	ODEQ	Ti	22	0.115	0.017	0.060	0.097	0.022	0.051	-----
152-hr. event 01/28/13	T13-14862	ODEQ	V	23	0.005	0.006	0.007	0.038	0.014	0.037	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Cr	24	0.009	0.009	0.030	0.004	0.008	0.025	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Mn	25	0.063	0.010	0.074	0.046	0.008	0.018	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Fe	26	1.400	0.099	0.090	1.339	0.069	0.016	1.510
152-hr. event 01/28/13	T13-14862	ODEQ	Co	27	0.000	0.002	0.012	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Ni	28	0.014	0.006	0.018	0.009	0.004	0.012	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Cu	29	0.058	0.009	0.041	0.042	0.006	0.016	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Zn	30	0.322	0.025	0.035	0.284	0.017	0.017	0.330
152-hr. event 01/28/13	T13-14862	ODEQ	As	33	0.054	0.009	0.028	0.000	0.006	0.009	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14862	ODEQ	Se	34	0.016	0.006	0.037	0.028	0.009	0.013	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Br	35	0.196	0.015	0.042	0.208	0.019	0.013	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Rb	37	0.010	0.010	0.027	0.000	0.004	0.019	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Sr	38	0.010	0.010	0.044	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Zr	40	0.024	0.012	0.085	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Ag	47	-0.012	0.059	0.114	0.000	0.046	0.125	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Cd	48	-0.035	0.090	0.116	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14862	ODEQ	In	49	0.154	0.049	0.104	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Sn	50	-0.071	0.225	0.130	0.000	0.062	0.197	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Sb	51	-0.083	0.225	0.182	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Cs	55	0.025	0.030	0.175	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Ba	56	0.077	0.024	0.273	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Ce	58	-0.002	0.012	0.407	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14862	ODEQ	Pb	82	0.050	0.012	0.079	0.118	0.028	0.025	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Na	11	13.341	1.240	4.597	8.577	0.716	0.302	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Mg	12	1.630	0.136	1.133	1.611	0.120	0.114	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Al	13	1.877	0.152	0.572	0.972	0.130	0.129	1.555
162-hr. event 05/29/13	T13-14877	ODEQ	Si	14	8.093	0.589	0.207	6.870	0.462	0.093	7.604
162-hr. event 05/29/13	T13-14877	ODEQ	P	15	0.107	0.025	0.073	0.000	0.068	0.155	-----
162-hr. event 05/29/13	T13-14877	ODEQ	S	16	37.368	2.621	0.140	32.182	1.616	0.095	35.464
162-hr. event 05/29/13	T13-14877	ODEQ	Cl	17	0.102	0.014	0.040	0.181	0.026	0.075	-----
162-hr. event 05/29/13	T13-14877	ODEQ	K	19	4.063	0.286	0.061	4.023	0.203	0.070	4.196
162-hr. event 05/29/13	T13-14877	ODEQ	Ca	20	2.085	0.151	0.100	1.800	0.092	0.073	1.831
162-hr. event 05/29/13	T13-14877	ODEQ	Ti	22	0.162	0.018	0.060	0.150	0.023	0.051	-----
162-hr. event 05/29/13	T13-14877	ODEQ	V	23	0.017	0.006	0.007	0.028	0.014	0.037	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Cr	24	0.012	0.009	0.030	0.013	0.008	0.025	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Mn	25	0.074	0.010	0.074	0.058	0.008	0.018	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Fe	26	1.818	0.129	0.090	1.632	0.084	0.016	1.790
162-hr. event 05/29/13	T13-14877	ODEQ	Co	27	0.000	0.002	0.012	0.007	0.007	0.013	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Ni	28	0.013	0.006	0.018	0.009	0.004	0.012	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Cu	29	0.035	0.009	0.041	0.037	0.006	0.016	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Zn	30	0.626	0.045	0.035	0.546	0.029	0.017	0.613

Table 12. 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	
162-hr. event 05/29/13	T13-14877	ODEQ	As	33	0.027	0.009	0.028	0.003	0.015	0.009	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Se	34	0.008	0.006	0.037	0.017	0.009	0.013	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Br	35	0.104	0.009	0.042	0.101	0.012	0.013	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Rb	37	0.005	0.010	0.027	0.000	0.004	0.019	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Sr	38	0.021	0.010	0.044	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Zr	40	0.018	0.012	0.085	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Ag	47	-0.002	0.059	0.114	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Cd	48	-0.035	0.090	0.116	0.102	0.181	0.166	-----
162-hr. event 05/29/13	T13-14877	ODEQ	In	49	-0.012	0.047	0.104	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Sn	50	0.130	0.225	0.130	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Sb	51	0.000	0.225	0.182	0.045	0.418	0.376	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Cs	55	-0.012	0.030	0.175	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Ba	56	0.046	0.024	0.273	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Ce	58	0.000	0.012	0.407	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14877	ODEQ	Pb	82	0.047	0.012	0.079	0.040	0.026	0.025	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Na	11	17.125	1.560	4.597	11.221	0.932	0.302	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Mg	12	2.150	0.176	1.133	1.916	0.141	0.114	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Al	13	2.684	0.208	0.572	1.390	0.155	0.129	1.555
162-hr. event 05/29/13	T13-14878	ODEQ	Si	14	9.318	0.679	0.207	8.469	0.567	0.093	7.604
162-hr. event 05/29/13	T13-14878	ODEQ	P	15	0.348	0.034	0.073	0.000	0.071	0.155	-----
162-hr. event 05/29/13	T13-14878	ODEQ	S	16	37.474	2.628	0.140	33.312	1.672	0.095	35.464
162-hr. event 05/29/13	T13-14878	ODEQ	Cl	17	0.125	0.015	0.040	0.228	0.028	0.075	-----
162-hr. event 05/29/13	T13-14878	ODEQ	K	19	4.883	0.343	0.061	4.997	0.252	0.070	4.196
162-hr. event 05/29/13	T13-14878	ODEQ	Ca	20	2.966	0.212	0.100	2.556	0.130	0.073	1.831
162-hr. event 05/29/13	T13-14878	ODEQ	Ti	22	0.251	0.023	0.060	0.217	0.027	0.051	-----
162-hr. event 05/29/13	T13-14878	ODEQ	V	23	0.021	0.006	0.007	0.050	0.015	0.037	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Cr	24	0.058	0.009	0.030	0.043	0.011	0.025	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Mn	25	0.099	0.011	0.074	0.092	0.010	0.018	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Fe	26	2.529	0.178	0.090	2.317	0.118	0.016	1.790
162-hr. event 05/29/13	T13-14878	ODEQ	Co	27	0.000	0.002	0.012	0.000	0.007	0.013	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Ni	28	0.020	0.006	0.018	0.012	0.004	0.012	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Cu	29	0.062	0.009	0.041	0.038	0.006	0.016	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14878	ODEQ	Zn	30	0.674	0.048	0.035	0.596	0.032	0.017	0.613
162-hr. event 05/29/13	T13-14878	ODEQ	As	33	0.018	0.008	0.028	0.017	0.016	0.009	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Se	34	0.015	0.006	0.037	0.020	0.009	0.013	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Br	35	0.102	0.009	0.042	0.101	0.014	0.013	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Rb	37	0.000	0.010	0.027	0.004	0.011	0.019	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Sr	38	0.023	0.010	0.044	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Zr	40	0.018	0.012	0.085	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Ag	47	-0.012	0.059	0.114	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Cd	48	-0.035	0.090	0.116	0.057	0.181	0.166	-----
162-hr. event 05/29/13	T13-14878	ODEQ	In	49	-0.012	0.047	0.104	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Sn	50	-0.071	0.225	0.130	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Sb	51	0.296	0.226	0.182	0.203	0.441	0.376	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Cs	55	0.043	0.030	0.175	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Ba	56	0.108	0.025	0.273	0.000	0.045	0.105	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Ce	58	0.000	0.012	0.407	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14878	ODEQ	Pb	82	0.051	0.012	0.079	0.049	0.028	0.025	-----
blank filter	T13-14893	ODEQ	Na	11	-0.014	0.411	4.597	0.000	0.095	0.302	-----
blank filter	T13-14893	ODEQ	Mg	12	0.000	0.033	1.133	0.000	0.030	0.114	-----
blank filter	T13-14893	ODEQ	Al	13	-0.013	0.063	0.572	0.000	0.085	0.129	-----
blank filter	T13-14893	ODEQ	Si	14	0.019	0.019	0.207	0.000	0.042	0.093	-----
blank filter	T13-14893	ODEQ	P	15	0.000	0.024	0.073	0.000	0.031	0.155	-----
blank filter	T13-14893	ODEQ	S	16	-0.012	0.024	0.140	0.000	0.021	0.095	-----
blank filter	T13-14893	ODEQ	Cl	17	0.000	0.012	0.040	0.025	0.014	0.075	-----
blank filter	T13-14893	ODEQ	K	19	0.005	0.030	0.061	0.000	0.015	0.070	-----
blank filter	T13-14893	ODEQ	Ca	20	0.001	0.036	0.100	0.012	0.014	0.073	-----
blank filter	T13-14893	ODEQ	Ti	22	0.006	0.015	0.060	0.019	0.018	0.051	-----
blank filter	T13-14893	ODEQ	V	23	-0.001	0.006	0.007	0.000	0.011	0.037	-----
blank filter	T13-14893	ODEQ	Cr	24	0.000	0.009	0.030	0.000	0.008	0.025	-----
blank filter	T13-14893	ODEQ	Mn	25	0.002	0.009	0.074	0.001	0.006	0.018	-----
blank filter	T13-14893	ODEQ	Fe	26	-0.010	0.012	0.090	0.000	0.005	0.016	-----
blank filter	T13-14893	ODEQ	Co	27	0.000	0.002	0.012	0.001	0.004	0.013	-----
blank filter	T13-14893	ODEQ	Ni	28	0.003	0.006	0.018	0.000	0.003	0.012	-----

Table 12. 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	T13-14893	ODEQ	Cu	29	0.002	0.008	0.041	0.000	0.004	0.016	-----
blank filter	T13-14893	ODEQ	Zn	30	0.003	0.011	0.035	0.000	0.004	0.017	-----
blank filter	T13-14893	ODEQ	As	33	0.000	0.008	0.028	0.000	0.006	0.009	-----
blank filter	T13-14893	ODEQ	Se	34	0.003	0.006	0.037	0.000	0.006	0.013	-----
blank filter	T13-14893	ODEQ	Br	35	0.000	0.006	0.042	0.000	0.005	0.013	-----
blank filter	T13-14893	ODEQ	Rb	37	0.000	0.010	0.027	0.000	0.004	0.019	-----
blank filter	T13-14893	ODEQ	Sr	38	0.000	0.010	0.044	0.000	0.081	0.023	-----
blank filter	T13-14893	ODEQ	Zr	40	-0.002	0.012	0.085	0.000	0.085	0.032	-----
blank filter	T13-14893	ODEQ	Ag	47	-0.012	0.059	0.114	0.000	0.046	0.125	-----
blank filter	T13-14893	ODEQ	Cd	48	-0.035	0.090	0.116	0.000	0.048	0.166	-----
blank filter	T13-14893	ODEQ	In	49	-0.012	0.047	0.104	0.000	0.050	0.154	-----
blank filter	T13-14893	ODEQ	Sn	50	0.035	0.225	0.130	0.000	0.086	0.197	-----
blank filter	T13-14893	ODEQ	Sb	51	-0.083	0.225	0.182	0.000	0.100	0.376	-----
blank filter	T13-14893	ODEQ	Cs	55	-0.012	0.030	0.175	0.000	0.039	0.110	-----
blank filter	T13-14893	ODEQ	Ba	56	-0.012	0.024	0.273	0.000	0.032	0.105	-----
blank filter	T13-14893	ODEQ	Ce	58	0.000	0.012	0.407	0.000	0.026	0.094	-----
blank filter	T13-14893	ODEQ	Pb	82	0.004	0.012	0.079	0.000	0.013	0.025	-----
blank filter	T13-14894	ODEQ	Na	11	0.096	0.411	4.597	0.000	0.095	0.302	-----
blank filter	T13-14894	ODEQ	Mg	12	0.000	0.033	1.133	0.000	0.030	0.114	-----
blank filter	T13-14894	ODEQ	Al	13	0.023	0.063	0.572	0.020	0.069	0.129	-----
blank filter	T13-14894	ODEQ	Si	14	0.016	0.019	0.207	0.028	0.035	0.093	-----
blank filter	T13-14894	ODEQ	P	15	0.000	0.024	0.073	0.000	0.031	0.155	-----
blank filter	T13-14894	ODEQ	S	16	0.021	0.024	0.140	0.018	0.018	0.095	-----
blank filter	T13-14894	ODEQ	Cl	17	0.018	0.012	0.040	0.000	0.015	0.075	-----
blank filter	T13-14894	ODEQ	K	19	0.012	0.030	0.061	0.000	0.015	0.070	-----
blank filter	T13-14894	ODEQ	Ca	20	0.004	0.036	0.100	0.000	0.015	0.073	-----
blank filter	T13-14894	ODEQ	Ti	22	0.016	0.015	0.060	0.000	0.013	0.051	-----
blank filter	T13-14894	ODEQ	V	23	-0.002	0.006	0.007	0.000	0.011	0.037	-----
blank filter	T13-14894	ODEQ	Cr	24	0.004	0.009	0.030	0.000	0.008	0.025	-----
blank filter	T13-14894	ODEQ	Mn	25	0.001	0.009	0.074	0.000	0.006	0.018	-----
blank filter	T13-14894	ODEQ	Fe	26	-0.012	0.012	0.090	0.000	0.005	0.016	-----
blank filter	T13-14894	ODEQ	Co	27	0.000	0.002	0.012	0.000	0.004	0.013	-----

Table 12. 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	T13-14894	ODEQ	Ni	28	0.000	0.006	0.018	0.000	0.003	0.012	-----
blank filter	T13-14894	ODEQ	Cu	29	0.004	0.008	0.041	0.000	0.004	0.016	-----
blank filter	T13-14894	ODEQ	Zn	30	-0.005	0.011	0.035	0.000	0.004	0.017	-----
blank filter	T13-14894	ODEQ	As	33	0.000	0.008	0.028	0.000	0.006	0.009	-----
blank filter	T13-14894	ODEQ	Se	34	0.000	0.006	0.037	0.000	0.006	0.013	-----
blank filter	T13-14894	ODEQ	Br	35	0.003	0.006	0.042	0.013	0.007	0.013	-----
blank filter	T13-14894	ODEQ	Rb	37	0.004	0.010	0.027	0.000	0.004	0.019	-----
blank filter	T13-14894	ODEQ	Sr	38	0.000	0.010	0.044	0.000	0.081	0.023	-----
blank filter	T13-14894	ODEQ	Zr	40	-0.001	0.012	0.085	0.000	0.085	0.032	-----
blank filter	T13-14894	ODEQ	Ag	47	-0.012	0.059	0.114	0.000	0.046	0.125	-----
blank filter	T13-14894	ODEQ	Cd	48	-0.035	0.090	0.116	0.000	0.048	0.166	-----
blank filter	T13-14894	ODEQ	In	49	-0.012	0.047	0.104	0.000	0.050	0.154	-----
blank filter	T13-14894	ODEQ	Sn	50	-0.071	0.225	0.130	0.124	0.316	0.197	-----
blank filter	T13-14894	ODEQ	Sb	51	-0.083	0.225	0.182	0.000	0.100	0.376	-----
blank filter	T13-14894	ODEQ	Cs	55	-0.012	0.030	0.175	0.000	0.039	0.110	-----
blank filter	T13-14894	ODEQ	Ba	56	-0.012	0.024	0.273	0.000	0.032	0.105	-----
blank filter	T13-14894	ODEQ	Ce	58	0.006	0.012	0.407	0.000	0.026	0.094	-----
blank filter	T13-14894	ODEQ	Pb	82	0.001	0.012	0.079	0.000	0.013	0.025	-----
152-hr. event 01/28/13	T13-14863	AQMD	Na	11	4.783	0.990	0.750	6.464	0.543	0.302	-----
152-hr. event 01/28/13	T13-14863	AQMD	Mg	12	1.526	0.724	0.648	1.079	0.087	0.114	-----
152-hr. event 01/28/13	T13-14863	AQMD	Al	13	2.185	0.513	0.403	0.533	0.115	0.129	-----
152-hr. event 01/28/13	T13-14863	AQMD	Si	14	6.008	0.575	0.275	4.751	0.324	0.093	5.223
152-hr. event 01/28/13	T13-14863	AQMD	P	15	1.885	0.242	0.147	0.000	0.065	0.155	-----
152-hr. event 01/28/13	T13-14863	AQMD	S	16	22.506	1.400	0.273	30.567	1.536	0.095	33.923
152-hr. event 01/28/13	T13-14863	AQMD	Cl	17	<MDL	-----	0.127	0.201	0.026	0.075	-----
152-hr. event 01/28/13	T13-14863	AQMD	K	19	2.927	0.216	0.069	2.808	0.143	0.070	2.995
152-hr. event 01/28/13	T13-14863	AQMD	Ca	20	1.308	0.231	0.165	1.170	0.062	0.073	1.305
152-hr. event 01/28/13	T13-14863	AQMD	Ti	22	<MDL	-----	0.186	0.111	0.023	0.051	-----
152-hr. event 01/28/13	T13-14863	AQMD	V	23	<MDL	-----	0.177	0.040	0.014	0.037	-----
152-hr. event 01/28/13	T13-14863	AQMD	Cr	24	<MDL	-----	0.092	0.014	0.009	0.025	-----
152-hr. event 01/28/13	T13-14863	AQMD	Mn	25	<MDL	-----	0.136	0.055	0.008	0.018	-----
152-hr. event 01/28/13	T13-14863	AQMD	Fe	26	1.390	0.207	0.137	1.287	0.067	0.016	1.510

Table 12. 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	
152-hr. event 01/28/13	T13-14863	AQMD	Co	27	<MDL	-----	0.097	0.007	0.007	0.013	-----
152-hr. event 01/28/13	T13-14863	AQMD	Ni	28	<MDL	-----	0.075	0.005	0.004	0.012	-----
152-hr. event 01/28/13	T13-14863	AQMD	Cu	29	<MDL	-----	0.100	0.041	0.006	0.016	-----
152-hr. event 01/28/13	T13-14863	AQMD	Zn	30	0.318	0.089	0.074	0.298	0.017	0.017	0.330
152-hr. event 01/28/13	T13-14863	AQMD	As	33	<MDL	-----	0.136	0.002	0.016	0.009	-----
152-hr. event 01/28/13	T13-14863	AQMD	Se	34	<MDL	-----	0.251	0.014	0.009	0.013	-----
152-hr. event 01/28/13	T13-14863	AQMD	Br	35	0.271	0.148	0.135	0.203	0.019	0.013	-----
152-hr. event 01/28/13	T13-14863	AQMD	Rb	37	<MDL	-----	0.131	0.008	0.011	0.019	-----
152-hr. event 01/28/13	T13-14863	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14863	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14863	AQMD	Ag	47	<MDL	-----	0.341	0.023	0.136	0.125	-----
152-hr. event 01/28/13	T13-14863	AQMD	Cd	48	<MDL	-----	0.378	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14863	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14863	AQMD	Sn	50	<MDL	-----	0.458	0.045	0.328	0.197	-----
152-hr. event 01/28/13	T13-14863	AQMD	Sb	51	<MDL	-----	0.524	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14863	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14863	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14863	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14863	AQMD	Pb	82	0.147	0.244	0.237	0.089	0.027	0.025	-----
152-hr. event 01/28/13	T13-14864	AQMD	Na	11	4.594	0.980	0.750	5.921	0.499	0.302	-----
152-hr. event 01/28/13	T13-14864	AQMD	Mg	12	1.627	0.729	0.648	1.006	0.082	0.114	-----
152-hr. event 01/28/13	T13-14864	AQMD	Al	13	2.145	0.511	0.403	0.685	0.120	0.129	-----
152-hr. event 01/28/13	T13-14864	AQMD	Si	14	5.766	0.563	0.275	4.761	0.325	0.093	5.223
152-hr. event 01/28/13	T13-14864	AQMD	P	15	1.836	0.239	0.147	0.000	0.065	0.155	-----
152-hr. event 01/28/13	T13-14864	AQMD	S	16	21.892	1.369	0.273	30.329	1.524	0.095	33.923
152-hr. event 01/28/13	T13-14864	AQMD	Cl	17	<MDL	-----	0.127	0.138	0.026	0.075	-----
152-hr. event 01/28/13	T13-14864	AQMD	K	19	2.886	0.214	0.069	2.827	0.144	0.070	2.995
152-hr. event 01/28/13	T13-14864	AQMD	Ca	20	1.306	0.231	0.165	1.156	0.061	0.073	1.305
152-hr. event 01/28/13	T13-14864	AQMD	Ti	22	<MDL	-----	0.186	0.113	0.022	0.051	-----
152-hr. event 01/28/13	T13-14864	AQMD	V	23	<MDL	-----	0.177	0.021	0.014	0.037	-----
152-hr. event 01/28/13	T13-14864	AQMD	Cr	24	<MDL	-----	0.092	0.029	0.009	0.025	-----
152-hr. event 01/28/13	T13-14864	AQMD	Mn	25	<MDL	-----	0.136	0.030	0.008	0.018	-----

Table 12. 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	
152-hr. event 01/28/13	T13-14864	AQMD	Fe	26	1.294	0.202	0.137	1.315	0.068	0.016	1.510
152-hr. event 01/28/13	T13-14864	AQMD	Co	27	<MDL	-----	0.097	0.000	0.006	0.013	-----
152-hr. event 01/28/13	T13-14864	AQMD	Ni	28	<MDL	-----	0.075	0.003	0.004	0.012	-----
152-hr. event 01/28/13	T13-14864	AQMD	Cu	29	<MDL	-----	0.100	0.054	0.006	0.016	-----
152-hr. event 01/28/13	T13-14864	AQMD	Zn	30	0.309	0.089	0.074	0.301	0.018	0.017	0.330
152-hr. event 01/28/13	T13-14864	AQMD	As	33	<MDL	-----	0.136	0.033	0.016	0.009	-----
152-hr. event 01/28/13	T13-14864	AQMD	Se	34	<MDL	-----	0.251	0.010	0.009	0.013	-----
152-hr. event 01/28/13	T13-14864	AQMD	Br	35	0.262	0.148	0.135	0.195	0.019	0.013	-----
152-hr. event 01/28/13	T13-14864	AQMD	Rb	37	<MDL	-----	0.131	0.000	0.004	0.019	-----
152-hr. event 01/28/13	T13-14864	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
152-hr. event 01/28/13	T13-14864	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
152-hr. event 01/28/13	T13-14864	AQMD	Ag	47	<MDL	-----	0.341	0.000	0.046	0.125	-----
152-hr. event 01/28/13	T13-14864	AQMD	Cd	48	<MDL	-----	0.378	0.000	0.048	0.166	-----
152-hr. event 01/28/13	T13-14864	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
152-hr. event 01/28/13	T13-14864	AQMD	Sn	50	<MDL	-----	0.458	0.011	0.328	0.197	-----
152-hr. event 01/28/13	T13-14864	AQMD	Sb	51	<MDL	-----	0.524	0.000	0.100	0.376	-----
152-hr. event 01/28/13	T13-14864	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
152-hr. event 01/28/13	T13-14864	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
152-hr. event 01/28/13	T13-14864	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
152-hr. event 01/28/13	T13-14864	AQMD	Pb	82	0.128	0.243	0.237	0.077	0.030	0.025	-----
162-hr. event 05/29/13	T13-14879	AQMD	Na	11	6.253	1.064	0.750	9.085	0.759	0.302	-----
162-hr. event 05/29/13	T13-14879	AQMD	Mg	12	2.249	0.760	0.648	1.770	0.130	0.114	-----
162-hr. event 05/29/13	T13-14879	AQMD	Al	13	3.046	0.556	0.403	1.187	0.148	0.129	1.555
162-hr. event 05/29/13	T13-14879	AQMD	Si	14	8.384	0.695	0.275	7.127	0.479	0.093	7.604
162-hr. event 05/29/13	T13-14879	AQMD	P	15	2.237	0.260	0.147	0.000	0.071	0.155	-----
162-hr. event 05/29/13	T13-14879	AQMD	S	16	26.299	1.592	0.273	34.680	1.741	0.095	35.464
162-hr. event 05/29/13	T13-14879	AQMD	Cl	17	<MDL	-----	0.127	0.189	0.028	0.075	-----
162-hr. event 05/29/13	T13-14879	AQMD	K	19	4.326	0.286	0.069	4.259	0.215	0.070	4.196
162-hr. event 05/29/13	T13-14879	AQMD	Ca	20	2.047	0.268	0.165	1.711	0.088	0.073	1.831
162-hr. event 05/29/13	T13-14879	AQMD	Ti	22	<MDL	-----	0.186	0.112	0.024	0.051	-----
162-hr. event 05/29/13	T13-14879	AQMD	V	23	<MDL	-----	0.177	0.061	0.015	0.037	-----
162-hr. event 05/29/13	T13-14879	AQMD	Cr	24	<MDL	-----	0.092	0.005	0.009	0.025	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14879	AQMD	Mn	25	0.155	0.144	0.136	0.056	0.009	0.018	-----
162-hr. event 05/29/13	T13-14879	AQMD	Fe	26	1.761	0.226	0.137	1.626	0.084	0.016	1.790
162-hr. event 05/29/13	T13-14879	AQMD	Co	27	<MDL	-----	0.097	0.011	0.007	0.013	-----
162-hr. event 05/29/13	T13-14879	AQMD	Ni	28	<MDL	-----	0.075	0.005	0.004	0.012	-----
162-hr. event 05/29/13	T13-14879	AQMD	Cu	29	<MDL	-----	0.100	0.033	0.006	0.016	-----
162-hr. event 05/29/13	T13-14879	AQMD	Zn	30	0.601	0.104	0.074	0.539	0.029	0.017	0.613
162-hr. event 05/29/13	T13-14879	AQMD	As	33	<MDL	-----	0.136	0.027	0.015	0.009	-----
162-hr. event 05/29/13	T13-14879	AQMD	Se	34	<MDL	-----	0.251	0.003	0.008	0.013	-----
162-hr. event 05/29/13	T13-14879	AQMD	Br	35	0.149	0.142	0.135	0.116	0.014	0.013	-----
162-hr. event 05/29/13	T13-14879	AQMD	Rb	37	<MDL	-----	0.131	0.000	0.004	0.019	-----
162-hr. event 05/29/13	T13-14879	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14879	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14879	AQMD	Ag	47	<MDL	-----	0.341	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14879	AQMD	Cd	48	<MDL	-----	0.378	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14879	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14879	AQMD	Sn	50	<MDL	-----	0.458	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14879	AQMD	Sb	51	<MDL	-----	0.524	0.000	0.100	0.376	-----
162-hr. event 05/29/13	T13-14879	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14879	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14879	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14879	AQMD	Pb	82	0.179	0.246	0.237	0.028	0.027	0.025	-----
162-hr. event 05/29/13	T13-14880	AQMD	Na	11	5.828	1.045	0.750	8.995	0.751	0.302	-----
162-hr. event 05/29/13	T13-14880	AQMD	Mg	12	2.162	0.757	0.648	1.688	0.125	0.114	-----
162-hr. event 05/29/13	T13-14880	AQMD	Al	13	2.833	0.546	0.403	1.017	0.142	0.129	1.555
162-hr. event 05/29/13	T13-14880	AQMD	Si	14	8.338	0.697	0.275	7.260	0.488	0.093	7.604
162-hr. event 05/29/13	T13-14880	AQMD	P	15	2.156	0.257	0.147	0.000	0.071	0.155	-----
162-hr. event 05/29/13	T13-14880	AQMD	S	16	24.176	1.496	0.273	35.120	1.764	0.095	35.464
162-hr. event 05/29/13	T13-14880	AQMD	Cl	17	<MDL	-----	0.127	0.185	0.028	0.075	-----
162-hr. event 05/29/13	T13-14880	AQMD	K	19	4.157	0.279	0.069	4.354	0.220	0.070	4.196
162-hr. event 05/29/13	T13-14880	AQMD	Ca	20	1.881	0.260	0.165	1.722	0.089	0.073	1.831
162-hr. event 05/29/13	T13-14880	AQMD	Ti	22	<MDL	-----	0.186	0.104	0.023	0.051	-----
162-hr. event 05/29/13	T13-14880	AQMD	V	23	<MDL	-----	0.177	0.051	0.015	0.037	-----

Table 12. 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	
162-hr. event 05/29/13	T13-14880	AQMD	Cr	24	<MDL	-----	0.092	0.021	0.009	0.025	-----
162-hr. event 05/29/13	T13-14880	AQMD	Mn	25	<MDL	-----	0.136	0.060	0.011	0.018	-----
162-hr. event 05/29/13	T13-14880	AQMD	Fe	26	1.605	0.219	0.137	1.603	0.083	0.016	1.790
162-hr. event 05/29/13	T13-14880	AQMD	Co	27	<MDL	-----	0.097	0.000	0.007	0.013	-----
162-hr. event 05/29/13	T13-14880	AQMD	Ni	28	<MDL	-----	0.075	0.003	0.004	0.012	-----
162-hr. event 05/29/13	T13-14880	AQMD	Cu	29	<MDL	-----	0.100	0.039	0.006	0.016	-----
162-hr. event 05/29/13	T13-14880	AQMD	Zn	30	0.581	0.103	0.074	0.555	0.030	0.017	0.613
162-hr. event 05/29/13	T13-14880	AQMD	As	33	<MDL	-----	0.136	0.019	0.015	0.009	-----
162-hr. event 05/29/13	T13-14880	AQMD	Se	34	<MDL	-----	0.251	0.000	0.006	0.013	-----
162-hr. event 05/29/13	T13-14880	AQMD	Br	35	0.174	0.143	0.135	0.097	0.013	0.013	-----
162-hr. event 05/29/13	T13-14880	AQMD	Rb	37	<MDL	-----	0.131	0.008	0.011	0.019	-----
162-hr. event 05/29/13	T13-14880	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
162-hr. event 05/29/13	T13-14880	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
162-hr. event 05/29/13	T13-14880	AQMD	Ag	47	<MDL	-----	0.341	0.000	0.046	0.125	-----
162-hr. event 05/29/13	T13-14880	AQMD	Cd	48	<MDL	-----	0.378	0.000	0.048	0.166	-----
162-hr. event 05/29/13	T13-14880	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
162-hr. event 05/29/13	T13-14880	AQMD	Sn	50	<MDL	-----	0.458	0.000	0.086	0.197	-----
162-hr. event 05/29/13	T13-14880	AQMD	Sb	51	<MDL	-----	0.524	0.057	0.441	0.376	-----
162-hr. event 05/29/13	T13-14880	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
162-hr. event 05/29/13	T13-14880	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
162-hr. event 05/29/13	T13-14880	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
162-hr. event 05/29/13	T13-14880	AQMD	Pb	82	<MDL	-----	0.237	0.047	0.026	0.025	-----
blank filter	T13-14895	AQMD	Na	11	<MDL	-----	0.750	0.000	0.095	0.302	-----
blank filter	T13-14895	AQMD	Mg	12	<MDL	-----	0.648	0.003	0.031	0.114	-----
blank filter	T13-14895	AQMD	Al	13	<MDL	-----	0.403	0.000	0.085	0.129	-----
blank filter	T13-14895	AQMD	Si	14	<MDL	-----	0.275	0.000	0.042	0.093	-----
blank filter	T13-14895	AQMD	P	15	<MDL	-----	0.147	0.000	0.031	0.155	-----
blank filter	T13-14895	AQMD	S	16	<MDL	-----	0.273	0.021	0.017	0.095	-----
blank filter	T13-14895	AQMD	Cl	17	<MDL	-----	0.127	0.000	0.015	0.075	-----
blank filter	T13-14895	AQMD	K	19	<MDL	-----	0.069	0.000	0.015	0.070	-----
blank filter	T13-14895	AQMD	Ca	20	<MDL	-----	0.165	0.002	0.014	0.073	-----
blank filter	T13-14895	AQMD	Ti	22	<MDL	-----	0.186	0.015	0.017	0.051	-----

Table 12. 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	T13-14895	AQMD	V	23	<MDL	-----	0.177	0.000	0.011	0.037	-----
blank filter	T13-14895	AQMD	Cr	24	<MDL	-----	0.092	0.005	0.008	0.025	-----
blank filter	T13-14895	AQMD	Mn	25	<MDL	-----	0.136	0.011	0.007	0.018	-----
blank filter	T13-14895	AQMD	Fe	26	<MDL	-----	0.137	0.000	0.005	0.016	-----
blank filter	T13-14895	AQMD	Co	27	<MDL	-----	0.097	0.000	0.004	0.013	-----
blank filter	T13-14895	AQMD	Ni	28	<MDL	-----	0.075	0.000	0.003	0.012	-----
blank filter	T13-14895	AQMD	Cu	29	<MDL	-----	0.100	0.000	0.005	0.016	-----
blank filter	T13-14895	AQMD	Zn	30	<MDL	-----	0.074	0.000	0.004	0.017	-----
blank filter	T13-14895	AQMD	As	33	<MDL	-----	0.136	0.000	0.006	0.009	-----
blank filter	T13-14895	AQMD	Se	34	<MDL	-----	0.251	0.000	0.006	0.013	-----
blank filter	T13-14895	AQMD	Br	35	<MDL	-----	0.135	0.000	0.005	0.013	-----
blank filter	T13-14895	AQMD	Rb	37	<MDL	-----	0.131	0.000	0.004	0.019	-----
blank filter	T13-14895	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
blank filter	T13-14895	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
blank filter	T13-14895	AQMD	Ag	47	<MDL	-----	0.341	0.000	0.046	0.125	-----
blank filter	T13-14895	AQMD	Cd	48	<MDL	-----	0.378	0.011	0.181	0.166	-----
blank filter	T13-14895	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
blank filter	T13-14895	AQMD	Sn	50	<MDL	-----	0.458	0.000	0.086	0.197	-----
blank filter	T13-14895	AQMD	Sb	51	<MDL	-----	0.524	0.011	0.463	0.376	-----
blank filter	T13-14895	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
blank filter	T13-14895	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
blank filter	T13-14895	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
blank filter	T13-14895	AQMD	Pb	82	<MDL	-----	0.237	0.000	0.013	0.025	-----
blank filter	T13-14896	AQMD	Na	11	<MDL	-----	0.750	0.000	0.095	0.302	-----
blank filter	T13-14896	AQMD	Mg	12	<MDL	-----	0.648	0.000	0.032	0.114	-----
blank filter	T13-14896	AQMD	Al	13	<MDL	-----	0.403	0.000	0.085	0.129	-----
blank filter	T13-14896	AQMD	Si	14	<MDL	-----	0.275	0.000	0.042	0.093	-----
blank filter	T13-14896	AQMD	P	15	<MDL	-----	0.147	0.000	0.031	0.155	-----
blank filter	T13-14896	AQMD	S	16	<MDL	-----	0.273	0.007	0.018	0.095	-----
blank filter	T13-14896	AQMD	Cl	17	<MDL	-----	0.127	0.000	0.015	0.075	-----
blank filter	T13-14896	AQMD	K	19	<MDL	-----	0.069	0.019	0.012	0.070	-----
blank filter	T13-14896	AQMD	Ca	20	<MDL	-----	0.165	0.007	0.014	0.073	-----

Table 12. 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	T13-14896	AQMD	Ti	22	<MDL	-----	0.186	0.014	0.018	0.051	-----
blank filter	T13-14896	AQMD	V	23	<MDL	-----	0.177	0.000	0.011	0.037	-----
blank filter	T13-14896	AQMD	Cr	24	<MDL	-----	0.092	0.006	0.008	0.025	-----
blank filter	T13-14896	AQMD	Mn	25	<MDL	-----	0.136	0.000	0.006	0.018	-----
blank filter	T13-14896	AQMD	Fe	26	<MDL	-----	0.137	0.000	0.005	0.016	-----
blank filter	T13-14896	AQMD	Co	27	<MDL	-----	0.097	0.000	0.004	0.013	-----
blank filter	T13-14896	AQMD	Ni	28	<MDL	-----	0.075	0.000	0.003	0.012	-----
blank filter	T13-14896	AQMD	Cu	29	<MDL	-----	0.100	0.000	0.004	0.016	-----
blank filter	T13-14896	AQMD	Zn	30	<MDL	-----	0.074	0.000	0.004	0.017	-----
blank filter	T13-14896	AQMD	As	33	<MDL	-----	0.136	0.002	0.007	0.009	-----
blank filter	T13-14896	AQMD	Se	34	<MDL	-----	0.251	0.000	0.006	0.013	-----
blank filter	T13-14896	AQMD	Br	35	<MDL	-----	0.135	0.016	0.008	0.013	-----
blank filter	T13-14896	AQMD	Rb	37	<MDL	-----	0.131	0.000	0.004	0.019	-----
blank filter	T13-14896	AQMD	Sr	38	<MDL	-----	0.147	0.000	0.081	0.023	-----
blank filter	T13-14896	AQMD	Zr	40	<MDL	-----	0.223	0.000	0.085	0.032	-----
blank filter	T13-14896	AQMD	Ag	47	<MDL	-----	0.341	0.000	0.046	0.125	-----
blank filter	T13-14896	AQMD	Cd	48	<MDL	-----	0.378	0.000	0.048	0.166	-----
blank filter	T13-14896	AQMD	In	49	<MDL	-----	0.378	0.000	0.050	0.154	-----
blank filter	T13-14896	AQMD	Sn	50	<MDL	-----	0.458	0.000	0.086	0.197	-----
blank filter	T13-14896	AQMD	Sb	51	<MDL	-----	0.524	0.000	0.083	0.376	-----
blank filter	T13-14896	AQMD	Cs	55	<MDL	-----	1.334	0.000	0.039	0.110	-----
blank filter	T13-14896	AQMD	Ba	56	<MDL	-----	1.156	0.000	0.032	0.105	-----
blank filter	T13-14896	AQMD	Ce	58	<MDL	-----	1.592	0.000	0.026	0.094	-----
blank filter	T13-14896	AQMD	Pb	82	<MDL	-----	0.237	0.000	0.013	0.025	-----

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

Table 13. 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	
152-hr. event 01/28/13	T13-14867	DRI	Na	11	0.000	3.076	1.331	5.680	0.736	0.246	-----
152-hr. event 01/28/13	T13-14867	DRI	Mg	12	0.000	0.538	0.328	0.806	0.486	0.195	-----
152-hr. event 01/28/13	T13-14867	DRI	Al	13	0.723	0.137	0.166	1.399	0.200	0.162	1.457
152-hr. event 01/28/13	T13-14867	DRI	Si	14	4.917	0.029	0.060	6.017	0.597	0.555	5.223
152-hr. event 01/28/13	T13-14867	DRI	P	15	0.000	0.008	0.021	-0.005	0.019	0.003	-----
152-hr. event 01/28/13	T13-14867	DRI	S	16	38.255	0.099	0.040	35.800	3.144	0.022	33.923
152-hr. event 01/28/13	T13-14867	DRI	Cl	17	0.124	0.004	0.012	0.164	0.020	0.118	0.165
152-hr. event 01/28/13	T13-14867	DRI	K	19	2.873	0.008	0.018	2.958	0.282	0.046	2.995
152-hr. event 01/28/13	T13-14867	DRI	Ca	20	1.383	0.006	0.029	1.277	0.134	0.000	1.305
152-hr. event 01/28/13	T13-14867	DRI	Ti	22	0.135	0.003	0.017	0.114	0.013	0.013	0.127
152-hr. event 01/28/13	T13-14867	DRI	V	23	0.018	0.001	0.002	0.046	0.013	0.004	-----
152-hr. event 01/28/13	T13-14867	DRI	Cr	24	0.017	0.004	0.009	0.006	0.013	0.005	-----
152-hr. event 01/28/13	T13-14867	DRI	Mn	25	0.040	0.010	0.021	0.072	0.039	0.008	-----
152-hr. event 01/28/13	T13-14867	DRI	Fe	26	1.564	0.017	0.026	1.561	0.172	0.112	1.510
152-hr. event 01/28/13	T13-14867	DRI	Ni	28	0.014	0.002	0.005	0.014	0.012	0.006	-----
152-hr. event 01/28/13	T13-14867	DRI	Cu	29	0.045	0.003	0.012	0.052	0.032	0.007	-----
152-hr. event 01/28/13	T13-14867	DRI	Zn	30	0.431	0.006	0.010	0.417	0.077	0.113	0.330
152-hr. event 01/28/13	T13-14867	DRI	As	33	0.000	0.002	0.008	0.026	0.077	0.011	-----
152-hr. event 01/28/13	T13-14867	DRI	Se	34	0.012	0.004	0.011	0.020	0.023	0.016	-----
152-hr. event 01/28/13	T13-14867	DRI	Br	35	0.215	0.004	0.012	0.242	0.068	0.007	0.234
152-hr. event 01/28/13	T13-14867	DRI	Rb	37	0.011	0.001	0.008	0.020	0.030	0.019	-----
152-hr. event 01/28/13	T13-14867	DRI	Sr	38	0.021	0.003	0.013	0.011	0.030	0.012	-----
152-hr. event 01/28/13	T13-14867	DRI	Zr	40	0.013	0.004	0.025	0.039	0.128	0.042	-----
152-hr. event 01/28/13	T13-14867	DRI	Pb	82	0.067	0.006	0.023	0.088	0.081	0.046	-----
152-hr. event 01/28/13	T13-14868	DRI	Na	11	0.000	2.791	1.331	6.730	0.848	0.246	-----
152-hr. event 01/28/13	T13-14868	DRI	Mg	12	0.000	0.533	0.328	1.276	0.600	0.195	-----
152-hr. event 01/28/13	T13-14868	DRI	Al	13	2.082	0.141	0.166	2.642	0.290	0.162	1.457
152-hr. event 01/28/13	T13-14868	DRI	Si	14	7.708	0.039	0.060	8.934	0.884	0.555	5.223
152-hr. event 01/28/13	T13-14868	DRI	P	15	0.000	0.008	0.021	-0.006	0.019	0.003	-----

Table 13. 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	
152-hr. event 01/28/13	T13-14868	DRI	S	16	39.011	0.101	0.040	35.622	3.129	0.022	33.923
152-hr. event 01/28/13	T13-14868	DRI	Cl	17	0.138	0.004	0.012	0.188	0.022	0.118	0.165
152-hr. event 01/28/13	T13-14868	DRI	K	19	3.314	0.009	0.018	3.361	0.320	0.046	2.995
152-hr. event 01/28/13	T13-14868	DRI	Ca	20	2.856	0.009	0.029	2.741	0.284	0.000	1.305
152-hr. event 01/28/13	T13-14868	DRI	Ti	22	0.199	0.003	0.017	0.196	0.021	0.013	0.127
152-hr. event 01/28/13	T13-14868	DRI	V	23	0.021	0.001	0.002	0.040	0.012	0.004	-----
152-hr. event 01/28/13	T13-14868	DRI	Cr	24	0.023	0.004	0.009	0.023	0.016	0.005	-----
152-hr. event 01/28/13	T13-14868	DRI	Mn	25	0.074	0.010	0.021	0.078	0.040	0.008	-----
152-hr. event 01/28/13	T13-14868	DRI	Fe	26	2.657	0.019	0.026	2.779	0.289	0.112	1.510
152-hr. event 01/28/13	T13-14868	DRI	Ni	28	0.015	0.002	0.005	0.022	0.015	0.006	-----
152-hr. event 01/28/13	T13-14868	DRI	Cu	29	0.049	0.003	0.012	0.089	0.038	0.007	-----
152-hr. event 01/28/13	T13-14868	DRI	Zn	30	0.396	0.006	0.010	0.403	0.076	0.113	0.330
152-hr. event 01/28/13	T13-14868	DRI	As	33	0.000	0.002	0.008	0.027	0.080	0.011	-----
152-hr. event 01/28/13	T13-14868	DRI	Se	34	0.025	0.004	0.011	0.033	0.026	0.016	-----
152-hr. event 01/28/13	T13-14868	DRI	Br	35	0.221	0.004	0.012	0.242	0.068	0.007	0.234
152-hr. event 01/28/13	T13-14868	DRI	Rb	37	0.003	0.001	0.008	0.018	0.029	0.019	-----
152-hr. event 01/28/13	T13-14868	DRI	Sr	38	0.032	0.003	0.013	0.024	0.031	0.012	-----
152-hr. event 01/28/13	T13-14868	DRI	Zr	40	0.044	0.005	0.025	0.095	0.146	0.042	-----
152-hr. event 01/28/13	T13-14868	DRI	Pb	82	0.067	0.006	0.023	0.053	0.072	0.046	-----
162-hr. event 05/29/13	T13-14883	DRI	Na	11	0.000	3.570	1.331	8.118	1.002	0.246	-----
162-hr. event 05/29/13	T13-14883	DRI	Mg	12	0.000	0.544	0.328	1.483	0.660	0.195	-----
162-hr. event 05/29/13	T13-14883	DRI	Al	13	1.438	0.139	0.166	1.825	0.229	0.162	1.555
162-hr. event 05/29/13	T13-14883	DRI	Si	14	7.342	0.037	0.060	8.212	0.813	0.555	7.604
162-hr. event 05/29/13	T13-14883	DRI	P	15	0.000	0.008	0.021	-0.006	0.019	0.003	-----
162-hr. event 05/29/13	T13-14883	DRI	S	16	39.991	0.104	0.040	36.153	3.175	0.022	35.464
162-hr. event 05/29/13	T13-14883	DRI	Cl	17	0.092	0.004	0.012	0.122	0.017	0.118	0.131
162-hr. event 05/29/13	T13-14883	DRI	K	19	4.014	0.009	0.018	3.985	0.379	0.046	4.196
162-hr. event 05/29/13	T13-14883	DRI	Ca	20	1.900	0.007	0.029	1.861	0.194	0.000	1.831
162-hr. event 05/29/13	T13-14883	DRI	Ti	22	0.162	0.003	0.017	0.158	0.017	0.013	0.187

Table 13. 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	
162-hr. event 05/29/13	T13-14883	DRI	V	23	0.027	0.001	0.002	0.021	0.009	0.004	-----
162-hr. event 05/29/13	T13-14883	DRI	Cr	24	0.005	0.004	0.009	0.013	0.014	0.005	-----
162-hr. event 05/29/13	T13-14883	DRI	Mn	25	0.041	0.010	0.021	0.075	0.039	0.008	-----
162-hr. event 05/29/13	T13-14883	DRI	Fe	26	1.865	0.018	0.026	1.868	0.201	0.112	1.790
162-hr. event 05/29/13	T13-14883	DRI	Ni	28	0.009	0.002	0.005	0.016	0.013	0.006	-----
162-hr. event 05/29/13	T13-14883	DRI	Cu	29	0.004	0.003	0.012	0.033	0.030	0.007	-----
162-hr. event 05/29/13	T13-14883	DRI	Zn	30	0.684	0.007	0.010	0.695	0.105	0.113	0.613
162-hr. event 05/29/13	T13-14883	DRI	As	33	0.000	0.002	0.008	0.020	0.063	0.011	-----
162-hr. event 05/29/13	T13-14883	DRI	Se	34	0.012	0.004	0.011	0.012	0.021	0.016	-----
162-hr. event 05/29/13	T13-14883	DRI	Br	35	0.095	0.004	0.012	0.116	0.038	0.007	-----
162-hr. event 05/29/13	T13-14883	DRI	Rb	37	0.009	0.001	0.008	0.001	0.024	0.019	-----
162-hr. event 05/29/13	T13-14883	DRI	Sr	38	0.017	0.003	0.013	0.014	0.030	0.012	-----
162-hr. event 05/29/13	T13-14883	DRI	Zr	40	0.015	0.004	0.025	0.004	0.120	0.042	-----
162-hr. event 05/29/13	T13-14883	DRI	Pb	82	0.044	0.006	0.023	0.056	0.073	0.046	-----
162-hr. event 05/29/13	T13-14884	DRI	Na	11	0.000	3.552	1.331	9.624	1.168	0.246	-----
162-hr. event 05/29/13	T13-14884	DRI	Mg	12	0.000	0.547	0.328	1.643	0.706	0.195	-----
162-hr. event 05/29/13	T13-14884	DRI	Al	13	1.672	0.140	0.166	2.354	0.268	0.162	1.555
162-hr. event 05/29/13	T13-14884	DRI	Si	14	8.211	0.040	0.060	9.309	0.921	0.555	7.604
162-hr. event 05/29/13	T13-14884	DRI	P	15	0.000	0.008	0.021	-0.006	0.019	0.003	-----
162-hr. event 05/29/13	T13-14884	DRI	S	16	40.813	0.106	0.040	36.504	3.206	0.022	35.464
162-hr. event 05/29/13	T13-14884	DRI	Cl	17	0.104	0.004	0.012	0.152	0.019	0.118	0.131
162-hr. event 05/29/13	T13-14884	DRI	K	19	4.199	0.009	0.018	4.194	0.399	0.046	4.196
162-hr. event 05/29/13	T13-14884	DRI	Ca	20	2.514	0.008	0.029	2.446	0.254	0.000	1.831
162-hr. event 05/29/13	T13-14884	DRI	Ti	22	0.213	0.003	0.017	0.220	0.023	0.013	0.187
162-hr. event 05/29/13	T13-14884	DRI	V	23	0.008	0.001	0.002	0.023	0.009	0.004	-----
162-hr. event 05/29/13	T13-14884	DRI	Cr	24	0.012	0.004	0.009	0.005	0.013	0.005	-----
162-hr. event 05/29/13	T13-14884	DRI	Mn	25	0.086	0.010	0.021	0.084	0.040	0.008	-----
162-hr. event 05/29/13	T13-14884	DRI	Fe	26	2.260	0.018	0.026	2.348	0.247	0.112	1.790
162-hr. event 05/29/13	T13-14884	DRI	Ni	28	0.005	0.002	0.005	0.006	0.009	0.006	-----

Table 13. 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	
162-hr. event 05/29/13	T13-14884	DRI	Cu	29	0.016	0.003	0.012	0.040	0.031	0.007	-----
162-hr. event 05/29/13	T13-14884	DRI	Zn	30	0.740	0.007	0.010	0.755	0.112	0.113	0.613
162-hr. event 05/29/13	T13-14884	DRI	As	33	0.000	0.002	0.008	0.008	0.038	0.011	-----
162-hr. event 05/29/13	T13-14884	DRI	Se	34	0.009	0.004	0.011	0.017	0.022	0.016	-----
162-hr. event 05/29/13	T13-14884	DRI	Br	35	0.109	0.004	0.012	0.107	0.036	0.007	-----
162-hr. event 05/29/13	T13-14884	DRI	Rb	37	0.012	0.001	0.008	0.016	0.029	0.019	-----
162-hr. event 05/29/13	T13-14884	DRI	Sr	38	0.030	0.003	0.013	0.012	0.030	0.012	-----
162-hr. event 05/29/13	T13-14884	DRI	Zr	40	0.020	0.004	0.025	0.026	0.125	0.042	-----
162-hr. event 05/29/13	T13-14884	DRI	Pb	82	0.058	0.006	0.023	0.094	0.083	0.046	-----
blank filter	T13-14899	DRI	Na	11	0.000	2.046	1.331	-0.058	0.288	0.246	-----
blank filter	T13-14899	DRI	Mg	12	0.000	0.535	0.328	0.023	0.375	0.195	-----
blank filter	T13-14899	DRI	Al	13	0.082	0.135	0.166	-0.020	0.150	0.162	-----
blank filter	T13-14899	DRI	Si	14	0.059	0.015	0.060	0.108	0.052	0.555	-----
blank filter	T13-14899	DRI	P	15	0.000	0.008	0.021	-0.003	0.019	0.003	-----
blank filter	T13-14899	DRI	S	16	0.000	0.005	0.040	0.000	0.000	0.022	-----
blank filter	T13-14899	DRI	Cl	17	0.029	0.003	0.012	0.016	0.012	0.118	-----
blank filter	T13-14899	DRI	K	19	0.026	0.006	0.018	0.012	0.014	0.046	-----
blank filter	T13-14899	DRI	Ca	20	0.048	0.004	0.029	-0.001	0.024	0.000	-----
blank filter	T13-14899	DRI	Ti	22	0.001	0.002	0.017	0.000	0.005	0.013	-----
blank filter	T13-14899	DRI	V	23	0.000	0.001	0.002	-0.001	0.007	0.004	-----
blank filter	T13-14899	DRI	Cr	24	0.000	0.004	0.009	0.002	0.013	0.005	-----
blank filter	T13-14899	DRI	Mn	25	0.000	0.010	0.021	-0.004	0.034	0.008	-----
blank filter	T13-14899	DRI	Fe	26	0.007	0.016	0.026	0.006	0.067	0.112	-----
blank filter	T13-14899	DRI	Ni	28	0.000	0.002	0.005	0.002	0.009	0.006	-----
blank filter	T13-14899	DRI	Cu	29	0.000	0.003	0.012	-0.007	0.028	0.007	-----
blank filter	T13-14899	DRI	Zn	30	0.043	0.006	0.010	0.004	0.055	0.113	-----
blank filter	T13-14899	DRI	As	33	0.000	0.002	0.008	-0.007	0.014	0.011	-----
blank filter	T13-14899	DRI	Se	34	0.004	0.004	0.011	0.010	0.021	0.016	-----
blank filter	T13-14899	DRI	Br	35	0.001	0.003	0.012	-0.002	0.020	0.007	-----

Table 13. 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	T13-14899	DRI	Rb	37	0.004	0.001	0.008	-0.001	0.024	0.019	-----
blank filter	T13-14899	DRI	Sr	38	0.003	0.003	0.013	-0.005	0.029	0.012	-----
blank filter	T13-14899	DRI	Zr	40	0.003	0.004	0.025	0.007	0.120	0.042	-----
blank filter	T13-14899	DRI	Pb	82	0.007	0.006	0.023	0.003	0.063	0.046	-----
blank filter	T13-14900	DRI	Na	11	0.000	2.015	1.331	-0.058	0.288	0.246	-----
blank filter	T13-14900	DRI	Mg	12	0.000	0.538	0.328	-0.009	0.375	0.195	-----
blank filter	T13-14900	DRI	Al	13	0.001	0.135	0.166	0.016	0.150	0.162	-----
blank filter	T13-14900	DRI	Si	14	0.054	0.015	0.060	-0.005	0.051	0.555	-----
blank filter	T13-14900	DRI	P	15	0.005	0.008	0.021	-0.003	0.019	0.003	-----
blank filter	T13-14900	DRI	S	16	0.000	0.005	0.040	0.000	0.000	0.022	-----
blank filter	T13-14900	DRI	Cl	17	0.001	0.003	0.012	-0.014	0.012	0.118	-----
blank filter	T13-14900	DRI	K	19	0.007	0.006	0.018	0.000	0.014	0.046	-----
blank filter	T13-14900	DRI	Ca	20	0.014	0.003	0.029	-0.014	0.024	0.000	-----
blank filter	T13-14900	DRI	Ti	22	0.000	0.002	0.017	0.000	0.005	0.013	-----
blank filter	T13-14900	DRI	V	23	0.000	0.001	0.002	-0.001	0.007	0.004	-----
blank filter	T13-14900	DRI	Cr	24	0.000	0.004	0.009	0.000	0.013	0.005	-----
blank filter	T13-14900	DRI	Mn	25	0.002	0.010	0.021	-0.006	0.034	0.008	-----
blank filter	T13-14900	DRI	Fe	26	0.008	0.016	0.026	0.033	0.068	0.112	-----
blank filter	T13-14900	DRI	Ni	28	0.000	0.002	0.005	0.000	0.008	0.006	-----
blank filter	T13-14900	DRI	Cu	29	0.000	0.003	0.012	-0.002	0.028	0.007	-----
blank filter	T13-14900	DRI	Zn	30	0.017	0.006	0.010	-0.004	0.055	0.113	-----
blank filter	T13-14900	DRI	As	33	0.000	0.002	0.008	-0.001	0.018	0.011	-----
blank filter	T13-14900	DRI	Se	34	0.001	0.004	0.011	0.011	0.021	0.016	-----
blank filter	T13-14900	DRI	Br	35	0.000	0.003	0.012	0.004	0.021	0.007	-----
blank filter	T13-14900	DRI	Rb	37	0.003	0.001	0.008	-0.003	0.023	0.019	-----
blank filter	T13-14900	DRI	Sr	38	0.003	0.003	0.013	-0.010	0.029	0.012	-----
blank filter	T13-14900	DRI	Zr	40	0.003	0.004	0.025	0.013	0.122	0.042	-----
blank filter	T13-14900	DRI	Pb	82	0.006	0.006	0.023	-0.020	0.061	0.046	-----
152-hr. event 01/28/13	T13-14869	RTI	Na	11	5.721	0.477	0.054	5.638	0.731	0.246	-----

Table 13. 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	
152-hr. event 01/28/13	T13-14869	RTI	Mg	12	0.730	0.056	0.016	1.184	0.579	0.195	-----
152-hr. event 01/28/13	T13-14869	RTI	Al	13	1.201	0.102	0.058	1.427	0.202	0.162	1.457
152-hr. event 01/28/13	T13-14869	RTI	Si	14	5.583	0.371	0.032	5.786	0.574	0.555	5.223
152-hr. event 01/28/13	T13-14869	RTI	P	15	0.069	0.023	0.016	-0.005	0.019	0.003	-----
152-hr. event 01/28/13	T13-14869	RTI	S	16	34.940	1.751	0.015	34.245	3.008	0.022	33.923
152-hr. event 01/28/13	T13-14869	RTI	Cl	17	0.168	0.014	0.011	0.156	0.020	0.118	0.165
152-hr. event 01/28/13	T13-14869	RTI	K	19	3.326	0.167	0.007	2.873	0.274	0.046	2.995
152-hr. event 01/28/13	T13-14869	RTI	Ca	20	1.256	0.063	0.005	1.304	0.137	0.000	1.305
152-hr. event 01/28/13	T13-14869	RTI	Ti	22	0.074	0.011	0.015	0.116	0.013	0.013	0.127
152-hr. event 01/28/13	T13-14869	RTI	V	23	0.017	0.006	0.011	0.028	0.010	0.004	-----
152-hr. event 01/28/13	T13-14869	RTI	Cr	24	0.004	0.004	0.008	0.005	0.013	0.005	-----
152-hr. event 01/28/13	T13-14869	RTI	Mn	25	0.058	0.005	0.007	0.055	0.037	0.008	-----
152-hr. event 01/28/13	T13-14869	RTI	Fe	26	1.558	0.079	0.008	1.599	0.175	0.112	1.510
152-hr. event 01/28/13	T13-14869	RTI	Ni	28	0.011	0.002	0.004	0.018	0.013	0.006	-----
152-hr. event 01/28/13	T13-14869	RTI	Cu	29	0.049	0.004	0.006	0.057	0.033	0.007	-----
152-hr. event 01/28/13	T13-14869	RTI	Zn	30	0.352	0.018	0.005	0.382	0.074	0.113	0.330
152-hr. event 01/28/13	T13-14869	RTI	As	33	0.023	0.006	0.007	0.023	0.071	0.011	-----
152-hr. event 01/28/13	T13-14869	RTI	Se	34	0.019	0.006	0.009	0.023	0.024	0.016	-----
152-hr. event 01/28/13	T13-14869	RTI	Br	35	0.218	0.014	0.008	0.255	0.072	0.007	0.234
152-hr. event 01/28/13	T13-14869	RTI	Rb	37	0.002	0.005	0.007	0.011	0.027	0.019	-----
152-hr. event 01/28/13	T13-14869	RTI	Sr	38	0.020	0.006	0.006	-0.001	0.029	0.012	-----
152-hr. event 01/28/13	T13-14869	RTI	Zr	40	0.038	0.038	0.071	0.134	0.163	0.042	-----
152-hr. event 01/28/13	T13-14869	RTI	Pb	82	0.073	0.014	0.018	0.057	0.073	0.046	-----
152-hr. event 01/28/13	T13-14870	RTI	Na	11	6.082	0.507	0.054	5.683	0.736	0.246	-----
152-hr. event 01/28/13	T13-14870	RTI	Mg	12	0.761	0.058	0.016	1.025	0.538	0.195	-----
152-hr. event 01/28/13	T13-14870	RTI	Al	13	1.486	0.119	0.058	1.739	0.222	0.162	1.457
152-hr. event 01/28/13	T13-14870	RTI	Si	14	6.543	0.434	0.032	6.148	0.610	0.555	5.223
152-hr. event 01/28/13	T13-14870	RTI	P	15	0.097	0.024	0.016	-0.005	0.019	0.003	-----
152-hr. event 01/28/13	T13-14870	RTI	S	16	35.852	1.797	0.015	33.538	2.946	0.022	33.923

Table 13. 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	
152-hr. event 01/28/13	T13-14870	RTI	Cl	17	0.197	0.015	0.011	0.165	0.020	0.118	0.165
152-hr. event 01/28/13	T13-14870	RTI	K	19	3.559	0.179	0.007	2.980	0.284	0.046	2.995
152-hr. event 01/28/13	T13-14870	RTI	Ca	20	1.663	0.084	0.005	1.661	0.173	0.000	1.305
152-hr. event 01/28/13	T13-14870	RTI	Ti	22	0.121	0.013	0.015	0.132	0.015	0.013	0.127
152-hr. event 01/28/13	T13-14870	RTI	V	23	0.019	0.007	0.011	0.035	0.011	0.004	-----
152-hr. event 01/28/13	T13-14870	RTI	Cr	24	0.008	0.004	0.008	0.014	0.014	0.005	-----
152-hr. event 01/28/13	T13-14870	RTI	Mn	25	0.063	0.005	0.007	0.061	0.038	0.008	-----
152-hr. event 01/28/13	T13-14870	RTI	Fe	26	1.987	0.100	0.008	1.940	0.207	0.112	1.510
152-hr. event 01/28/13	T13-14870	RTI	Ni	28	0.012	0.002	0.004	0.020	0.014	0.006	-----
152-hr. event 01/28/13	T13-14870	RTI	Cu	29	0.053	0.004	0.006	0.059	0.033	0.007	-----
152-hr. event 01/28/13	T13-14870	RTI	Zn	30	0.365	0.019	0.005	0.372	0.073	0.113	0.330
152-hr. event 01/28/13	T13-14870	RTI	As	33	0.020	0.006	0.007	0.006	0.034	0.011	-----
152-hr. event 01/28/13	T13-14870	RTI	Se	34	0.025	0.006	0.009	0.038	0.028	0.016	-----
152-hr. event 01/28/13	T13-14870	RTI	Br	35	0.226	0.014	0.008	0.254	0.072	0.007	0.234
152-hr. event 01/28/13	T13-14870	RTI	Rb	37	0.005	0.005	0.007	0.014	0.027	0.019	-----
152-hr. event 01/28/13	T13-14870	RTI	Sr	38	0.020	0.006	0.006	0.019	0.030	0.012	-----
152-hr. event 01/28/13	T13-14870	RTI	Zr	40	0.028	0.038	0.071	0.059	0.133	0.042	-----
152-hr. event 01/28/13	T13-14870	RTI	Pb	82	0.092	0.015	0.018	0.044	0.070	0.046	-----
162-hr. event 05/29/13	T13-14885	RTI	Na	11	10.120	0.838	0.054	10.032	1.214	0.246	-----
162-hr. event 05/29/13	T13-14885	RTI	Mg	12	1.321	0.095	0.016	2.316	0.906	0.195	-----
162-hr. event 05/29/13	T13-14885	RTI	Al	13	2.896	0.209	0.058	3.350	0.348	0.162	1.555
162-hr. event 05/29/13	T13-14885	RTI	Si	14	11.748	0.777	0.032	11.508	1.138	0.555	7.604
162-hr. event 05/29/13	T13-14885	RTI	P	15	0.273	0.029	0.016	-0.006	0.019	0.003	-----
162-hr. event 05/29/13	T13-14885	RTI	S	16	37.021	1.856	0.015	35.807	3.145	0.022	35.464
162-hr. event 05/29/13	T13-14885	RTI	Cl	17	0.166	0.015	0.011	0.154	0.019	0.118	0.131
162-hr. event 05/29/13	T13-14885	RTI	K	19	5.367	0.269	0.007	4.503	0.429	0.046	4.196
162-hr. event 05/29/13	T13-14885	RTI	Ca	20	3.356	0.168	0.005	3.438	0.356	0.000	1.831
162-hr. event 05/29/13	T13-14885	RTI	Ti	22	0.286	0.019	0.015	0.290	0.031	0.013	0.187
162-hr. event 05/29/13	T13-14885	RTI	V	23	0.009	0.007	0.011	0.022	0.009	0.004	-----

Table 13. 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	
162-hr. event 05/29/13	T13-14885	RTI	Cr	24	0.003	0.004	0.008	0.014	0.014	0.005	-----
162-hr. event 05/29/13	T13-14885	RTI	Mn	25	0.098	0.007	0.007	0.089	0.041	0.008	-----
162-hr. event 05/29/13	T13-14885	RTI	Fe	26	3.215	0.162	0.008	3.082	0.319	0.112	1.790
162-hr. event 05/29/13	T13-14885	RTI	Ni	28	0.008	0.002	0.004	0.009	0.010	0.006	-----
162-hr. event 05/29/13	T13-14885	RTI	Cu	29	0.046	0.004	0.006	0.046	0.032	0.007	-----
162-hr. event 05/29/13	T13-14885	RTI	Zn	30	0.819	0.042	0.005	0.787	0.115	0.113	0.613
162-hr. event 05/29/13	T13-14885	RTI	As	33	0.016	0.006	0.007	0.020	0.064	0.011	-----
162-hr. event 05/29/13	T13-14885	RTI	Se	34	0.015	0.005	0.009	0.008	0.021	0.016	-----
162-hr. event 05/29/13	T13-14885	RTI	Br	35	0.104	0.008	0.008	0.118	0.039	0.007	-----
162-hr. event 05/29/13	T13-14885	RTI	Rb	37	0.012	0.005	0.007	0.003	0.024	0.019	-----
162-hr. event 05/29/13	T13-14885	RTI	Sr	38	0.017	0.006	0.006	0.017	0.030	0.012	-----
162-hr. event 05/29/13	T13-14885	RTI	Zr	40	0.000	0.020	0.071	0.025	0.125	0.042	-----
162-hr. event 05/29/13	T13-14885	RTI	Pb	82	0.041	0.014	0.018	0.061	0.074	0.046	-----
162-hr. event 05/29/13	T13-14886	RTI	Na	11	7.169	0.596	0.054	7.404	0.922	0.246	-----
162-hr. event 05/29/13	T13-14886	RTI	Mg	12	1.148	0.083	0.016	1.712	0.724	0.195	-----
162-hr. event 05/29/13	T13-14886	RTI	Al	13	1.434	0.116	0.058	1.828	0.229	0.162	1.555
162-hr. event 05/29/13	T13-14886	RTI	Si	14	7.867	0.521	0.032	8.307	0.823	0.555	7.604
162-hr. event 05/29/13	T13-14886	RTI	P	15	0.106	0.024	0.016	-0.006	0.019	0.003	-----
162-hr. event 05/29/13	T13-14886	RTI	S	16	36.529	1.831	0.015	36.084	3.169	0.022	35.464
162-hr. event 05/29/13	T13-14886	RTI	Cl	17	0.140	0.014	0.011	0.116	0.017	0.118	0.131
162-hr. event 05/29/13	T13-14886	RTI	K	19	4.847	0.243	0.007	3.932	0.374	0.046	4.196
162-hr. event 05/29/13	T13-14886	RTI	Ca	20	1.755	0.088	0.005	1.742	0.182	0.000	1.831
162-hr. event 05/29/13	T13-14886	RTI	Ti	22	0.147	0.013	0.015	0.162	0.018	0.013	0.187
162-hr. event 05/29/13	T13-14886	RTI	V	23	0.013	0.006	0.011	0.027	0.009	0.004	-----
162-hr. event 05/29/13	T13-14886	RTI	Cr	24	0.003	0.004	0.008	0.015	0.015	0.005	-----
162-hr. event 05/29/13	T13-14886	RTI	Mn	25	0.069	0.006	0.007	0.073	0.039	0.008	-----
162-hr. event 05/29/13	T13-14886	RTI	Fe	26	1.882	0.095	0.008	1.824	0.196	0.112	1.790
162-hr. event 05/29/13	T13-14886	RTI	Ni	28	0.010	0.002	0.004	0.010	0.010	0.006	-----
162-hr. event 05/29/13	T13-14886	RTI	Cu	29	0.032	0.003	0.006	0.048	0.032	0.007	-----

Table 13. 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	
162-hr. event 05/29/13	T13-14886	RTI	Zn	30	0.648	0.033	0.005	0.678	0.103	0.113	0.613
162-hr. event 05/29/13	T13-14886	RTI	As	33	0.014	0.005	0.007	-0.001	0.021	0.011	-----
162-hr. event 05/29/13	T13-14886	RTI	Se	34	0.015	0.005	0.009	0.014	0.022	0.016	-----
162-hr. event 05/29/13	T13-14886	RTI	Br	35	0.090	0.008	0.008	0.110	0.037	0.007	-----
162-hr. event 05/29/13	T13-14886	RTI	Rb	37	0.003	0.004	0.007	0.009	0.026	0.019	-----
162-hr. event 05/29/13	T13-14886	RTI	Sr	38	0.016	0.005	0.006	0.032	0.032	0.012	-----
162-hr. event 05/29/13	T13-14886	RTI	Zr	40	0.010	0.034	0.071	0.065	0.136	0.042	-----
162-hr. event 05/29/13	T13-14886	RTI	Pb	82	0.045	0.012	0.018	0.065	0.075	0.046	-----
blank filter	T13-14901	RTI	Na	11	0.000	0.027	0.054	-0.058	0.288	0.246	-----
blank filter	T13-14901	RTI	Mg	12	0.000	0.007	0.016	-0.115	0.373	0.195	-----
blank filter	T13-14901	RTI	Al	13	0.000	0.020	0.058	0.034	0.150	0.162	-----
blank filter	T13-14901	RTI	Si	14	0.000	0.011	0.032	0.080	0.051	0.555	-----
blank filter	T13-14901	RTI	P	15	0.000	0.005	0.016	-0.001	0.019	0.003	-----
blank filter	T13-14901	RTI	S	16	0.000	0.005	0.015	0.000	0.000	0.022	-----
blank filter	T13-14901	RTI	Cl	17	0.000	0.003	0.011	0.007	0.012	0.118	-----
blank filter	T13-14901	RTI	K	19	0.000	0.003	0.007	0.002	0.014	0.046	-----
blank filter	T13-14901	RTI	Ca	20	0.000	0.003	0.005	0.021	0.024	0.000	-----
blank filter	T13-14901	RTI	Ti	22	0.000	0.004	0.015	0.001	0.005	0.013	-----
blank filter	T13-14901	RTI	V	23	0.000	0.003	0.011	0.002	0.007	0.004	-----
blank filter	T13-14901	RTI	Cr	24	0.000	0.002	0.008	0.003	0.013	0.005	-----
blank filter	T13-14901	RTI	Mn	25	0.000	0.002	0.007	-0.009	0.034	0.008	-----
blank filter	T13-14901	RTI	Fe	26	0.000	0.002	0.008	0.105	0.068	0.112	-----
blank filter	T13-14901	RTI	Ni	28	0.000	0.002	0.004	0.001	0.008	0.006	-----
blank filter	T13-14901	RTI	Cu	29	0.000	0.001	0.006	-0.008	0.028	0.007	-----
blank filter	T13-14901	RTI	Zn	30	0.000	0.001	0.005	0.004	0.055	0.113	-----
blank filter	T13-14901	RTI	As	33	0.000	0.002	0.007	0.001	0.023	0.011	-----
blank filter	T13-14901	RTI	Se	34	0.000	0.002	0.009	0.001	0.020	0.016	-----
blank filter	T13-14901	RTI	Br	35	0.000	0.002	0.008	0.002	0.021	0.007	-----
blank filter	T13-14901	RTI	Rb	37	0.001	0.003	0.007	0.008	0.025	0.019	-----

Table 13. 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	T13-14901	RTI	Sr	38	0.000	0.002	0.006	-0.011	0.029	0.012	-----
blank filter	T13-14901	RTI	Zr	40	0.000	0.020	0.071	0.001	0.120	0.042	-----
blank filter	T13-14901	RTI	Pb	82	0.007	0.006	0.018	-0.011	0.061	0.046	-----
blank filter	T13-14902	RTI	Na	11	0.019	0.023	0.054	-0.013	0.288	0.246	-----
blank filter	T13-14902	RTI	Mg	12	0.000	0.007	0.016	-0.056	0.373	0.195	-----
blank filter	T13-14902	RTI	Al	13	0.000	0.020	0.058	0.042	0.150	0.162	-----
blank filter	T13-14902	RTI	Si	14	0.355	0.027	0.032	0.473	0.069	0.555	-----
blank filter	T13-14902	RTI	P	15	0.000	0.005	0.016	-0.003	0.019	0.003	-----
blank filter	T13-14902	RTI	S	16	0.030	0.005	0.015	0.017	0.002	0.022	-----
blank filter	T13-14902	RTI	Cl	17	0.083	0.006	0.011	0.091	0.015	0.118	-----
blank filter	T13-14902	RTI	K	19	0.042	0.004	0.007	0.037	0.014	0.046	-----
blank filter	T13-14902	RTI	Ca	20	0.064	0.005	0.005	0.068	0.025	0.000	-----
blank filter	T13-14902	RTI	Ti	22	0.000	0.004	0.015	0.010	0.005	0.013	-----
blank filter	T13-14902	RTI	V	23	0.000	0.003	0.011	-0.001	0.007	0.004	-----
blank filter	T13-14902	RTI	Cr	24	0.000	0.002	0.008	0.000	0.013	0.005	-----
blank filter	T13-14902	RTI	Mn	25	0.000	0.002	0.007	-0.003	0.034	0.008	-----
blank filter	T13-14902	RTI	Fe	26	0.000	0.003	0.008	0.038	0.068	0.112	-----
blank filter	T13-14902	RTI	Ni	28	0.000	0.001	0.004	0.001	0.008	0.006	-----
blank filter	T13-14902	RTI	Cu	29	0.000	0.001	0.006	-0.007	0.028	0.007	-----
blank filter	T13-14902	RTI	Zn	30	0.062	0.004	0.005	0.086	0.056	0.113	-----
blank filter	T13-14902	RTI	As	33	0.000	0.002	0.007	-0.007	0.014	0.011	-----
blank filter	T13-14902	RTI	Se	34	0.000	0.002	0.009	-0.001	0.020	0.016	-----
blank filter	T13-14902	RTI	Br	35	0.000	0.002	0.008	0.002	0.021	0.007	-----
blank filter	T13-14902	RTI	Rb	37	0.001	0.003	0.007	0.013	0.027	0.019	-----
blank filter	T13-14902	RTI	Sr	38	0.000	0.002	0.006	-0.006	0.029	0.012	-----
blank filter	T13-14902	RTI	Zr	40	0.000	0.020	0.071	0.036	0.128	0.042	-----
blank filter	T13-14902	RTI	Pb	82	0.001	0.004	0.018	-0.011	0.062	0.046	-----

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