**TECHNICAL MEMORANDUM**

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**SUBJECT:** Experimental Inter-comparison of Speciation Laboratories – Study#7

## Introduction

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

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

- Gravimetric Mass Analysis – ten Teflon® filter samples and two metallic weights
- Ion Chromatography (IC) Analysis – six Nylon® filter samples or six Teflon® filter samples
- Carbon by Thermal-Optical Analysis (TOA) – six quartz filter samples
- Elemental analysis by X-Ray Fluorescence (XRF) – six 47-mm or 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 | IC analysis, Nylon® filters<br>TOA carbon, IMPROVE_A method<br>Elements by XRF (47-mm filters) |
| Desert Research Institute (DRI) | Reno, NV | Gravimetric mass<br>IC analysis, Teflon® filters<br>IC analysis, Nylon® filters<br>TOA carbon, IMPROVE_A method<br>Elements by XRF (25- & 47-mm filters) |
| Oregon Dept. of Environmental Quality (ODEQ) | Portland, OR | Gravimetric mass<br>IC analysis, Nylon® filters<br>Elements by XRF (47-mm filters) |
| Research Triangle Institute (RTI) | Research Triangle Park, NC | Gravimetric mass<br>IC analysis, Nylon® filters<br>TOA carbon, IMPROVE_A method<br>TOA carbon, CSN method<br>Elements by XRF (47-mm filters) |
| South Coast Air Quality Management District (AQMD) | Diamond Bar, CA | Gravimetric mass<br>IC analysis, Nylon® filters<br>TOA carbon, IMPROVE_A method<br>Elements by XRF (47-mm filters) |
| University of California / Davis (UCD) | Davis, CA | Gravimetric mass<br>Elements by XRF (25- & 47-mm filters) |
| EPA's National Exposure Research Laboratory (NERL) | Research Triangle Park, NC | Elements by XRF (25-mm filters) |
| EPA's National Air and Radiation Environmental Laboratory (NAREL) | Montgomery, AL | Gravimetric mass<br>IC analysis, Teflon® filters<br>IC analysis, Nylon® filters<br>TOA carbon, IMPROVE_A method<br>TOA carbon, CSN method |

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

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

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

**Gravimetric Analysis**

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

**Table 2. Sampling Schedule for Gravimetric PT Filters**

| Filter ID | Serial Number | Sample Start | Event Duration | Receiving Lab |
|---|---|---|---|---|
| T11-14010 | T0555811 | 16-Dec-2011 | 40-hour | DRI |
| T11-14011 | T0555812 | 16-Dec-2011 | 40-hour | DRI |
| T11-14012 | T0555813 | 18-Dec-2011 | 24-hour | DRI |
| T11-14013 | T0555814 | 18-Dec-2011 | 24-hour | DRI |
| T11-14014 | T0555815 | 19-Dec-2011 | 20-hour | DRI |
| T11-14015 | T0555816 | 19-Dec-2011 | 20-hour | DRI |
| T11-14016 | T0555817 | 19-Dec-2011 | 20-hour | DRI |
| T11-14020 | T0555826 | 16-Dec-2011 | 40-hour | ODEQ |
| T11-14021 | T0555827 | 16-Dec-2011 | 40-hour | ODEQ |
| T11-14022 | T0555828 | 18-Dec-2011 | 24-hour | ODEQ |
| T11-14023 | T0555829 | 18-Dec-2011 | 24-hour | ODEQ |
| T11-14024 | T0555830 | 19-Dec-2011 | 20-hour | ODEQ |
| T11-14025 | T0555831 | 19-Dec-2011 | 20-hour | ODEQ |
| T11-14026 | T0555832 | 19-Dec-2011 | 20-hour | ODEQ |
| T11-14030 | T0555836 | 16-Dec-2011 | 40-hour | RTI |
| T11-14031 | T0555837 | 16-Dec-2011 | 40-hour | RTI |
| T11-14032 | T0555838 | 18-Dec-2011 | 24-hour | RTI |
| T11-14033 | T0555839 | 18-Dec-2011 | 24-hour | RTI |
| T11-14034 | T0555840 | 19-Dec-2011 | 20-hour | RTI |

| Filter ID | Serial Number | Sample Start | Event Duration | Receiving Lab |
|---|---|---|---|---|
| T11-14035 | T0555841 | 19-Dec-2011 | 20-hour | RTI |
| T11-14036 | T0555842 | 19-Dec-2011 | 20-hour | RTI |
| T11-14040 | T0555851 | 16-Dec-2011 | 40-hour | AQMD |
| T11-14041 | T0555852 | 16-Dec-2011 | 40-hour | AQMD |
| T11-14042 | T0555853 | 18-Dec-2011 | 24-hour | AQMD |
| T11-14043 | T0555854 | 18-Dec-2011 | 24-hour | AQMD |
| T11-14044 | T0555855 | 19-Dec-2011 | 20-hour | AQMD |
| T11-14045 | T0555856 | 19-Dec-2011 | 20-hour | AQMD |
| T11-14046 | T0555857 | 19-Dec-2011 | 20-hour | AQMD |
| T11-14050 | none | 16-Dec-2011 | 40-hour | UCD |
| T11-14051 | none | 16-Dec-2011 | 40-hour | UCD |
| T11-14052 | none | 18-Dec-2011 | 24-hour | UCD |
| T11-14053 | none | 18-Dec-2011 | 24-hour | UCD |
| T11-14054 | none | 19-Dec-2011 | 20-hour | UCD |
| T11-14055 | none | 19-Dec-2011 | 20-hour | UCD |
| T11-14056 | none | 19-Dec-2011 | 20-hour | UCD |

Table 2 shows thirty-five filters that were loaded during three 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, ten replicates were created during a 40-hour collection event that started on December 16, and two of these replicates were submitted to each lab for analysis. Similarly, ten replicates were created during a 24-hour collection event that started on December 18, and two of these replicates were submitted to each lab for analysis. Table 2 does not list all of the filters that were PRE-weighed at the participating labs. Three of the ten filters that were PRE-weighed at each lab were not scheduled for loading because they were used as filter blanks for this study.

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

## Gravimetric Results

The results from this study are summarized in 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 speciation lab from the capture value determined at NAREL. Notice that a negative bar on the figure 2 graph represents a smaller $PM_{2.5}$ capture value determined at NAREL. The 3-sigma advisory limits were derived from all of the gravimetric PT studies administered by NAREL during the past several years. Performance was good for all of the participating labs.

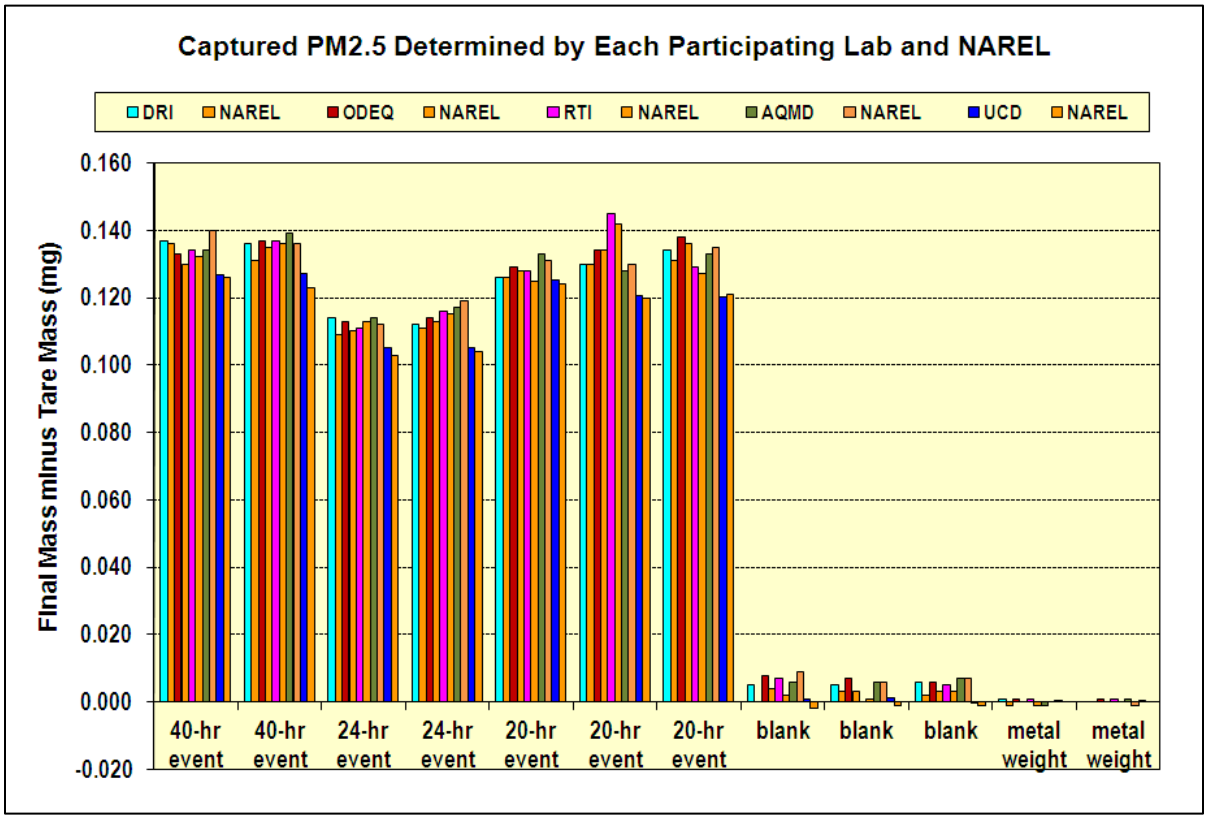
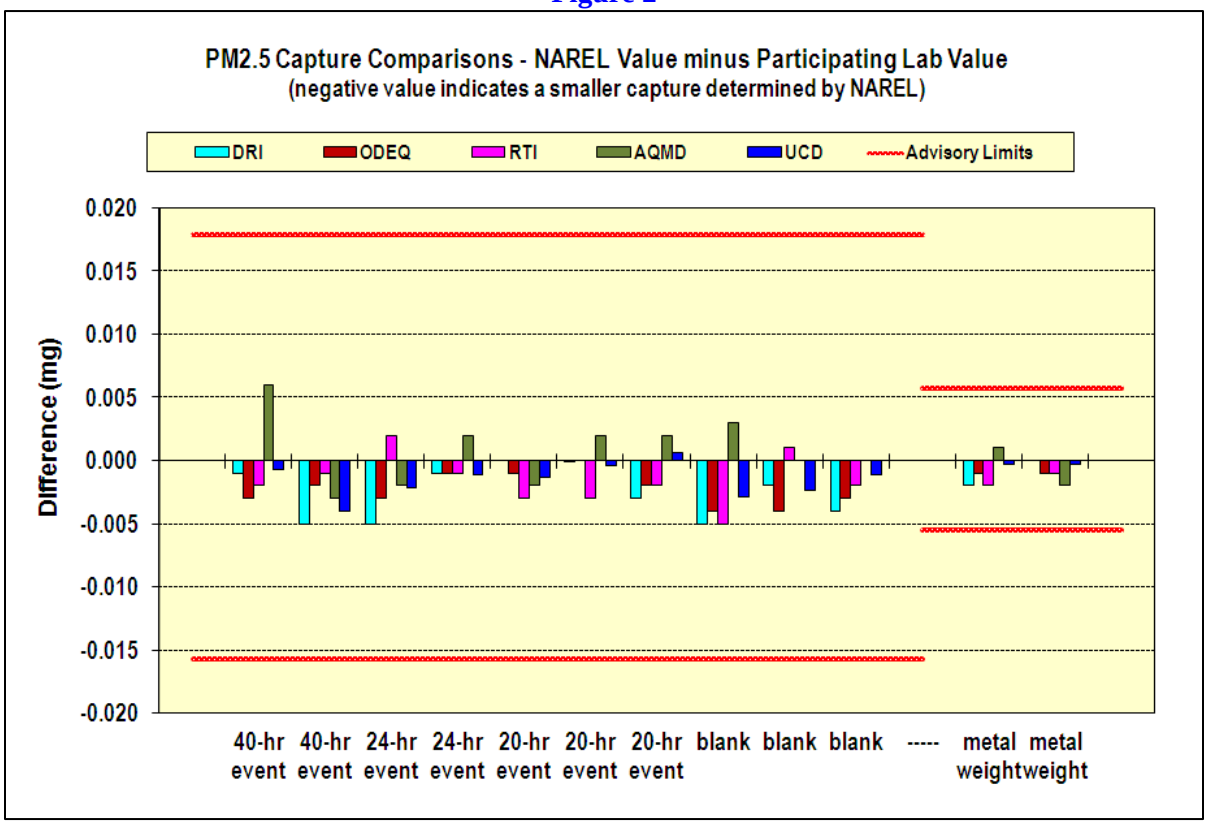



**Figure 1**

**Figure 2**



The raw data reported from all laboratories have been tabulated for easy viewing. At the end of this report, table 9 contains the tare weight, the final loaded weight, 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 (see reference 1 through 6).

## IC Analysis

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

NAREL provided each lab with a set of six filters for each method tested. Each sample set contained two blank filters and four filters that were loaded with $PM_{2.5}$ collected from the Montgomery air. Collocated Met One SuperSASS air samplers were used to load filters and create replicates in each sample set according the sampling schedule presented in table 3.

**Table 3. Sampling Schedule for Ion Chromatography PT Filters**

| Filter ID | Filter Medium | Sample Start | Event Duration | Receiving Lab | Method |
|---|---|---|---|---|---|
| N11-13925 | Nylon® | 01-Mar-2011 | 214-hour | CARB | CSN |
| N11-13926 | Nylon® | 01-Mar-2011 | 214-hour | CARB | CSN |
| N11-13940 | Nylon® | 29-Jun-2011 | 200-hour | CARB | CSN |
| N11-13941 | Nylon® | 29-Jun-2011 | 200-hour | CARB | CSN |
| N11-13927 | Nylon® | 01-Mar-2011 | 214-hour | DRI | CSN |
| N11-13928 | Nylon® | 01-Mar-2011 | 214-hour | DRI | CSN |
| N11-13942 | Nylon® | 29-Jun-2011 | 200-hour | DRI | CSN |
| N11-13943 | Nylon® | 29-Jun-2011 | 200-hour | DRI | CSN |
| N11-13929 | Nylon® | 01-Mar-2011 | 214-hour | ODEQ | CSN |
| N11-13930 | Nylon® | 01-Mar-2011 | 214-hour | ODEQ | CSN |
| N11-13944 | Nylon® | 29-Jun-2011 | 200-hour | ODEQ | CSN |
| N11-13945 | Nylon® | 29-Jun-2011 | 200-hour | ODEQ | CSN |
| N11-13931 | Nylon® | 01-Mar-2011 | 214-hour | RTI | CSN |
| N11-13932 | Nylon® | 01-Mar-2011 | 214-hour | RTI | CSN |
| N11-13946 | Nylon® | 29-Jun-2011 | 200-hour | RTI | CSN |
| N11-13947 | Nylon® | 29-Jun-2011 | 200-hour | RTI | CSN |
| N11-13933 | Nylon® | 01-Mar-2011 | 214-hour | AQMD | CSN |
| N11-13934 | Nylon® | 01-Mar-2011 | 214-hour | AQMD | CSN |
| N11-13948 | Nylon® | 29-Jun-2011 | 200-hour | AQMD | CSN |
| N11-13949 | Nylon® | 29-Jun-2011 | 200-hour | AQMD | CSN |
| N11-13935 | Nylon® | 01-Mar-2011 | 214-hour | NAREL | CSN |
| N11-13936 | Nylon® | 01-Mar-2011 | 214-hour | NAREL | CSN |
| N11-13950 | Nylon® | 29-Jun-2011 | 200-hour | NAREL | CSN |
| N11-13951 | Nylon® | 29-Jun-2011 | 200-hour | NAREL | CSN |
| T11-13962 | Teflon® | 10-Mar-2011 | 116-hour | DRI | CSN |

| Filter ID | Filter Medium | Sample Start | Event Duration | Receiving Lab | Method |
|---|---|---|---|---|---|
| T11-13963 | Teflon® | 10-Mar-2011 | 116-hour | DRI | CSN |
| T11-13974 | Teflon® | 08-Jul-2011 | 224-hour | DRI | CSN |
| T11-13975 | Teflon® | 08-Jul-2011 | 224-hour | DRI | CSN |
| T11-13964 | Teflon® | 10-Mar-2011 | 116-hour | NAREL | CSN |
| T11-13965 | Teflon® | 10-Mar-2011 | 116-hour | NAREL | CSN |
| T11-13976 | Teflon® | 08-Jul-2011 | 224-hour | NAREL | CSN |
| T11-13977 | Teflon® | 08-Jul-2011 | 224-hour | NAREL | CSN |
| N11-13956 | Nylon® | 10-Mar-2011 | 116-hour | RTI | IMPROVE |
| N11-13957 | Nylon® | 10-Mar-2011 | 116-hour | RTI | IMPROVE |
| N11-13968 | Nylon® | 08-Jul-2011 | 224-hour | RTI | IMPROVE |
| N11-13969 | Nylon® | 08-Jul-2011 | 224-hour | RTI | IMPROVE |
| N10-13468 | Nylon® | 10-Mar-2011 | 116-hour | NAREL | IMPROVE |
| N10-13469 | Nylon® | 10-Mar-2011 | 116-hour | NAREL | IMPROVE |
| N10-13480 | Nylon® | 08-Jul-2011 | 224-hour | NAREL | IMPROVE |
| N10-13481 | Nylon® | 08-Jul-2011 | 224-hour | NAREL | IMPROVE |

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 7 through 17).

**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 March 1 and June 29. Nitrate, sulfate, and ammonium were the most abundant analytes captured from the Montgomery air, and these mid-level ions are plotted together in figure 3. Each cluster of bars in the graph is labeled with the ion reported, but the individual samples within each cluster are not identified. It is important to understand that the replicate samples within each cluster were consistently arranged, from left to right, in the same order. Reasonably good agreement can be seen in figure 3 for all of the mid-level ions.

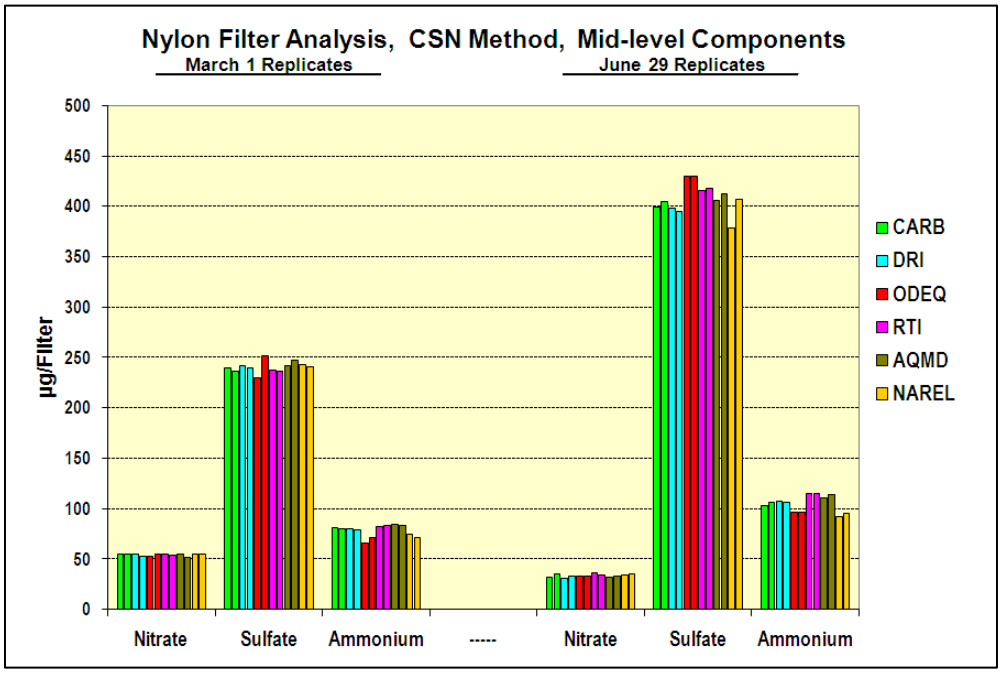
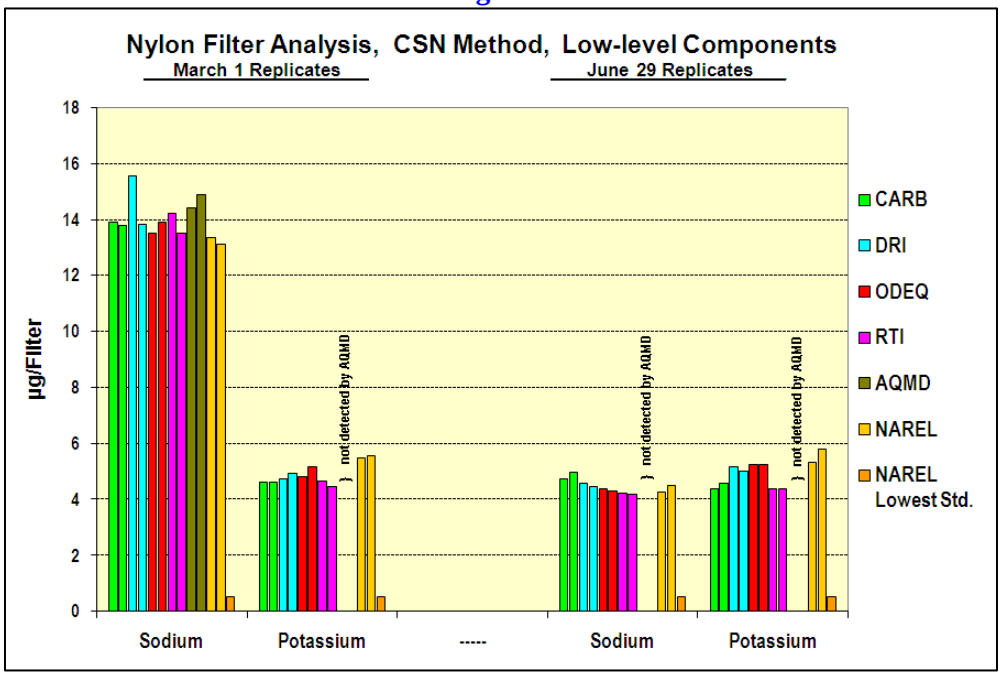



**Figure 3**

Sodium and potassium were present in the air at relatively low levels, and these ions are plotted in figure 4. Since figure 4 shows the low-level components, an extra bar has been added that represents the lowest calibration standard analyzed at NAREL. The lowest calibration standard is a good estimate of the practical quantification limit for the analysis.

The "not detected" results reported by AQMD are the most prominent feature of figure 4. All of the other positive results show good agreement for the replicate filters.

**Figure 4**



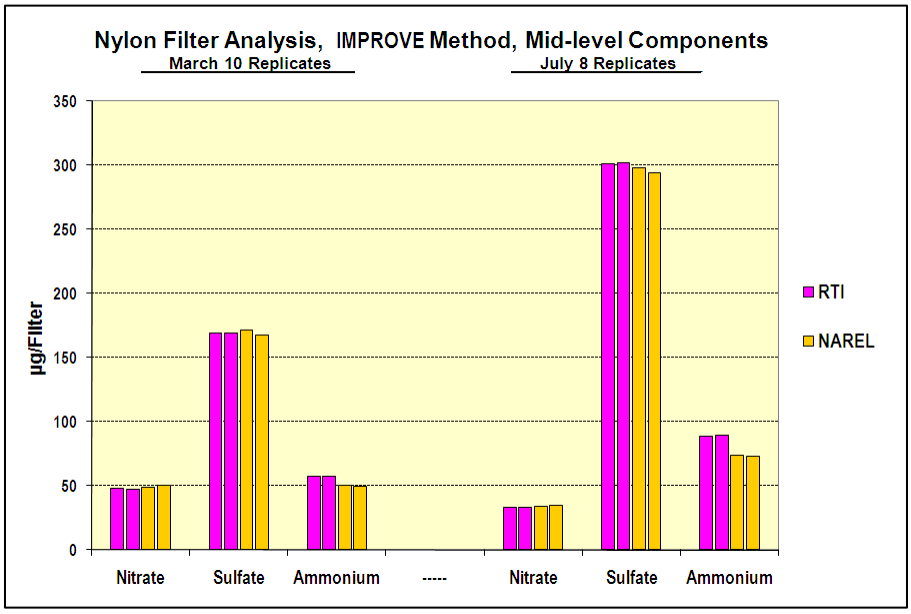
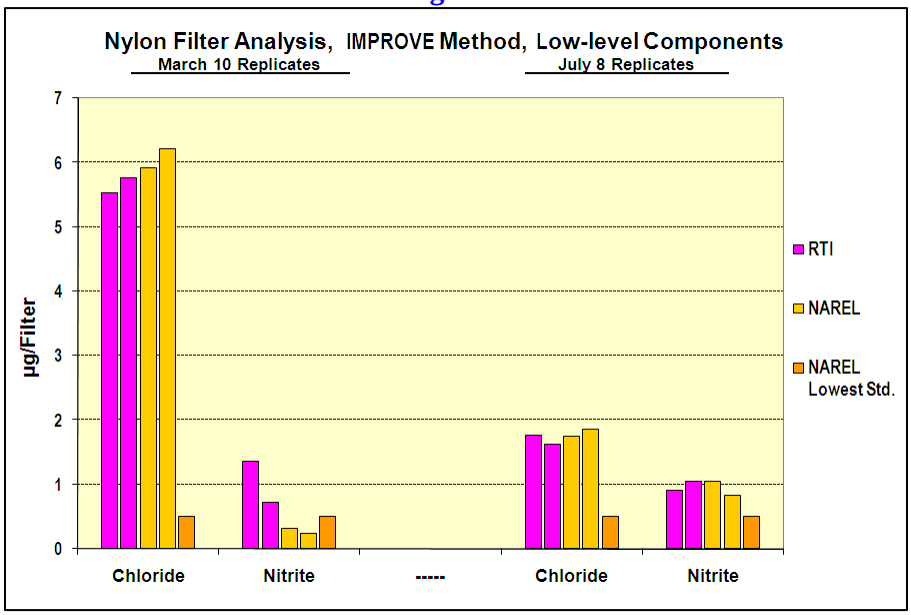



**Figure 5**

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 March 10 and July 8. 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. Two new low-level ions are shown in figure 6. Chloride and nitrite are routinely determined using the IMPROVE method, even though they are not reported for the CSN method. Note also that potassium and sodium are not reported for the IMPROVE method.

Figures 5 and 6 show good agreement between labs for all of the IMPROVE ions except nitrite. 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**



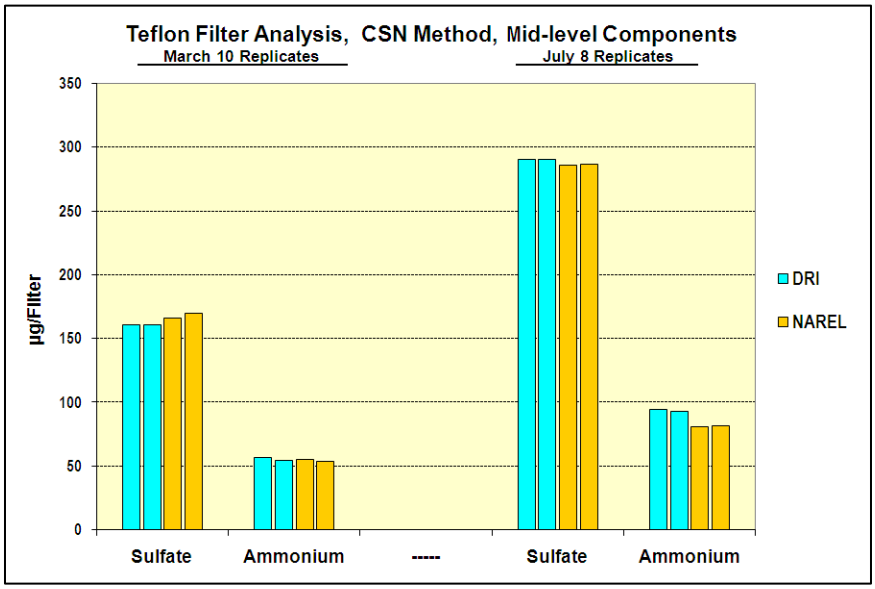
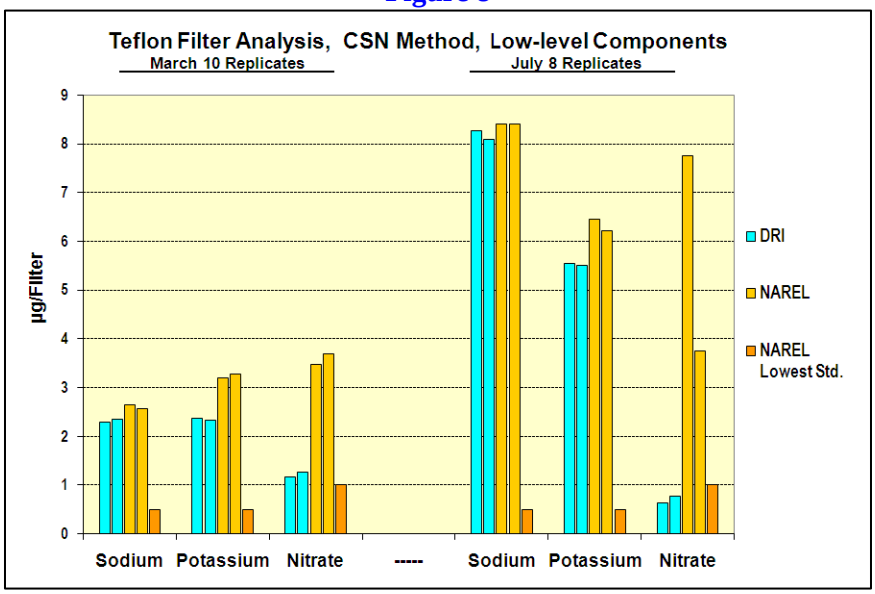



**Figure 7**

According to table 3, both Nylon® and Teflon® filters were loaded during the March 10 and July 8 sampling events. Results from the Nylon® filters were presented previously in figures 5 and 6. Results from the Teflon® filters are presented here in figures 7 and 8. Notice that nitrate is not included as a mid-level ion in figure 7. This is not surprising since the lower nitrate values reported from the Teflon® filters are due to a known sampling artifact. The nitrate values shown in figure 5 from the Nylon® filters are much higher than the nitrate values from the Teflon® filters shown in figure 8.

Reasonably good agreement can be seen in Figure 7 for the mid-level ions, but worse agreement is observed between labs for the low-level ions in figure 8. The nitrate values reported by NAREL are significantly higher than values reported by DRI. Furthermore, the July 8 replicates analyzed at NAREL show very poor precision for nitrate even though the extracts were analyzed twice with similar results from both determinations. 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.

**Figure 8**



**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(s) |
|---|---|---|---|---|---|
| Q11-13887 | quartz | 07-Jan-2011 | 216-hour | CARB | IMPROVE_A |
| Q11-13888 | quartz | 07-Jan-2011 | 216-hour | CARB | IMPROVE_A |
| Q11-13899 | quartz | 14-Jun-2011 | 221-hour | CARB | IMPROVE_A |
| Q11-13900 | quartz | 14-Jun-2011 | 221-hour | CARB | IMPROVE_A |
| Q11-13889 | quartz | 07-Jan-2011 | 216-hour | DRI | IMPROVE_A |
| Q11-13890 | quartz | 07-Jan-2011 | 216-hour | DRI | IMPROVE_A |
| Q11-13901 | quartz | 14-Jun-2011 | 221-hour | DRI | IMPROVE_A |
| Q11-13902 | quartz | 14-Jun-2011 | 221-hour | DRI | IMPROVE_A |
| Q11-13891 | quartz | 07-Jan-2011 | 216-hour | RTI | IMPROVE_A and CSN |
| Q11-13892 | quartz | 07-Jan-2011 | 216-hour | RTI | IMPROVE_A and CSN |
| Q11-13903 | quartz | 14-Jun-2011 | 221-hour | RTI | IMPROVE_A and CSN |
| Q11-13904 | quartz | 14-Jun-2011 | 221-hour | RTI | IMPROVE_A and CSN |
| Q11-13893 | quartz | 07-Jan-2011 | 216-hour | AQMD | IMPROVE_A |
| Q11-13894 | quartz | 07-Jan-2011 | 216-hour | AQMD | IMPROVE_A |
| Q11-13905 | quartz | 14-Jun-2011 | 221-hour | AQMD | IMPROVE_A |
| Q11-13906 | quartz | 14-Jun-2011 | 221-hour | AQMD | IMPROVE_A |
| Q11-13895 | quartz | 07-Jan-2011 | 216-hour | NAREL | IMPROVE_A and CSN |
| Q11-13896 | quartz | 07-Jan-2011 | 216-hour | NAREL | IMPROVE_A and CSN |
| Q11-13907 | quartz | 14-Jun-2011 | 221-hour | NAREL | IMPROVE_A and CSN |
| Q11-13909 | quartz | 14-Jun-2011 | 221-hour | NAREL | IMPROVE_A and CSN |

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 winter event that started on January 7, and two of these replicates were submitted to each lab for analysis. Likewise, ten replicates were created during the 216-hour late spring event that started on June14, 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 shipped to DRI for analysis. The DRI lab is set up to analyze a large volume of samples and routinely operate several TOA instruments. DRI and RTI were able to analyze each filter more than once using different instruments for the second analysis. RTI and NAREL also reported results using more than one TOA method. The results were reported for each sample based upon the amount of carbon per square centimeter of deposit area (µg $C/cm^2$).

According to table 4, two different TOA methods were used to report results: the IMPROVE_A method and the CSN method. To avoid confusion, it should be stated again that the CSN method was previously referred to as the Speciation Trends Network (STN) method. CSN is used in this report to be consistent with the language used in recent EPA contracts. It may be useful to briefly explain the major differences between the IMPROVE_A and the CSN methods. Table 5 shows the temperature protocol that is used by each method.

**Table 5. Comparison of Temperature Protocols for Two TOA Methods**

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

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

Beyond the thermal protocols listed in table 5, each TOA method is further defined by the way optical measurements are made and utilized to calculate carbon fractions. For example, the optical measurements are used to distinguish the elemental carbon (EC) from the organic carbon (OC) present in the sample. In fact we shall see, all of the carbon fractions have a functional definition that depends upon the method of analysis.

All of the instruments used for this study are equipped with a small tubular quartz oven and a laser/diode system. The sample analysis begins by placing a carefully measured [punched] segment of the filter sample into the oven directly in the path of the laser. A purge gas removes air from the oven and surrounds the sample with a stream of pure helium before the heating and data acquisition begin. Light from the laser will interact with the sample during the analysis. A diode detector can be positioned to measure the light transmitted through the sample, and this configuration is needed for a TOT (thermal optical transmittance) analysis. A diode can also be positioned to measure the reflected light, and this configuration is needed for a TOR (thermal optical reflectance) analysis. As the sample segment is heated and the pure helium phase of the analysis proceeds, some of the organic carbon may char to form a darker pyrolized carbon (PyrolC). All of the methods in this study use either TOT or TOR to evaluate the PyrolC. Three different instruments were used for this study. The older Sunset [single mode] instruments are equipped with only one diode detector configured for the TOT analysis. The DRI Model 2001 instruments and the Sunset Dual Mode instruments are newer designs capable of measuring the transmitted and the reflected light simultaneously. These newer instruments provide more optical information since each instrument is equipped with two diode detectors giving the user a choice of the TOT or the TOR analysis. Table 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,#13 | OC, EC, TC, OCsub, ECsub | 2 |
| | | | DRI Instr. #7,#8,#10,#12,#13 | OC, EC, TC, OCsub, ECsub | 3 |
| | | | RTI Instr. #1 | OC, EC, TC, OCsub, ECsub | 4 |
| | | | AQMD Instr. #2 | OC, EC, TC, OCsub, ECsub | 5 |
| | | Sunset (dual-mode) | RTI Instr. T | OC, EC, TC, OCsub, ECsub | 6 |
| | | | NAREL Instr. #2 | OC, EC, TC, OCsub, ECsub | 7 |
| CSN | TOT | Sunset (dual-mode) | RTI Instr. T | OC, EC, TC, OCsub | 8 |
| | | | RTI Instr. R | OC, EC, TC, OCsub | 9 |
| | | Sunset (single-mode) | NAREL Instr. #1 | OC, EC, TC, OCsub | 10 |

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

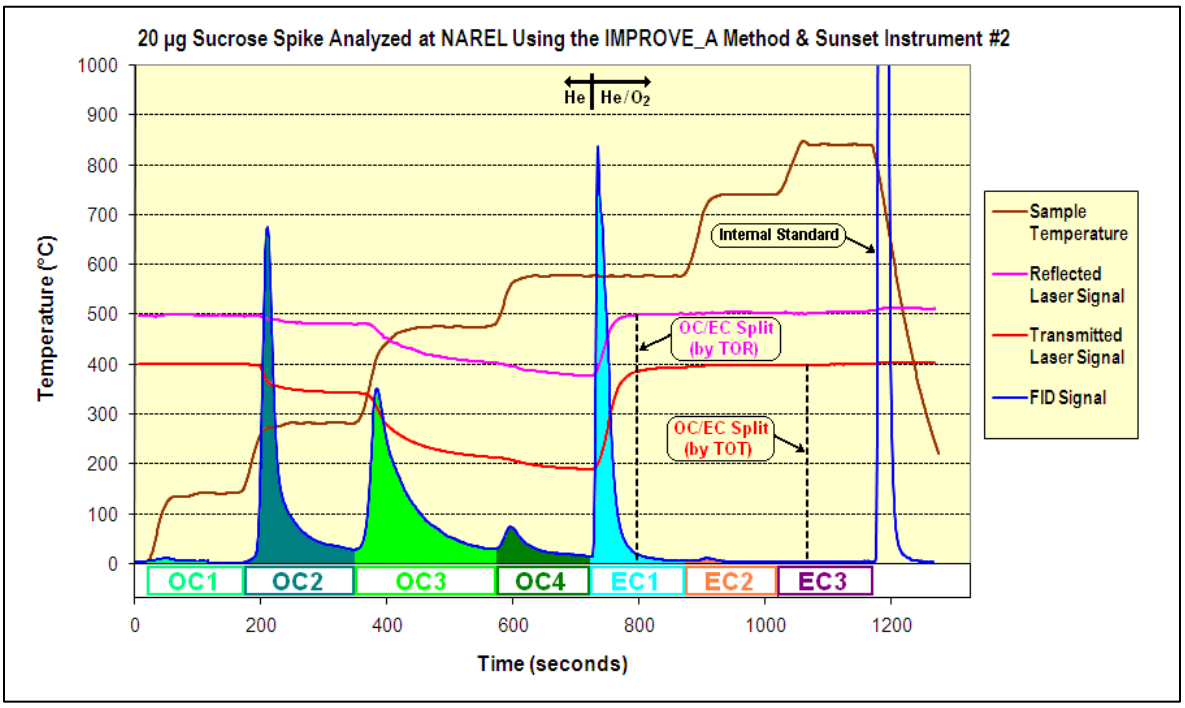


Figure 9 is a thermogram of a sucrose spike which was analyzed at NAREL using the IMPROVE_A heating profile. Sucrose is a good calibration check sample because it has a strong tendency to char creating PyrolC during the analysis, yet it contains no EC. Figure 9 shows suppression of both laser signals 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.

The IMPROVE_A and the CSN methods use different heating protocols, and furthermore, use different rules for calculating some of the subfractions. 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. All of the participating labs have an SOP for the TOA method(s) used at their laboratory. Many SOP’s are currently available on the web (see reference 18 through 24).

**Carbon Results**

Results from the analysis of replicate quartz filters using either 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**

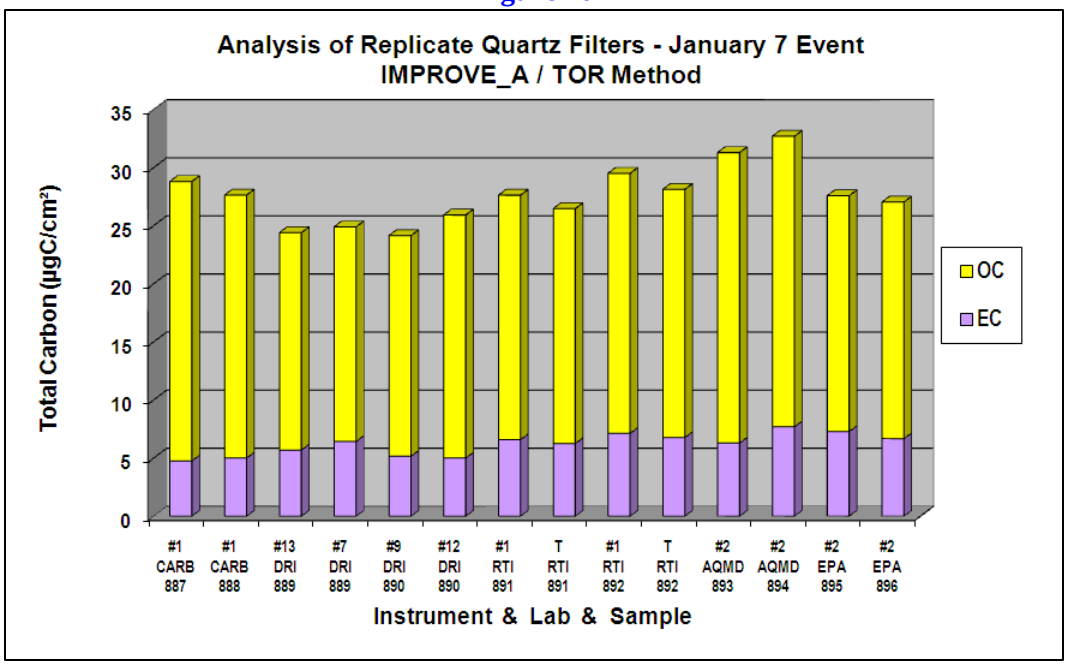
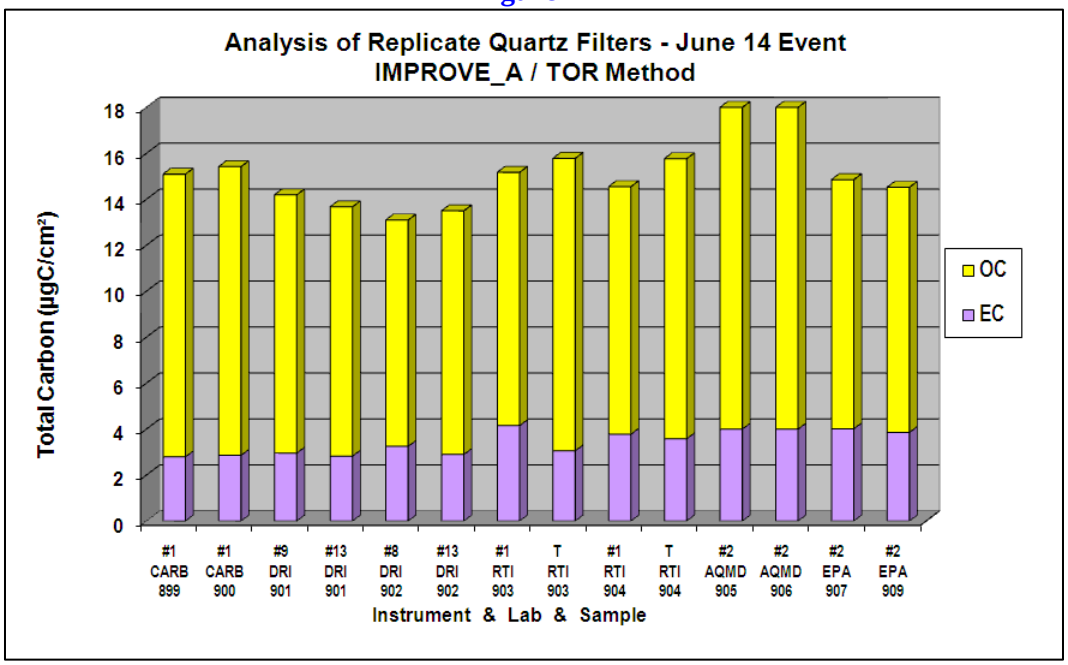



Figure 10 shows results from replicates that were created on January 7, and figure 11 shows the results from replicates created on June 14. The bar segments show the OC and EC components of the total carbon but do not show the more detailed fractions. Notice that each filter submitted to DRI and RTI was analyzed twice using different instruments.

**Figure 11**



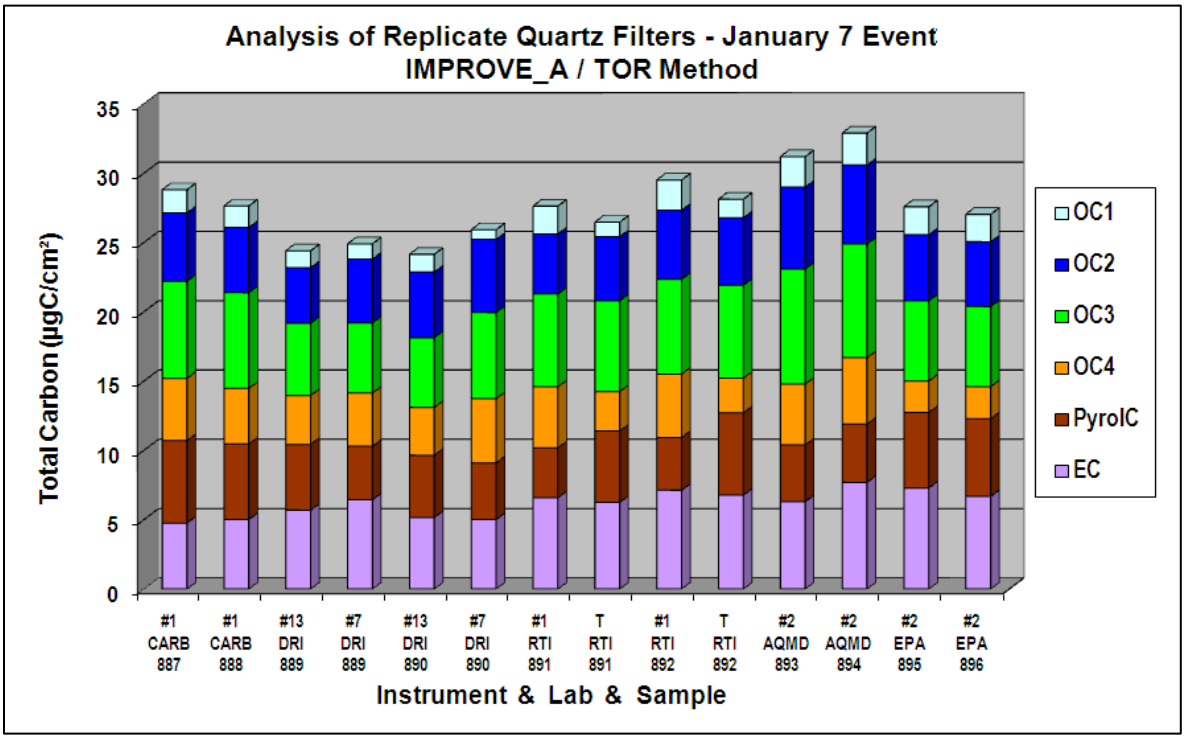
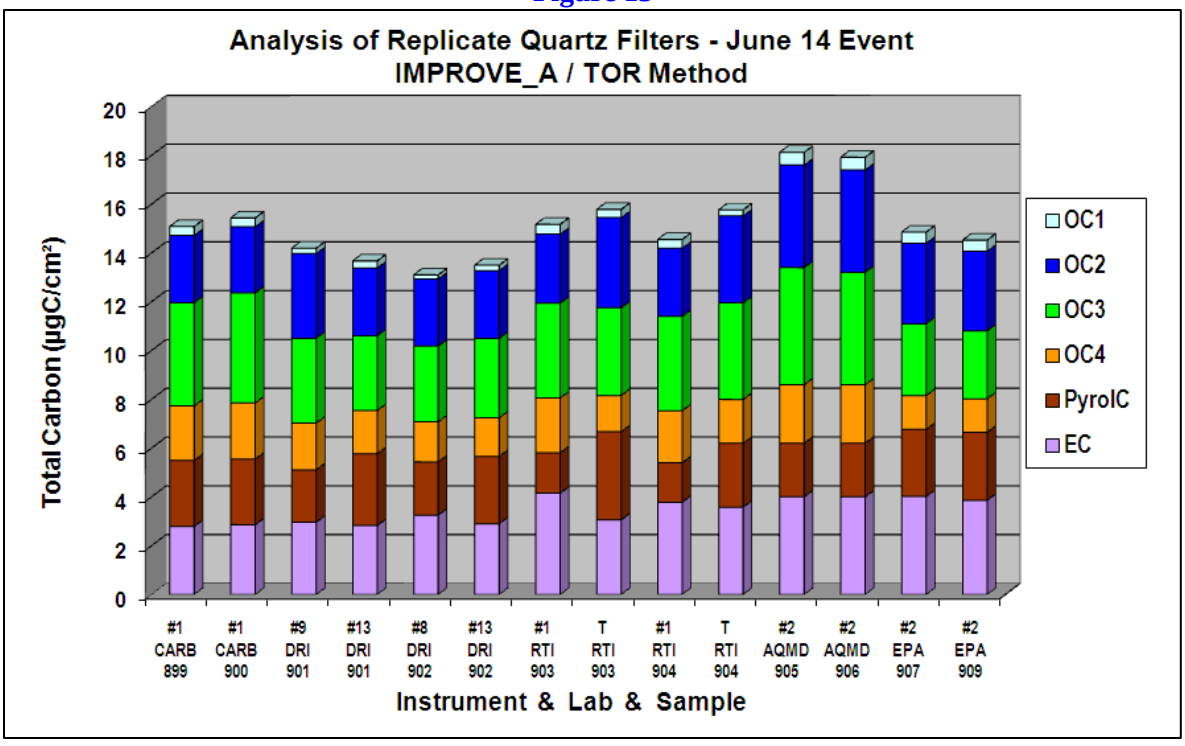



**Figure 12**

The results are presented again in figures 12 and 13 with more detail, and this time the OC subfractions are revealed. Both figures show unusual variability in the TC results. AQMD consistently reported the highest TC values, and DRI reported the lowest. All of the instruments used the same method, and there is relatively good agreement among labs for the carbon fractions.

**Figure 13**



Even though implementation of the new URG 3000N samplers is complete, a few of the CSN field sites have not discontinued carbon sampling with the Met One sampler. EPA has decided to perform dual sampling at a few sites to demonstrate comparability of the carbon sampling and analysis methods. At the dual sampling sites, the exposed quartz filters that are recovered from the Met One sampler are analyzed at RTI using the CSN method, and filters recovered from the URG 3000N sampler are analyzed at DRI using the IMPROVE_A method.

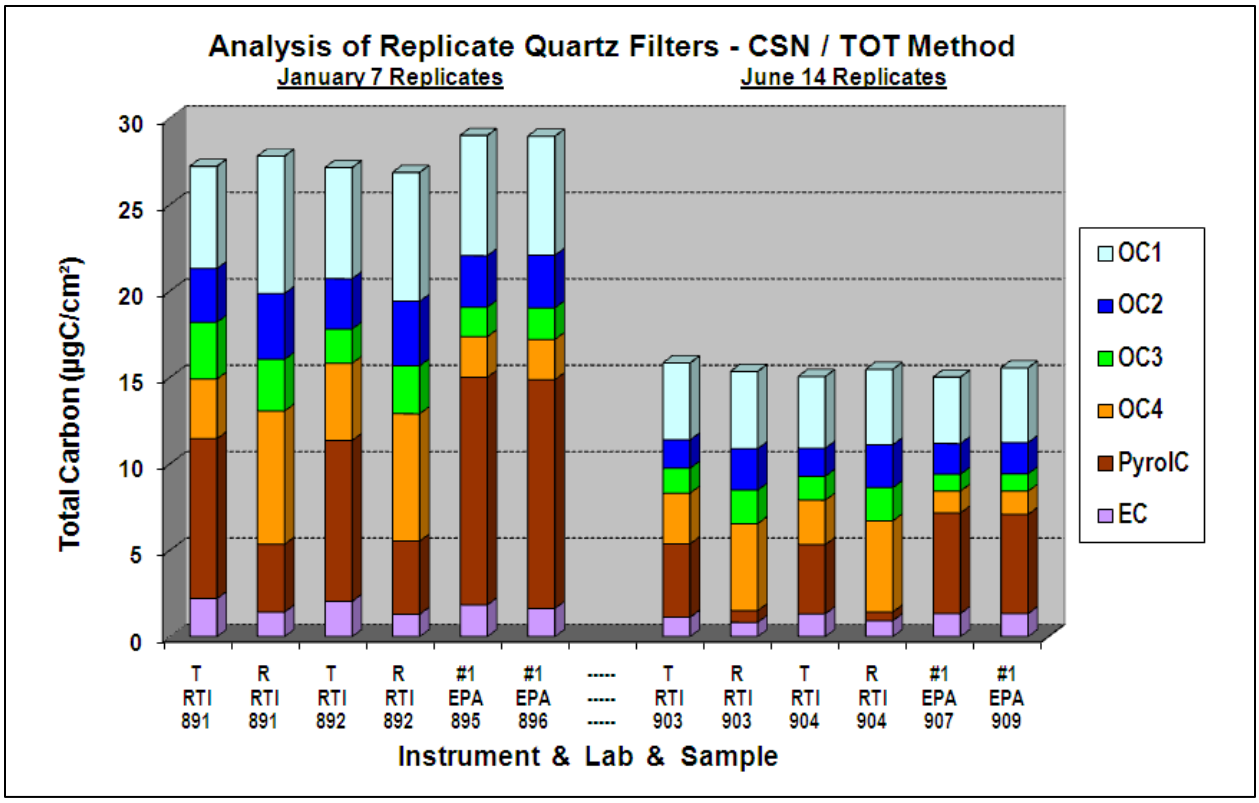



**Figure 14**

For this study, RTI and NAREL were the only labs that reported results from both TOA methods. Figure 14 presents the CSN/TOT results from January 7 replicates on the left side of the graph and results from the June 14 replicates on the right side of the graph. Figure 14 shows reasonably good agreement for the total carbon from all of the replicates, but there are significant differences among replicates for the OC4 and PyrolC subfractions. EPA's instrument #1 and RTI's instrument "R" show the greatest disparity. It is possible that the small values for PyrolC coupled with the larger values for OC4 may be due to active sites within the quartz oven or possibly due to a small pneumatic leak that allows air into the oven during the first [non-oxidizing] stage of the analysis. Other explanations are possible.

It is interesting to compare the CSN results shown in figure 14 with the IMPROVE_A results shown previously. Good agreement is observed in the TC reported from both methods, but significant differences are observed for several of the carbon fractions. For example, the EC reported from the CSN/TOT method is consistently smaller than the EC reported from the IMPROVE_A/TOR method.

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 set of PT samples.

**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 |
|---|---|---|---|---|---|
| T11-13844 | 47-mm Teflon® | 03/17/11 | 165-hour event | CARB | RTI |
| T11-13845 | 47-mm Teflon® | 03/17/11 | 165-hour event | CARB | RTI |
| T11-13860 | 47-mm Teflon® | 06/07/11 | 120-hour event | CARB | RTI |
| T11-13861 | 47-mm Teflon® | 06/07/11 | 120-hour event | CARB | RTI |
| T11-13876 | 47-mm Teflon® | blank | ----- | CARB | RTI |
| T11-13877 | 47-mm Teflon® | blank | ----- | CARB | RTI |
| T11-13846 | 47-mm Teflon® | 03/17/11 | 165-hour event | DRI | RTI |
| T11-13847 | 47-mm Teflon® | 03/17/11 | 165-hour event | DRI | RTI |
| T11-13862 | 47-mm Teflon® | 06/07/11 | 120-hour event | DRI | RTI |
| T11-13863 | 47-mm Teflon® | 06/07/11 | 120-hour event | DRI | RTI |
| T11-13878 | 47-mm Teflon® | blank | ----- | DRI | RTI |
| T11-13879 | 47-mm Teflon® | blank | ----- | DRI | RTI |
| T11-13848 | 47-mm Teflon® | 03/17/11 | 165-hour event | ODEQ | RTI |
| T11-13849 | 47-mm Teflon® | 03/17/11 | 165-hour event | ODEQ | RTI |
| T11-13864 | 47-mm Teflon® | 06/07/11 | 120-hour event | ODEQ | RTI |
| T11-13865 | 47-mm Teflon® | 06/07/11 | 120-hour event | ODEQ | RTI |
| T11-13880 | 47-mm Teflon® | blank | ----- | ODEQ | RTI |
| T11-13881 | 47-mm Teflon® | blank | ----- | ODEQ | RTI |
| T11-13850 | 47-mm Teflon® | 03/17/11 | 165-hour event | AQMD | RTI |
| T11-13851 | 47-mm Teflon® | 03/17/11 | 165-hour event | AQMD | RTI |
| T11-13866 | 47-mm Teflon® | 06/07/11 | 120-hour event | AQMD | RTI |
| T11-13867 | 47-mm Teflon® | 06/07/11 | 120-hour event | AQMD | RTI |
| T11-13882 | 47-mm Teflon® | blank | ----- | AQMD | RTI |
| T11-13883 | 47-mm Teflon® | blank | ----- | AQMD | RTI |
| T11-13852 | 47-mm Teflon® | 03/17/11 | 165-hour event | UCD | RTI |
| T11-13853 | 47-mm Teflon® | 03/17/11 | 165-hour event | UCD | RTI |
| T11-13868 | 47-mm Teflon® | 06/07/11 | 120-hour event | UCD | RTI |
| T11-13869 | 47-mm Teflon® | 06/07/11 | 120-hour event | UCD | RTI |
| T11-13884 | 47-mm Teflon® | blank | ----- | UCD | RTI |
| T11-13885 | 47-mm Teflon® | blank | ----- | UCD | RTI |
| T11-13839 | 25-mm Teflon® | 03/17/11 | 165-hour event | DRI | EPA |
| T11-13840 | 25-mm Teflon® | 03/17/11 | 165-hour event | DRI | EPA |
| T11-13855 | 25-mm Teflon® | 06/07/11 | 120-hour event | DRI | EPA |
| T11-13856 | 25-mm Teflon® | 06/07/11 | 120-hour event | DRI | EPA |
| T11-13871 | 25-mm Teflon® | blank | ----- | DRI | EPA |
| T11-13872 | 25-mm Teflon® | blank | ----- | DRI | EPA |
| T11-13841 | 25-mm Teflon® | 03/17/11 | 165-hour event | UCD | EPA |
| T11-13842 | 25-mm Teflon® | 03/17/11 | 165-hour event | UCD | EPA |
| T11-13857 | 25-mm Teflon® | 06/07/11 | 120-hour event | UCD | EPA |
| T11-13858 | 25-mm Teflon® | 06/07/11 | 120-hour event | UCD | EPA |
| T11-13873 | 25-mm Teflon® | blank | ----- | UCD | EPA |
| T11-13874 | 25-mm Teflon® | blank | ----- | UCD | EPA |

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 |
|---|---|---|---|---|---|---|---|
| 165-hr event starting on 03/17/11 | 25-mm | T11-13839 | DRI | EPA | 994 | 942 | 6% |
| | | T11-13840 | DRI | EPA | 927 | 942 | -2% |
| | | T11-13841 | UCD | EPA | 942 | 942 | 0% |
| | | T11-13842 | UCD | EPA | 937 | 942 | -1% |
| | 47-mm | T11-13844 | CARB | RTI | 920 | 942 | -2% |
| | | T11-13845 | CARB | RTI | 923 | 942 | -2% |
| | | T11-13846 | DRI | RTI | 948 | 942 | 1% |
| | | T11-13847 | DRI | RTI | 940 | 942 | 0% |
| | | T11-13848 | ODEQ | RTI | 928 | 942 | -1% |
| | | T11-13849 | ODEQ | RTI | 929 | 942 | -1% |
| | | T11-13850 | AQMD | RTI | 928 | 942 | -1% |
| | | T11-13851 | AQMD | RTI | 927 | 942 | -2% |
| | | T11-13852 | UCD | RTI | 970 | 942 | 3% |
| | | T11-13853 | UCD | RTI | 976 | 942 | 4% |
| 120-hr event starting on 06/07/11 | 25-mm | T11-13855 | DRI | EPA | 1011 | 1009 | 0% |
| | | T11-13856 | DRI | EPA | 1019 | 1009 | 1% |
| | | T11-13857 | UCD | EPA | 1025 | 1009 | 2% |
| | | T11-13858 | UCD | EPA | 1030 | 1009 | 2% |
| | 47-mm | T11-13860 | CARB | RTI | 992 | 1009 | -2% |
| | | T11-13861 | CARB | RTI | 978 | 1009 | -3% |
| | | T11-13862 | DRI | RTI | 999 | 1009 | -1% |
| | | T11-13863 | DRI | RTI | 1002 | 1009 | -1% |
| | | T11-13864 | ODEQ | RTI | 1001 | 1009 | -1% |
| | | T11-13865 | ODEQ | RTI | 1009 | 1009 | 0% |
| | | T11-13866 | AQMD | RTI | 1003 | 1009 | -1% |
| | | T11-13867 | AQMD | RTI | 1008 | 1009 | 0% |
| | | T11-13868 | UCD | RTI | 1022 | 1009 | 1% |
| | | T11-13869 | UCD | RTI | 1029 | 1009 | 2% |

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 EPA's National Exposure Research Lab (NERL) 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 exposed filters and at least two representative blank filters as described previously in table 7. 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. $\mu g/cm^2$), and in those cases, results were multiplied by the total area of the deposit to produce the final results that appear in this report. It is interesting to note that all labs did not use a consistent deposit area for a given filter size. Most labs used 11.3 $cm^2$ for the deposit area of a 47-mm filter, but DRI,

ODEQ, and AQMD used 11.74, 11.82, and 11.8 $cm^2$ respectively. For those labs that analyzed 25-mm filters, EPA and UCD used 3.53 $cm^2$ for the deposit area, but DRI used 3.35 $cm^2$. This small source of inter-laboratory bias would be eliminated if all labs agreed to use a consistent deposit area for each filter size.

All of the participating labs have an SOP for their XRF analysis. Some of the SOP's are currently available on the web for easy viewing (see reference 25 through 30).

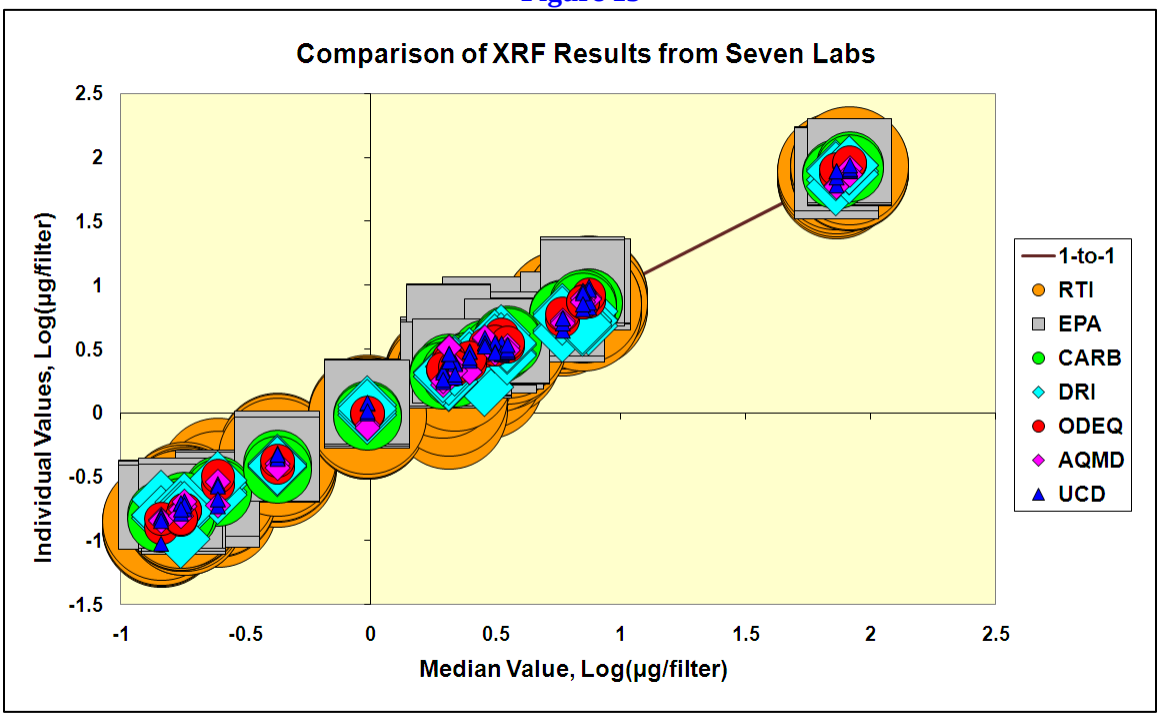
**XRF Results**

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 UCD also reported results from 25-mm filters with EPA 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 normally reported for these programs. Accordingly, this report includes results for thirty-three elements reported from the 47-mm filters and twenty-four elements reported from 25-mm filters.

All of the XRF results that were significantly above the reported uncertainties have been compared to the median values by constructing a scatter plot shown in figure 15. 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 15 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 15**



The more significant results are presented again as stacked-bar graphs in figures 16 and 17. 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 16**

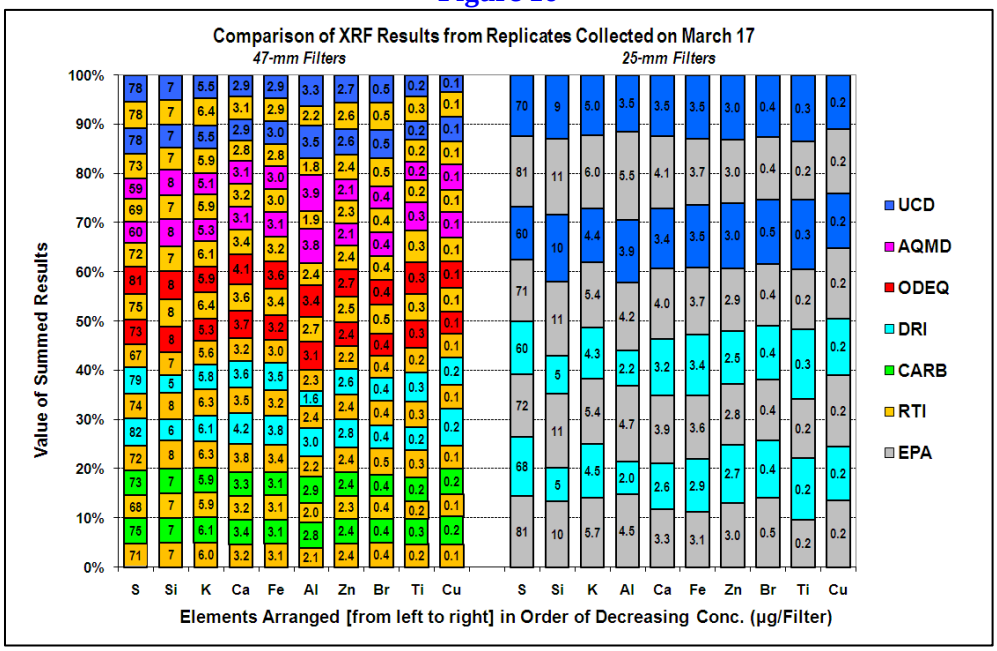
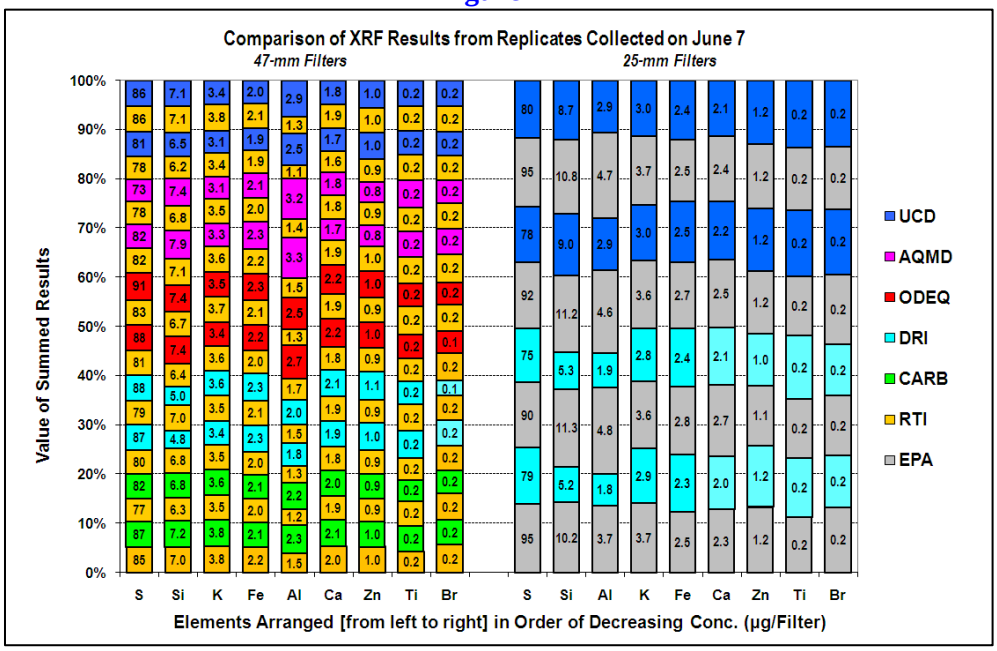



**Figure 17**



The normalized stacked-bar graphs presented in figures 16 and 17 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 18 through 28 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. Notice that uncertainties were not reported by the AQMD and UCD labs. 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 18 through 28 that the result from the reference lab is always presented immediately to the left of the test lab result.

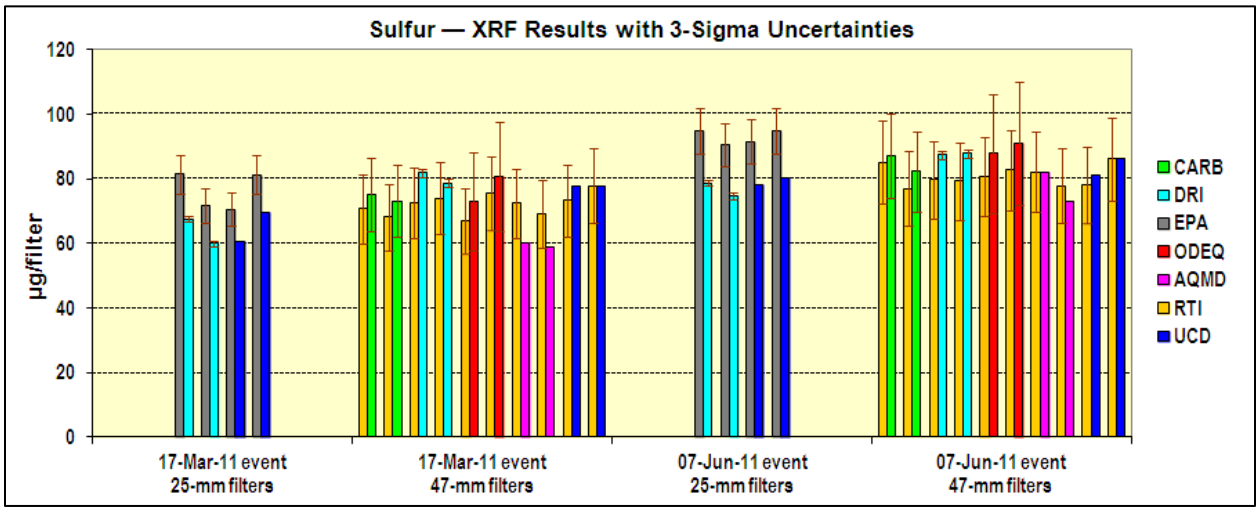
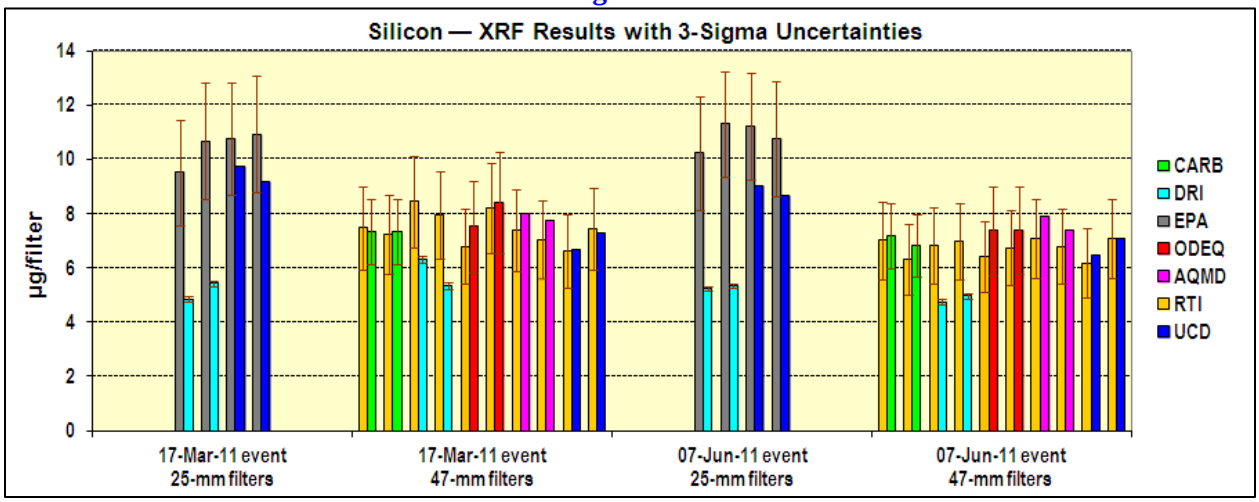



**Figure 18**

Results for sulfur are presented in figure 18. It was the most abundant element reported by all of the labs, and sulfur is a large peak in the analytical spectrum. Figure 18 shows reasonably good agreement among all of the labs for the sulfur concentration.

The silicon results reported by DRI in figure 19 are noticeably samller that the results reported by other labs. It is also interesting to note that DRI reported noticeably smaller uncertainties than the other labs.

**Figure 19**



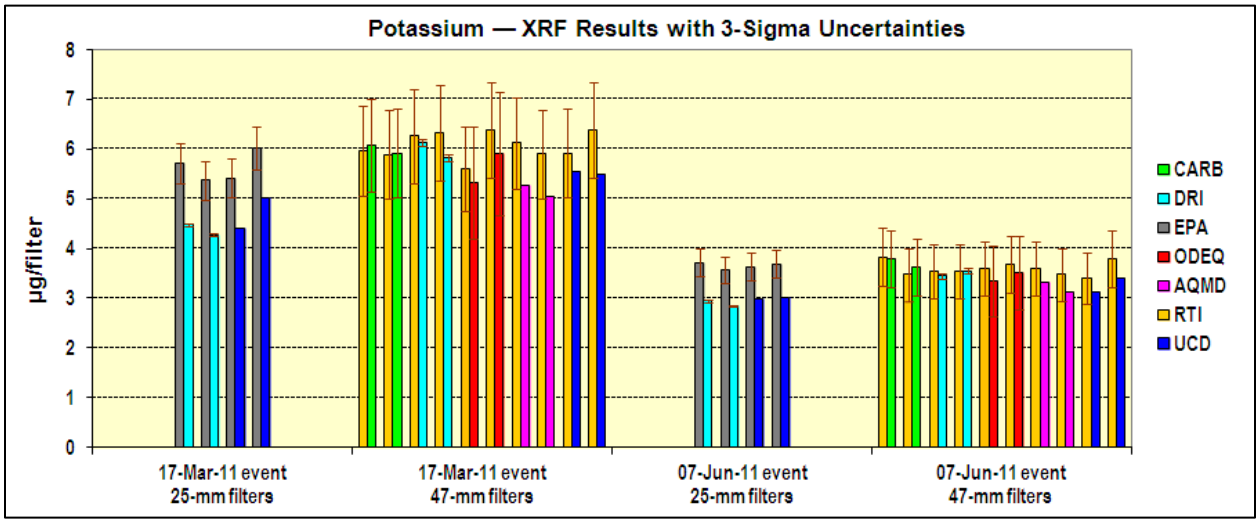



**Figure 20**

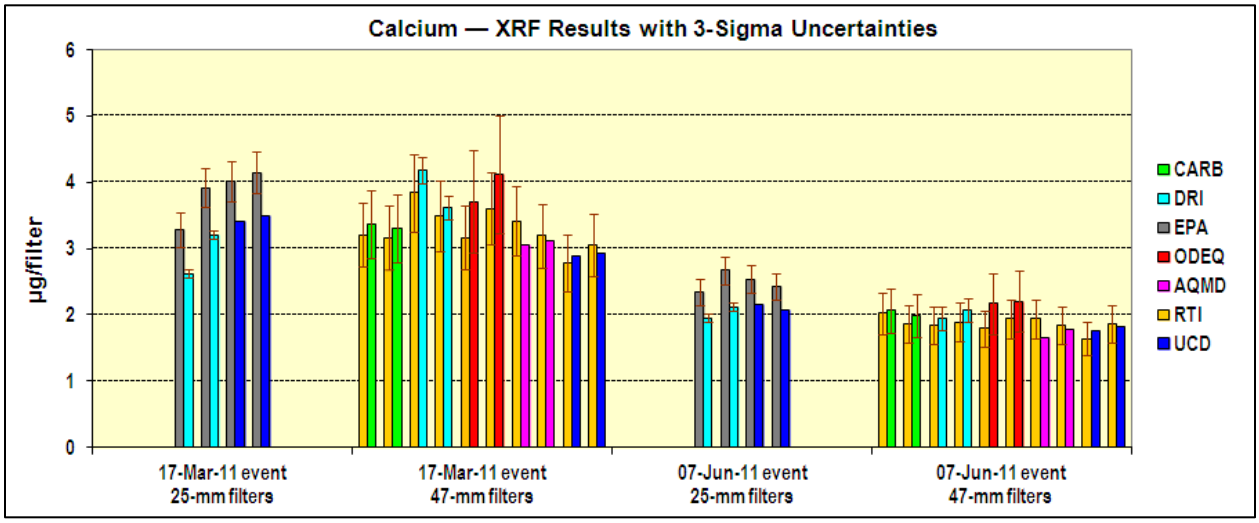



**Figure 21**

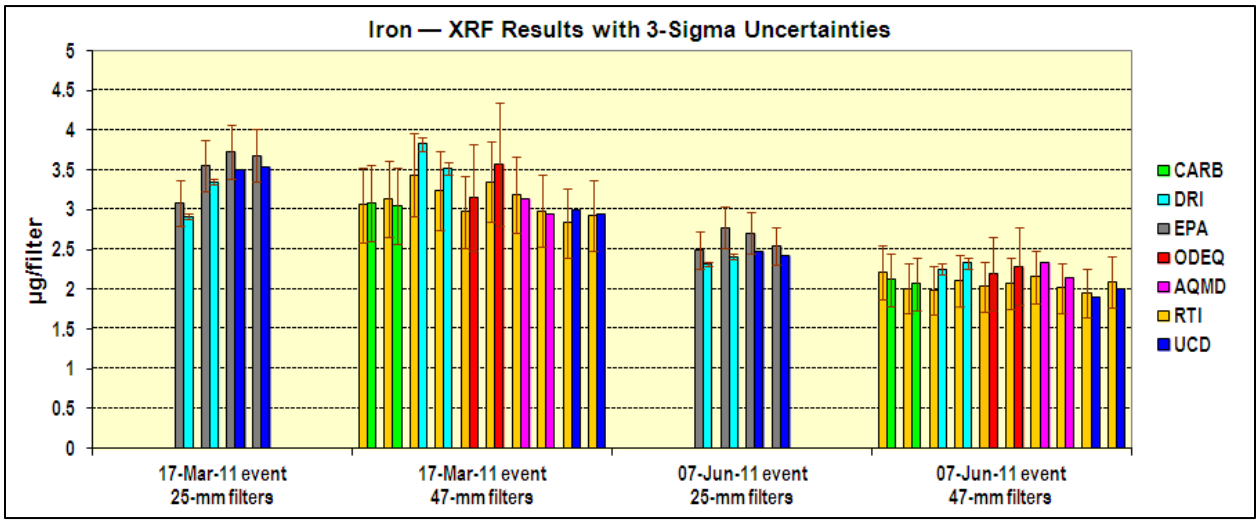



**Figure 22**

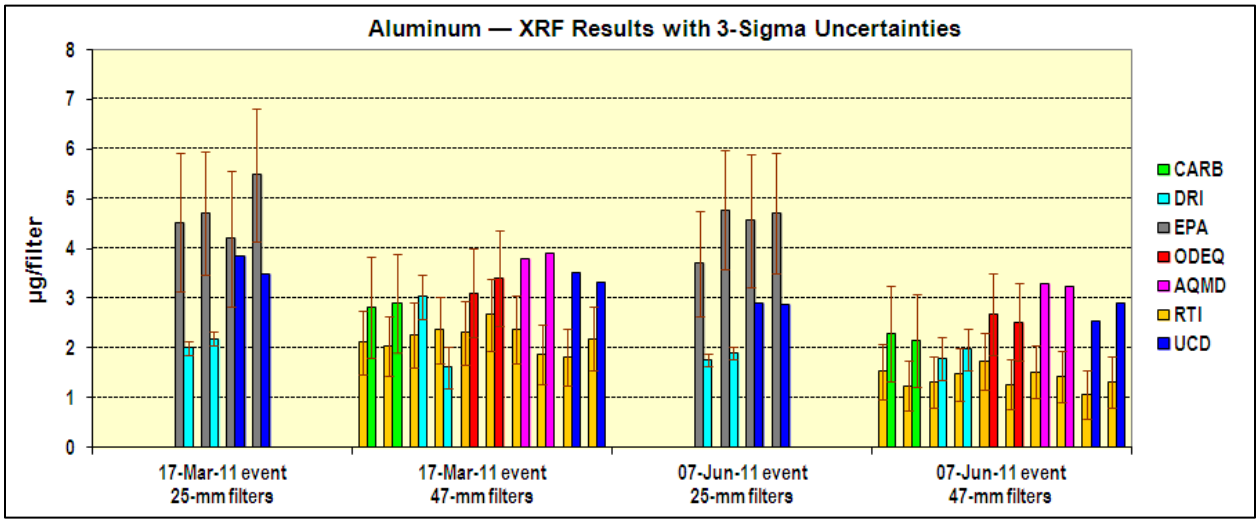



**Figure 23**

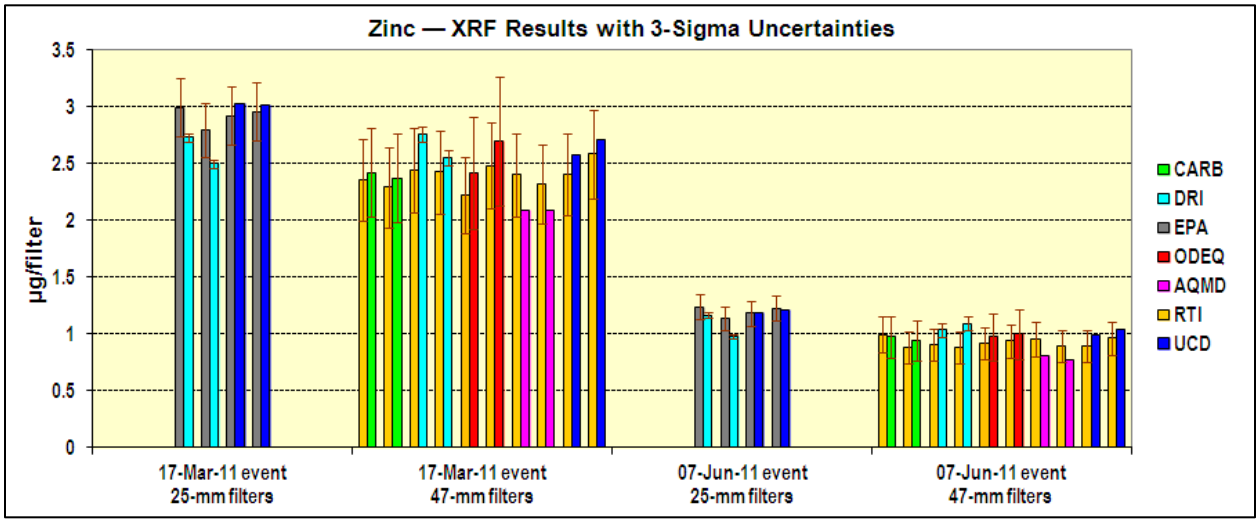



**Figure 24**

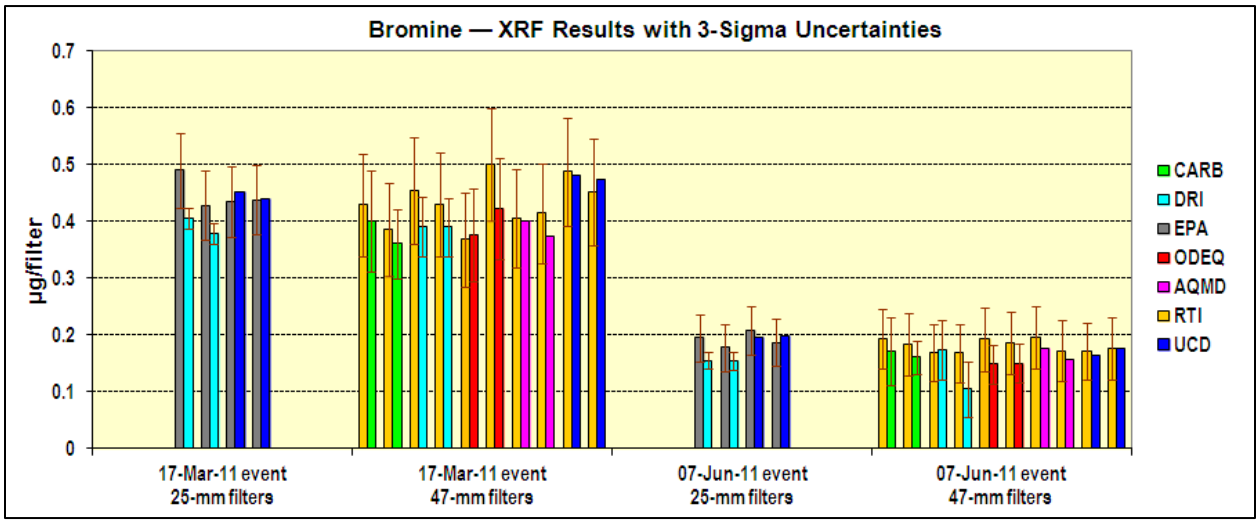



**Figure 25**

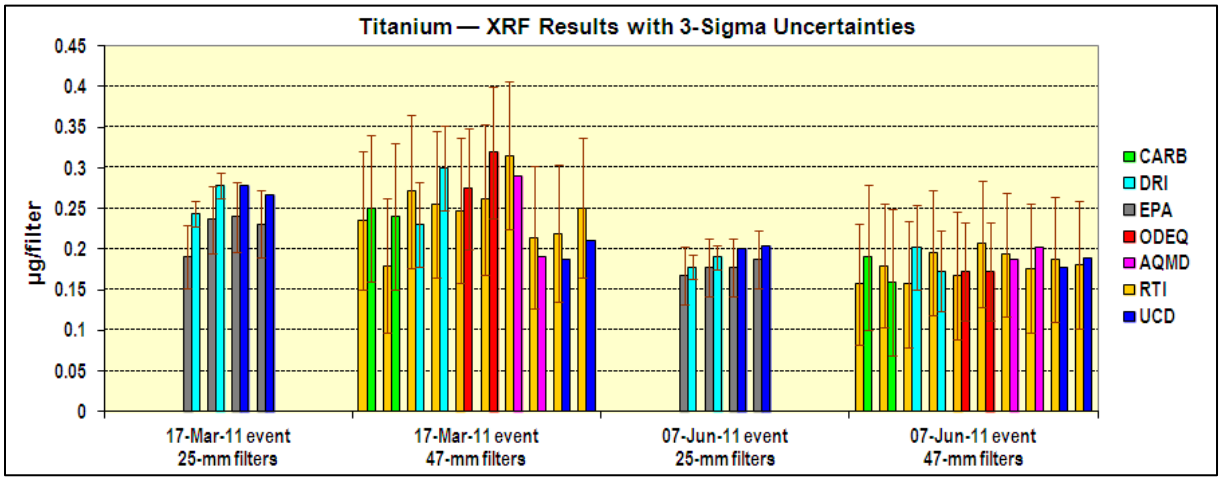



**Figure 26**

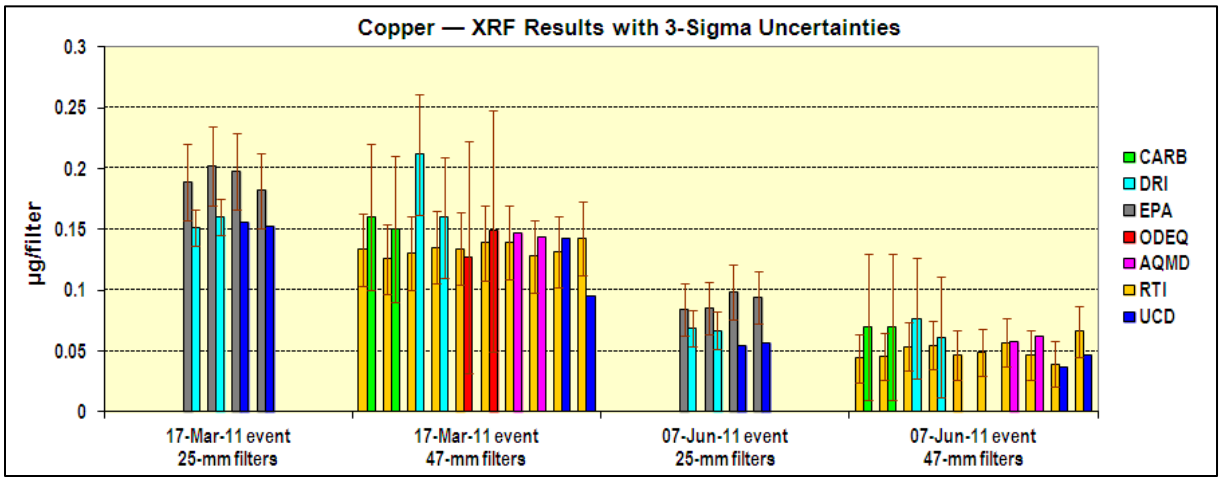



**Figure 27**

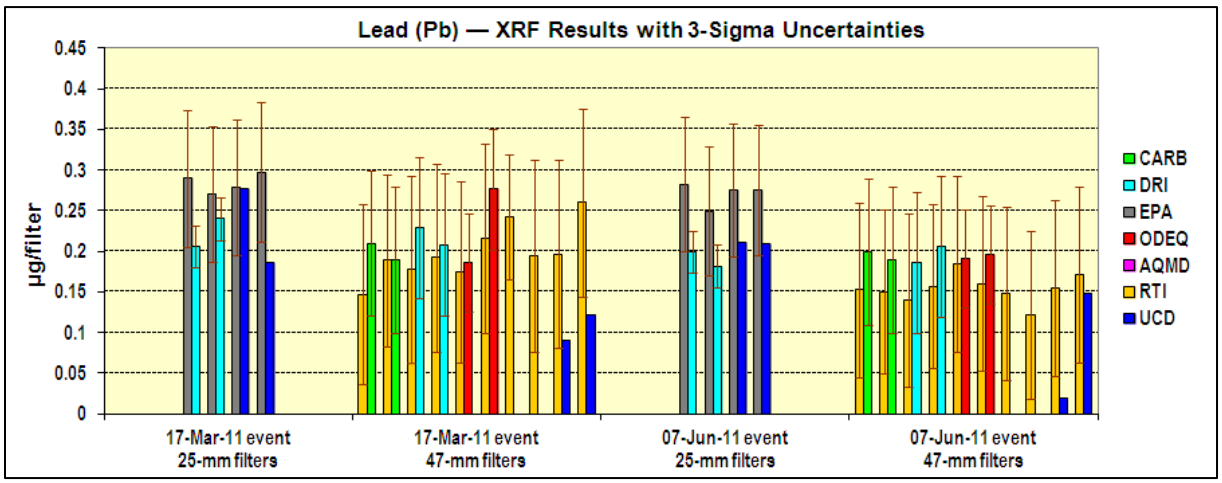



**Figure 28**

Lead (Pb) results are presented in figure 28 even though AQMD reported Pb as not detected in the samples submitted to their lab. Also note that Pb results were not included in figures 15 through 17.

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 15 through 17.

**Conclusions**

This study was designed to evaluate the analytical performance of several $PM_{2.5}$ speciation labs. The approach was similar the previous study (see reference 31). Each test lab analyzed a similar set of blind PT filters that contained hidden replicates and blanks, and the results reported from all of the labs have been compared. The scope of the study included four analytical techniques, and multiple methods were reported for the IC, TOA carbon, and XRF. EPA was able to report results for all of the analytical techniques used during this study.

Five test labs analyzed a set of PT samples for gravimetric mass, and excellent results were observed from all of the participating labs. All of the results from the test labs showed good agreement with the gravimetric results reported from NAREL.

Six different labs reported IC results from at least one set of PT samples, and three different methods were tested. Both Nylon® and Teflon® filters were analyzed for selected ions during this study. Reasonably good agreement was observed in the results reported by different labs for the hidden replicates, and no alarming results were reported for the blank test filters.

Five labs analyzed a set of quartz PT filters, and three of the labs analyzed each filter multiple times in order to report results using more than one instrument. All five labs reported results using the IMPROVE_A method, but only two labs, RTI and NAREL, reported results using the CSN method. A total of ten data packages were reported with TOA carbon results. Each lab received an almost identical set of filters, and every set of filters contained hidden replicates and blanks.

Two trends were observed in the total carbon (TC) values reported for this study. AQMD consistently reported the highest TC values which were 13-20% higher than the median value reported for hidden replicates. DRI consistently reported the lowest TC values which were 5-12% lower than the median. Both of these trends in TC results from AQMD and DRI were also observed in previous studies, yet the exact cause of this performance is still unknown.

Good precision was observed for almost all of the carbon fractions reported for this study. However, one of the instruments at RTI produced troubling results for two of the OC subfractions. The troubling results were reported from RTI's instrument "R" which was running the CSN/TOT method. This instrument reported OC4 and PyrolC values that were dramatically different from the values reported by EPA. A followup investigation was performed by RTI staff immediately after release of the data from this study, and several factors contributing to the problem were identified and corrected.

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

A variety of instruments were used to produce the XRF results in this report. Different instruments create different raw data spectra (reference 32) and furthermore, different labs use different data reduction algorithms. Several factors were different for the two filter media that include the following.

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

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

EPA appreciates the exceptional contributions from DRI and UCD. DRI does not routinely analyze 25-mm Teflon® and Nylon® filters, and UCD does not normally analyze 47-mm filters. These labs made extra effort to report results from both routine and non-routine filter media. UCD normally serves as the reference lab for 25-mm XRF filters, but during the past year, UCD has been extremely busy implementing new XRF instruments, and EPA's NERL facility was able to help with this study.

**References**


1. CARB July 30, 2002. Standard Operating Procedure for the Determination of PM2.5 Mass in Ambient Air by Gravimetric Analysis, SOP MLD055, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD055_fin.pdf
2. DRI May 28, 2010. Standard Operating Procedure PM2.5 FRM Gravimetric Analysis, DRI SOP #2-114r7, Division of Atmospheric Sciences, Desert Research Institute.
3. ODEQ June 27, 2003. Standard Operating Procedure for Gravimetric Analysis of Particulate Collected with R&P Partisol Samplers and MetOne SASS Samplers, Laboratory Division, State of Oregon Department of Environmental Quality, Portland, OR. [currently available on the web] http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0027SOP.pdf
4. RTI July 8, 2008. Standard Operating Procedure, Particulate Matter (PM) Gravimetric Analysis, Environmental and Industrial Sciences Division, RTI International, Research Triangle Park, North Carolina. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIGravMassSOPFINAL.pdf
5. AQMD April 20, 2012. Standard Operating Procedure, Gravimetric Laboratory and Weighing of PM2.5 Samples, SOP 00104 Version 2.1, Monitoring and Analysis Division, South Coast Air Quality Management District, Diamond Bar, California.
6. NAREL April 11, 2011. Standard Operating Procedure, Mass Measurements for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_mass.pdf
7. CARB June 18, 2002. Standard Operating Procedure for the Analysis of Anions and Cations in PM2.5 Speciation Samples by Ion Chromatography, SOP MLD064, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD064_fin.pdf
8. DRI June 10, 2010. Standard Operating Procedure Anion Analysis of Filter Extracts and Precipitation Samples by Ion Chromatography, DRI SOP #2-203r8, Division of Atmospheric Sciences, Desert Research Institute.
9. DRI June 10, 2010. Standard Operating Procedure Cation Analysis of Filter Extracts and Precipitation Samples by Ion Chromatography DRI SOP #2-208r3, Division of Atmospheric Sciences, Desert Research Institute.
10. ODEQ December 22, 2003. Standard Operating Procedure for Ion Chromatography Analysis of Ambient Air Particulate Matter, Laboratory Division, State of Oregon Department of Environmental Quality, Portland, OR. [currently available on the web] http://www.deq.state.or.us/lab/techrpts/docs/DEQ03LAB0029SOP.pdf
11. RTI August 26, 2009. Standard Operating Procedure for PM2.5 Anion Analysis, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25anionsop.pdf
12. RTI August 25, 2009. Standard Operating Procedure for PM2.5 Cation Analysis, Environmental & Industrial Sciences Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pm25cationsop.pdf
13. RTI October 26, 2005. Standard Operating Procedure for National Park Service Filter Preparation, Extraction, and Anion Analysis, .Environmental & Industrial Sciences Division,

Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://vista.cira.colostate.edu/improve/Publications/SOPs/RTI_SOPs/RTI_IonSOP102605.pdf

14. AQMD 2010. Standard Operating Procedure for the Determination of Inorganic Anions by Ion Chromatography, SOP0003, Monitoring and Analysis Division, South Coast Air Quality Management District, Diamond Bar, CA.
15. AQMD April 1, 2010. Standard Operating Procedure for the Determination of Cations in PM2.5 Filter Samples, SOP0002 Version 2.1, Monitoring and Analysis Division, South Coast Air Quality Management District, Diamond Bar, CA.
16. NAREL May 8, 2011. Standard Operating Procedure, Anion Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_anion.pdf
17. NAREL May 7, 2011. Standard Operating Procedure, Cation Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_cation.pdf
18. CARB June 15, 2007. Standard Operating Procedure for Organic and Elemental Carbon Analysis of Exposed Quartz Microfiber Filters, SOP MLD065, Northern Laboratory Branch, Monitoring and Laboratory Division, Air Resources Board, California Environmental Protection Agency. [currently available on the web] http://www.arb.ca.gov/aaqm/sop/MLD065_fin.pdf
19. DRI July 2008. DRI Standard Operating Procedure, DRI Model 2001 Thermal/Optical Carbon Analysis (TOR/TOT) of Aerosol Filter Samples - Method IMPROVE_A, DRI SOP #2-216r2, Division of Atmospheric Sciences, Desert Research Institute. [currently available on the web] http://vista.cira.colostate.edu/improve/Publications/SOPs/DRI_SOPs/2005/IMPROVEA_2-216r2_20080724.pdf
20. RTI February 16, 2009. Standard Operating Procedure, Determination of Organic, Elemental, and Total Carbon in Particulate Matter Using a Thermal/Optical-Transmittance Carbon Analyzer, Environmental and Industrial Sciences Division, RTI International, Research Triangle Park, North Carolina. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIOCECSOP.pdf
21. RTI February 13, 2009. Standard Operating Procedure, Determination of Carbon Fractions in Particulate Matter Using the IMPROVE_A Heating Protocol on a DRI 2001 Analyzer, Environmental and Industrial Sciences Division, RTI International, Research Triangle Park, North Carolina. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIIMPROVEACarbonAnalysisM2001SOP.pdf
22. RTI February 13, 2009. Standard Operating Procedure, Determination of Carbon Fractions in Particulate Matter Using the IMPROVE_A Heating Protocol on a Sunset Laboratory Dual-Mode Analyzer, Environmental and Industrial Sciences Division, RTI International, Research Triangle Park, North Carolina. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/RTIIMPROVEACarbonAnalysisSSLSOP.pdf
23. AQMD April 2, 2010. Standard Operating Procedure, Organic and Elemental Carbon Analysis of PM2.5 and PM10 Filter Samples, SOP 00001 Version 2.0, Monitoring and Analysis Division, South Coast Air Quality Management District, Diamond Bar, California.

24. NAREL May 24, 2011. Standard Operating Procedure, Carbon Analysis for the PM2.5 Chemical Speciation QA Program, National Air and Radiation Environmental Laboratory, U.S. Environmental Protection Agency, Montgomery, AL. [currently available on the web] http://www.epa.gov/narel/sops/sop_pm2.5_carbon.pdf

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

26. DRI December 17, 2010. Standard Operating Procedure X-ray Fluorescence (XRF) Analysis of Aerosol Filter Samples (PANalytical Epsilon 5), DRI SOP #2-209r6, Division of Atmospheric Sciences Desert Research Institute.

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

28. RTI August 19, 2009. Standard Operating Procedure for the X-Ray Fluorescence Analysis of PM2.5 Deposits on Teflon Filters, Environmental & Industrial Measurements Division, Research Triangle Institute, Research triangle Park, NC. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/pmxrfsop.pdf

29. AQMD April 3, 2010. Standard Operating Procedure, Analysis of $PM_{2.5}$ Filter Samples by Energy Dispersive X-Ray Fluorescence Spectrometry, SOP 00004 Version 1.3, Monitoring and Analysis Division, South Coast Air Quality Management District, Diamond Bar, California.

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

31. EPA/NAREL, June 15, 2011. Technical Memorandum: Experimental Inter-comparison of Speciation Laboratories, U.S. Environmental Protection Agency. [currently available on the web] http://www.epa.gov/ttn/amtic/files/ambient/pm25/spec/20110615MultilabSpeciation.pdf

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

## Table 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) | | |
| T11-14010 | 40-hr event 12/16/11 | 146.498 | 146.475 | 146.635 | 146.611 | 0.137 | 0.136 | -0.001 | DRI |
| T11-14011 | 40-hr event 12/16/11 | 144.815 | 144.794 | 144.951 | 144.925 | 0.136 | 0.131 | -0.005 | DRI |
| T11-14012 | 24-hr event 12/18/11 | 145.926 | 145.904 | 146.040 | 146.013 | 0.114 | 0.109 | -0.005 | DRI |
| T11-14013 | 24-hr event 12/18/11 | 145.896 | 145.872 | 146.008 | 145.983 | 0.112 | 0.111 | -0.001 | DRI |
| T11-14014 | 20-hr event 12/19/11 | 146.766 | 146.743 | 146.892 | 146.869 | 0.126 | 0.126 | 0.000 | DRI |
| T11-14015 | 20-hr event 12/19/11 | 141.301 | 141.278 | 141.431 | 141.408 | 0.130 | 0.130 | 0.000 | DRI |
| T11-14016 | 20-hr event 12/19/11 | 146.140 | 146.118 | 146.274 | 146.249 | 0.134 | 0.131 | -0.003 | DRI |
| T11-14017 | blank | 144.403 | 144.382 | 144.408 | 144.382 | 0.005 | 0.000 | -0.005 | DRI |
| T11-14018 | blank | 141.611 | 141.586 | 141.616 | 141.589 | 0.005 | 0.003 | -0.002 | DRI |
| T11-14019 | blank | 145.309 | 145.286 | 145.315 | 145.288 | 0.006 | 0.002 | -0.004 | DRI |
| MW11-14062 | metallic transfer weight | 173.343 | 173.343 | 173.344 | 173.342 | 0.001 | -0.001 | -0.002 | DRI |
| MW11-14063 | metallic transfer weight | 95.851 | 95.851 | 95.851 | 95.851 | 0.000 | 0.000 | 0.000 | DRI |
| T11-14020 | 40-hr event 12/16/11 | 141.647 | 141.654 | 141.780 | 141.784 | 0.133 | 0.130 | -0.003 | ODEQ |
| T11-14021 | 40-hr event 12/16/11 | 144.677 | 144.682 | 144.814 | 144.817 | 0.137 | 0.135 | -0.002 | ODEQ |
| T11-14022 | 24-hr event 12/18/11 | 145.148 | 145.154 | 145.261 | 145.264 | 0.113 | 0.110 | -0.003 | ODEQ |
| T11-14023 | 24-hr event 12/18/11 | 145.743 | 145.748 | 145.857 | 145.861 | 0.114 | 0.113 | -0.001 | ODEQ |
| T11-14024 | 20-hr event 12/19/11 | 148.366 | 148.372 | 148.495 | 148.500 | 0.129 | 0.128 | -0.001 | ODEQ |
| T11-14025 | 20-hr event 12/19/11 | 142.659 | 142.665 | 142.793 | 142.799 | 0.134 | 0.134 | 0.000 | ODEQ |
| T11-14026 | 20-hr event 12/19/11 | 148.402 | 148.409 | 148.540 | 148.545 | 0.138 | 0.136 | -0.002 | ODEQ |
| T11-14027 | blank | 143.747 | 143.752 | 143.755 | 143.756 | 0.008 | 0.004 | -0.004 | ODEQ |
| T11-14028 | blank | 145.823 | 145.828 | 145.830 | 145.831 | 0.007 | 0.003 | -0.004 | ODEQ |
| T11-14029 | blank | 145.567 | 145.572 | 145.573 | 145.575 | 0.006 | 0.003 | -0.003 | ODEQ |
| MW11-14064 | metallic transfer weight | 186.993 | 186.994 | 186.994 | 186.994 | 0.001 | 0.000 | -0.001 | ODEQ |
| MW11-14065 | metallic transfer weight | 90.600 | 90.602 | 90.601 | 90.602 | 0.001 | 0.000 | -0.001 | ODEQ |
| T11-14030 | 40-hr event 12/16/11 | 145.963 | 145.968 | 146.097 | 146.100 | 0.134 | 0.132 | -0.002 | RTI |
| T11-14031 | 40-hr event 12/16/11 | 146.289 | 146.293 | 146.426 | 146.429 | 0.137 | 0.136 | -0.001 | RTI |

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|---|---|---|---|---|---|---|---|---|---|
| | | Test Lab (mg) | NAREL (mg) | Test Lab (mg) | NAREL (mg) | Test Lab (mg) | NAREL (mg) | | |
| T11-14032 | 24-hr event 12/18/11 | 144.720 | 144.725 | 144.831 | 144.838 | 0.111 | 0.113 | 0.002 | RTI |
| T11-14033 | 24-hr event 12/18/11 | 146.815 | 146.815 | 146.931 | 146.930 | 0.116 | 0.115 | -0.001 | RTI |
| T11-14034 | 20-hr event 12/19/11 | 147.222 | 147.226 | 147.350 | 147.351 | 0.128 | 0.125 | -0.003 | RTI |
| T11-14035 | 20-hr event 12/19/11 | 146.261 | 146.265 | 146.406 | 146.407 | 0.145 | 0.142 | -0.003 | RTI |
| T11-14036 | 20-hr event 12/19/11 | 151.154 | 151.157 | 151.283 | 151.284 | 0.129 | 0.127 | -0.002 | RTI |
| T11-14037 | blank | 146.975 | 146.979 | 146.982 | 146.981 | 0.007 | 0.002 | -0.005 | RTI |
| T11-14038 | blank | 148.438 | 148.439 | 148.438 | 148.440 | 0.000 | 0.001 | 0.001 | RTI |
| T11-14039 | blank | 146.428 | 146.431 | 146.433 | 146.434 | 0.005 | 0.003 | -0.002 | RTI |
| MW11-14066 | metallic transfer weight | 192.418 | 192.420 | 192.419 | 192.419 | 0.001 | -0.001 | -0.002 | RTI |
| MW11-14067 | metallic transfer weight | 97.543 | 97.545 | 97.544 | 97.545 | 0.001 | 0.000 | -0.001 | RTI |
| T11-14040 | 40-hr event 12/16/11 | 144.542 | 144.540 | 144.676 | 144.680 | 0.134 | 0.140 | 0.006 | AQMD |
| T11-14041 | 40-hr event 12/16/11 | 145.864 | 145.862 | 146.003 | 145.998 | 0.139 | 0.136 | -0.003 | AQMD |
| T11-14042 | 24-hr event 12/18/11 | 144.684 | 144.682 | 144.798 | 144.794 | 0.114 | 0.112 | -0.002 | AQMD |
| T11-14043 | 24-hr event 12/18/11 | 145.773 | 145.770 | 145.890 | 145.889 | 0.117 | 0.119 | 0.002 | AQMD |
| T11-14044 | 20-hr event 12/19/11 | 147.791 | 147.787 | 147.924 | 147.918 | 0.133 | 0.131 | -0.002 | AQMD |
| T11-14045 | 20-hr event 12/19/11 | 143.688 | 143.684 | 143.816 | 143.814 | 0.128 | 0.130 | 0.002 | AQMD |
| T11-14046 | 20-hr event 12/19/11 | 147.096 | 147.092 | 147.229 | 147.227 | 0.133 | 0.135 | 0.002 | AQMD |
| T11-14047 | blank | 145.702 | 145.699 | 145.708 | 145.708 | 0.006 | 0.009 | 0.003 | AQMD |
| T11-14048 | blank | 144.204 | 144.200 | 144.210 | 144.206 | 0.006 | 0.006 | 0.000 | AQMD |
| T11-14049 | blank | 141.895 | 141.889 | 141.902 | 141.896 | 0.007 | 0.007 | 0.000 | AQMD |
| MW11-14068 | metallic transfer weight | 193.822 | 193.821 | 193.821 | 193.821 | -0.001 | 0.000 | 0.001 | AQMD |
| MW11-14069 | metallic transfer weight | 92.957 | 92.959 | 92.958 | 92.958 | 0.001 | -0.001 | -0.002 | AQMD |
| T11-14050 | 40-hr event 12/16/11 | 42.673 | 42.674 | 42.799 | 42.800 | 0.127 | 0.126 | -0.001 | UCD |
| T11-14051 | 40-hr event 12/16/11 | 46.421 | 46.423 | 46.548 | 46.546 | 0.127 | 0.123 | -0.004 | UCD |
| T11-14052 | 24-hr event 12/18/11 | 43.873 | 43.876 | 43.979 | 43.979 | 0.105 | 0.103 | -0.002 | UCD |
| T11-14053 | 24-hr event 12/18/11 | 44.535 | 44.537 | 44.640 | 44.641 | 0.105 | 0.104 | -0.001 | UCD |

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| 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) | | |
| T11-14054 | 20-hr event 12/19/11 | 44.478 | 44.481 | 44.603 | 44.605 | 0.125 | 0.124 | -0.001 | UCD |
| T11-14055 | 20-hr event 12/19/11 | 48.697 | 48.699 | 48.817 | 48.819 | 0.120 | 0.120 | 0.000 | UCD |
| T11-14056 | 20-hr event 12/19/11 | 44.449 | 44.451 | 44.570 | 44.572 | 0.120 | 0.121 | 0.001 | UCD |
| T11-14057 | blank | 45.036 | 45.038 | 45.036 | 45.036 | 0.001 | -0.002 | -0.003 | UCD |
| T11-14058 | blank | 44.772 | 44.774 | 44.774 | 44.773 | 0.001 | -0.001 | -0.002 | UCD |
| T11-14059 | blank | 44.708 | 44.709 | 44.708 | 44.708 | 0.000 | -0.001 | -0.001 | UCD |
| MW11-14070 | metallic transfer weight | 41.818 | 41.819 | 41.818 | 41.819 | 0.000 | 0.000 | 0.000 | UCD |
| MW11-14071 | metallic transfer weight | 38.534 | 38.534 | 38.534 | 38.534 | 0.000 | 0.000 | 0.000 | 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 |
| N11-13925 | Nylon® | 214-hr Event 03/01/11 | CARB | CSN | ----- | ----- | 55.0 | 240.0 | 13.90 | 80.9 | 4.59 |
| N11-13926 | Nylon® | 214-hr Event 03/01/11 | CARB | CSN | ----- | ----- | 54.3 | 236.0 | 13.80 | 80.3 | 4.61 |
| N11-13940 | Nylon® | 200-hr Event 06/29/11 | CARB | CSN | ----- | ----- | 31.7 | 399.0 | 4.74 | 103.0 | 4.39 |
| N11-13941 | Nylon® | 200-hr Event 06/29/11 | CARB | CSN | ----- | ----- | 34.9 | 405.0 | 4.95 | 106.0 | 4.56 |
| N11-13980 | Nylon® | filter blank | CARB | CSN | ----- | ----- | <0.5 | <1.75 | <0.75 | <0.5 | <1.25 |
| N11-13981 | Nylon® | filter blank | CARB | CSN | ----- | ----- | <0.5 | <1.75 | <0.75 | <0.5 | <1.25 |
| N11-13927 | Nylon® | 214-hr Event 03/01/11 | DRI | CSN | ----- | ----- | 55.1 | 241.6 | 15.56 | 79.5 | 4.73 |
| N11-13928 | Nylon® | 214-hr Event 03/01/11 | DRI | CSN | ----- | ----- | 53.0 | 239.5 | 13.82 | 78.6 | 4.92 |
| N11-13942 | Nylon® | 200-hr Event 06/29/11 | DRI | CSN | ----- | ----- | 30.7 | 398.1 | 4.58 | 107.0 | 5.16 |
| N11-13943 | Nylon® | 200-hr Event 06/29/11 | DRI | CSN | ----- | ----- | 32.5 | 394.5 | 4.47 | 106.0 | 4.99 |
| N11-13982 | Nylon® | filter blank | DRI | CSN | ----- | ----- | 0.2 | 0.2 | 0.19 | 0.0 | 0.00 |
| N11-13983 | Nylon® | filter blank | DRI | CSN | ----- | ----- | 0.2 | 0.2 | 0.17 | 0.0 | 0.00 |
| N11-13929 | Nylon® | 214-hr Event 03/01/11 | ODEQ | CSN | ----- | ----- | 52.8 | 230 | 13.5 | 65.9 | 4.79 |
| N11-13930 | Nylon® | 214-hr Event 03/01/11 | ODEQ | CSN | ----- | ----- | 54.7 | 252 | 13.9 | 70.8 | 5.15 |
| N11-13944 | Nylon® | 200-hr Event 06/29/11 | ODEQ | CSN | ----- | ----- | 32.9 | 430 | 4.37 | 96.7 | 5.24 |
| N11-13945 | Nylon® | 200-hr Event 06/29/11 | ODEQ | CSN | ----- | ----- | 32.5 | 430 | 4.3 | 96.8 | 5.25 |
| N11-13984 | Nylon® | filter blank | ODEQ | CSN | ----- | ----- | <1.4 | <1.4 | <3.6 | <0.72 | <1.1 |
| N11-13985 | Nylon® | filter blank | ODEQ | CSN | ----- | ----- | <1.4 | <1.4 | <3.6 | <0.72 | <1.1 |
| N11-13931 | Nylon® | 214-hr Event 03/01/11 | RTI | CSN | ----- | ----- | 55.1 | 237.0 | 14.20 | 82.5 | 4.65 |
| N11-13932 | Nylon® | 214-hr Event 03/01/11 | RTI | CSN | ----- | ----- | 53.9 | 236.2 | 13.52 | 82.7 | 4.44 |
| N11-13946 | Nylon® | 200-hr Event 06/29/11 | RTI | CSN | ----- | ----- | 36.1 | 416.0 | 4.23 | 114.8 | 4.39 |
| N11-13947 | Nylon® | 200-hr Event 06/29/11 | RTI | CSN | ----- | ----- | 34.0 | 418.0 | 4.18 | 115.4 | 4.39 |
| N11-13986 | Nylon® | filter blank | RTI | CSN | ----- | ----- | 0.9 | 0.0 | 0.00 | 0.0 | 0.00 |
| N11-13987 | Nylon® | filter blank | RTI | CSN | ----- | ----- | 0.6 | 0.0 | 0.29 | 0.0 | 0.00 |
| N11-13933 | Nylon® | 214-hr Event 03/01/11 | AQMD | CSN | ----- | ----- | 54.3 | 242.0 | 14.40 | 84.4 | ND |
| N11-13934 | Nylon® | 214-hr Event 03/01/11 | AQMD | CSN | ----- | ----- | 51.3 | 247.0 | 14.90 | 83.6 | ND |
| N11-13948 | Nylon® | 200-hr Event 06/29/11 | AQMD | CSN | ----- | ----- | 32.1 | 406.0 | ND | 111.0 | ND |
| N11-13949 | Nylon® | 200-hr Event 06/29/11 | AQMD | CSN | ----- | ----- | 32.7 | 413.0 | ND | 114.0 | ND |
| N11-13988 | Nylon® | filter blank | AQMD | CSN | ----- | ----- | ND | ND | ND | ND | ND |
| N11-13989 | Nylon® | filter blank | AQMD | CSN | ----- | ----- | ND | ND | ND | ND | ND |
| N11-13935 | Nylon® | 214-hr Event 03/01/11 | NAREL | CSN | ----- | ----- | 55.2 | 243.3 | 13.37 | 74.1 | 5.46 |
| N11-13936 | Nylon® | 214-hr Event 03/01/11 | NAREL | CSN | ----- | ----- | 54.2 | 241.0 | 13.10 | 70.7 | 5.57 |

## Table 10. Ion Chromatography PT Results

| Sample ID | Filter Medium | Sample Description | Lab | Method | Concentration (µg/filter) | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Chloride | Nitrite | Nitrate | Sulfate | Sodium | Ammonium | Potassium |
| N11-13950 | Nylon® | 200-hr Event 06/29/11 | NAREL | CSN | ----- | ----- | 33.5 | 378.8 | 4.24 | 92.3 | 5.32 |
| N11-13951 | Nylon® | 200-hr Event 06/29/11 | NAREL | CSN | ----- | ----- | 34.5 | 406.7 | 4.47 | 95.1 | 5.79 |
| N11-13990 | Nylon® | filter blank | NAREL | CSN | ----- | ----- | ND | 0.2 | ND | ND | ND |
| N11-13991 | Nylon® | filter blank | NAREL | CSN | ----- | ----- | ND | ND | ND | ND | ND |
| N11-13956 | Nylon® | 116-hr Event 03/10/11 | RTI | IMPROVE | 5.52 | 1.36 | 47.7 | 168.5 | ----- | 56.8 | ----- |
| N11-13957 | Nylon® | 116-hr Event 03/10/11 | RTI | IMPROVE | 5.75 | 0.72 | 47.3 | 168.6 | ----- | 57.0 | ----- |
| N11-13968 | Nylon® | 224-hr Event 07/08/11 | RTI | IMPROVE | 1.75 | 0.90 | 32.5 | 300.7 | ----- | 88.3 | ----- |
| N11-13969 | Nylon® | 224-hr Event 07/08/11 | RTI | IMPROVE | 1.62 | 1.04 | 32.5 | 301.9 | ----- | 89.0 | ----- |
| N11-13992 | Nylon® | filter blank | RTI | IMPROVE | 0.00 | 2.42 | 0.6 | 0.0 | ----- | 0.0 | ----- |
| N11-13993 | Nylon® | filter blank | RTI | IMPROVE | 0.00 | 1.37 | 0.5 | 0.0 | ----- | 0.0 | ----- |
| N11-13958 | Nylon® | 116-hr Event 03/10/11 | NAREL | IMPROVE | 5.91 | 0.31 | 48.7 | 171.2 | ----- | 50.3 | ----- |
| N11-13959 | Nylon® | 116-hr Event 03/10/11 | NAREL | IMPROVE | 6.21 | 0.24 | 49.7 | 167.2 | ----- | 49.0 | ----- |
| N11-13970 | Nylon® | 224-hr Event 07/08/11 | NAREL | IMPROVE | 1.74 | 1.04 | 33.5 | 297.3 | ----- | 73.4 | ----- |
| N11-13971 | Nylon® | 224-hr Event 07/08/11 | NAREL | IMPROVE | 1.86 | 0.82 | 34.2 | 293.7 | ----- | 72.3 | ----- |
| N11-13994 | Nylon® | filter blank | NAREL | IMPROVE | ND | 0.94 | 0.2 | ND | ----- | ND | ----- |
| N11-13995 | Nylon® | filter blank | NAREL | IMPROVE | ND | 1.33 | ND | ND | ----- | ND | ----- |
| T11-13962 | Teflon® | 116-hr Event 03/10/11 | DRI | CSN | ----- | ----- | 1.2 | 160.7 | 2.30 | 56.6 | 2.38 |
| T11-13963 | Teflon® | 116-hr Event 03/10/11 | DRI | CSN | ----- | ----- | 1.3 | 160.5 | 2.35 | 54.3 | 2.33 |
| T11-13974 | Teflon® | 224-hr Event 07/08/11 | DRI | CSN | ----- | ----- | 0.6 | 290.2 | 8.26 | 94.2 | 5.54 |
| T11-13975 | Teflon® | 224-hr Event 07/08/11 | DRI | CSN | ----- | ----- | 0.8 | 290.1 | 8.09 | 92.5 | 5.50 |
| T11-13996 | Teflon® | filter blank | DRI | CSN | ----- | ----- | 0.2 | 0.2 | 0.59 | 0.4 | 0.45 |
| T11-13997 | Teflon® | filter blank | DRI | CSN | ----- | ----- | 0.1 | 0.1 | 0.20 | 0.0 | 0.00 |
| T11-13964 | Teflon® | 116-hr Event 03/10/11 | NAREL | CSN | ----- | ----- | 3.5 | 166.3 | 2.64 | 55.2 | 3.20 |
| T11-13965 | Teflon® | 116-hr Event 03/10/11 | NAREL | CSN | ----- | ----- | 3.7 | 169.4 | 2.56 | 53.3 | 3.28 |
| T11-13976 | Teflon® | 224-hr Event 07/08/11 | NAREL | CSN | ----- | ----- | 7.8 | 285.7 | 8.41 | 80.6 | 6.46 |
| T11-13977 | Teflon® | 224-hr Event 07/08/11 | NAREL | CSN | ----- | ----- | 3.8 | 286.9 | 8.41 | 81.4 | 6.21 |
| T11-13998 | Teflon® | filter blank | NAREL | CSN | ----- | ----- | 2.5 | ND | 0.43 | -0.2 | ND |
| T11-13999 | Teflon® | filter blank | NAREL | CSN | ----- | ----- | 0.6 | ND | 0.33 | ND | 0.41 |

## 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 |
| Q11-13887 | 216-hr event 01/07/11 | CARB | 1 | IMPROVE_A | 24.1 | 4.8 | 28.8 | 1.7 | 4.9 | 7.0 | 4.5 | 6.0 |
| Q11-13888 | 216-hr event 01/07/11 | CARB | 1 | IMPROVE_A | 22.6 | 5.0 | 27.6 | 1.6 | 4.7 | 6.9 | 4.0 | 5.5 |
| Q11-13889 | 216-hr event 01/07/11 | DRI | 13 | IMPROVE_A | 18.7 ± 1.1 | 5.7 ± 0.5 | 24.4 ± 1.2 | 1.2 ± 0.4 | 4.0 ± 0.5 | 5.2 ± 0.5 | 3.5 ± 0.4 | 4.7 ± 1.0 |
| Q11-13889 | 216-hr event 01/07/11 | DRI | 7 | IMPROVE_A | 18.5 ± 1.1 | 6.4 ± 0.5 | 24.9 ± 1.3 | 1.1 ± 0.3 | 4.6 ± 0.6 | 5.1 ± 0.5 | 3.8 ± 0.5 | 3.9 ± 0.8 |
| Q11-13890 | 216-hr event 01/07/11 | DRI | 9 | IMPROVE_A | 19.0 ± 1.1 | 5.2 ± 0.4 | 24.1 ± 1.2 | 1.3 ± 0.4 | 4.7 ± 0.6 | 5.0 ± 0.5 | 3.5 ± 0.4 | 4.5 ± 0.9 |
| Q11-13890 | 216-hr event 01/07/11 | DRI | 12 | IMPROVE_A | 20.9 ± 1.3 | 5.0 ± 0.4 | 25.9 ± 1.3 | 0.7 ± 0.2 | 5.3 ± 0.6 | 6.2 ± 0.6 | 4.6 ± 0.6 | 4.1 ± 0.9 |
| Q11-13891 | 216-hr event 01/07/11 | RTI | 1 | IMPROVE_A | 21.0 ± 1.7 | 6.6 ± 0.9 | 27.6 ± 2.3 | 2.0 ± 0.7 | 4.3 ± 0.8 | 6.7 ± 1.2 | 4.4 ± 2.7 | 3.6 ± 2.0 |
| Q11-13891 | 216-hr event 01/07/11 | RTI | T | IMPROVE_A | 20.2 ± 1.3 | 6.3 ± 0.6 | 26.5 ± 1.8 | 1.0 ± 0.5 | 4.6 ± 0.7 | 6.6 ± 0.9 | 2.8 ± 1.7 | 5.2 ± 2.1 |
| Q11-13892 | 216-hr event 01/07/11 | RTI | 1 | IMPROVE_A | 22.4 ± 1.7 | 7.1 ± 1.0 | 29.5 ± 2.4 | 2.2 ± 0.7 | 5.0 ± 0.8 | 6.8 ± 1.2 | 4.6 ± 2.7 | 3.8 ± 2.0 |
| Q11-13892 | 216-hr event 01/07/11 | RTI | T | IMPROVE_A | 21.4 ± 1.4 | 6.8 ± 0.6 | 28.1 ± 1.9 | 1.3 ± 0.5 | 4.9 ± 0.7 | 6.7 ± 0.9 | 2.5 ± 1.6 | 5.9 ± 2.4 |
| Q11-13893 | 216-hr event 01/07/11 | AQMD | 2 | IMPROVE_A | 25.0 ± 0.4 | 6.3 ± 0.03 | 31.0 ± 0.4 | 2.2 | 5.9 | 8.3 | 4.4 | 4.1 |
| Q11-13894 | 216-hr event 01/07/11 | AQMD | 2 | IMPROVE_A | 25.0 ± 0.4 | 7.7 ± 0.03 | 33.0 ± 0.4 | 2.3 | 5.7 | 8.2 | 4.8 | 4.2 |
| Q11-13895 | 216-hr event 01/07/11 | NAREL | 2 | IMPROVE_A | 20.3 ± 1.2 | 7.3 ± 0.6 | 27.6 ± 1.7 | 2.0 | 4.8 | 5.8 | 2.3 | 5.5 |
| Q11-13896 | 216-hr event 01/07/11 | NAREL | 2 | IMPROVE_A | 20.4 ± 1.2 | 6.7 ± 0.5 | 27.0 ± 1.7 | 2.0 | 4.7 | 5.8 | 2.3 | 5.6 |
| Q11-13899 | 221-hr event 06/14/11 | CARB | 1 | IMPROVE_A | 12.3 | 2.8 | 15.1 | 0.4 | 2.8 | 4.2 | 2.2 | 2.7 |
| Q11-13900 | 221-hr event 06/14/11 | CARB | 1 | IMPROVE_A | 12.6 | 2.9 | 15.4 | 0.4 | 2.7 | 4.5 | 2.3 | 2.7 |
| Q11-13901 | 221-hr event 06/14/11 | DRI | 9 | IMPROVE_A | 11.2 ± 0.7 | 3.0 ± 0.2 | 14.2 ± 0.8 | 0.2 ± 0.1 | 3.5 ± 0.4 | 3.5 ± 0.4 | 1.9 ± 0.2 | 2.1 ± 0.5 |
| Q11-13901 | 221-hr event 06/14/11 | DRI | 13 | IMPROVE_A | 10.8 ± 0.7 | 2.8 ± 0.2 | 13.7 ± 0.7 | 0.3 ± 0.1 | 2.8 ± 0.3 | 3.1 ± 0.3 | 1.8 ± 0.2 | 2.9 ± 0.6 |
| Q11-13902 | 221-hr event 06/14/11 | DRI | 8 | IMPROVE_A | 9.8 ± 0.6 | 3.2 ± 0.3 | 13.1 ± 0.7 | 0.2 ± 0.1 | 2.7 ± 0.3 | 3.1 ± 0.3 | 1.6 ± 0.2 | 2.2 ± 0.5 |
| Q11-13902 | 221-hr event 06/14/11 | DRI | 13 | IMPROVE_A | 10.6 ± 0.7 | 2.9 ± 0.2 | 13.5 ± 0.7 | 0.2 ± 0.1 | 2.8 ± 0.3 | 3.3 ± 0.4 | 1.6 ± 0.2 | 2.8 ± 0.6 |
| Q11-13903 | 221-hr event 06/14/11 | RTI | 1 | IMPROVE_A | 11.0 ± 1.2 | 4.1 ± 0.8 | 15.2 ± 1.7 | 0.4 ± 0.6 | 2.8 ± 0.7 | 3.9 ± 1.1 | 2.2 ± 1.8 | 1.7 ± 1.4 |
| Q11-13903 | 221-hr event 06/14/11 | RTI | T | IMPROVE_A | 12.7 ± 0.9 | 3.1 ± 0.5 | 15.8 ± 1.2 | 0.3 ± 0.5 | 3.7 ± 0.6 | 3.6 ± 0.8 | 1.5 ± 1.2 | 3.6 ± 1.7 |
| Q11-13904 | 221-hr event 06/14/11 | RTI | 1 | IMPROVE_A | 10.8 ± 1.1 | 3.8 ± 0.8 | 14.5 ± 1.6 | 0.4 ± 0.6 | 2.8 ± 0.7 | 3.9 ± 1.1 | 2.1 ± 1.8 | 1.6 ± 1.4 |
| Q11-13904 | 221-hr event 06/14/11 | RTI | T | IMPROVE_A | 12.2 ± 0.9 | 3.6 ± 0.5 | 15.8 ± 1.2 | 0.2 ± 0.5 | 3.6 ± 0.6 | 4.0 ± 0.8 | 1.8 ± 1.3 | 2.6 ± 1.4 |
| Q11-13905 | 221-hr event 06/14/11 | AQMD | 2 | IMPROVE_A | 14.0 ± 0.4 | 4.0 ± 0.03 | 18.0 ± 0.4 | 0.5 | 4.2 | 4.8 | 2.4 | 2.2 |
| Q11-13906 | 221-hr event 06/14/11 | AQMD | 2 | IMPROVE_A | 14.0 ± 0.4 | 4.0 ± 0.03 | 18.0 ± 0.4 | 0.5 | 4.2 | 4.6 | 2.4 | 2.2 |
| Q11-13907 | 221-hr event 06/14/11 | NAREL | 2 | IMPROVE_A | 10.8 ± 0.7 | 4.0 ± 0.4 | 14.9 ± 1.0 | 0.5 | 3.3 | 2.9 | 1.4 | 2.8 |
| Q11-13909 | 221-hr event 06/14/11 | NAREL | 2 | IMPROVE_A | 10.7 ± 0.7 | 3.9 ± 0.4 | 14.5 ± 1.0 | 0.5 | 3.3 | 2.8 | 1.4 | 2.8 |
| Q11-13915 | filter blank | CARB | 1 | IMPROVE_A | <0.8 | <0.8 | <0.8 | 0.1 | 0.2 | 0.3 | 0.0 | 0.0 |
| Q11-13916 | filter blank | CARB | 1 | IMPROVE_A | <0.8 | <0.8 | <0.8 | 0.1 | 0.1 | 0.3 | 0.0 | 0.0 |
| Q11-13917 | filter blank | DRI | 13 | IMPROVE_A | 0.1 ± 0.3 | 0.0 ± 0.1 | 0.1 ± 0.3 | 0.0 ± 0.0 | 0.0 ± 0.1 | 0.1 ± 0.2 | 0.0 ± 0.1 | 0.0 ± 0.1 |

## 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 |
| Q11-13917 | filter blank | DRI | 10 | IMPROVE_A | 0.1 ± 0.3 | 0.0 ± 0.1 | 0.1 ± 0.3 | 0.0 ± 0.0 | 0.0 ± 0.1 | 0.1 ± 0.2 | 0.0 ± 0.1 | 0.0 ± 0.1 |
| Q11-13918 | filter blank | DRI | 13 | IMPROVE_A | 0.1 ± 0.3 | 0.0 ± 0.1 | 0.1 ± 0.3 | 0.0 ± 0.0 | 0.0 ± 0.1 | 0.1 ± 0.2 | 0.0 ± 0.1 | 0.0 ± 0.1 |
| Q11-13918 | filter blank | DRI | 8 | IMPROVE_A | 0.1 ± 0.3 | 0.0 ± 0.1 | 0.1 ± 0.3 | 0.0 ± 0.0 | 0.0 ± 0.1 | 0.1 ± 0.2 | 0.0 ± 0.1 | 0.0 ± 0.1 |
| Q11-13919 | filter blank | RTI | 1 | IMPROVE_A | 0.3 ± 0.6 | 0.0 ± 0.6 | 0.3 ± 0.9 | 0.1 ± 0.6 | 0.1 ± 0.6 | 0.1 ± 0.9 | 0.0 ± 0.9 | 0.0 ± 0.9 |
| Q11-13919 | filter blank | RTI | T | IMPROVE_A | 0.3 ± 0.3 | 0.0 ± 0.3 | 0.3 ± 0.5 | 0.1 ± 0.5 | 0.0 ± 0.5 | 0.2 ± 0.6 | 0.0 ± 0.6 | 0.0 ± 0.6 |
| Q11-13920 | filter blank | RTI | 1 | IMPROVE_A | 0.3 ± 0.6 | 0.0 ± 0.6 | 0.3 ± 0.9 | 0.0 ± 0.6 | 0.1 ± 0.6 | 0.1 ± 0.9 | 0.2 ± 1.0 | 0.0 ± 0.9 |
| Q11-13920 | filter blank | RTI | T | IMPROVE_A | 0.3 ± 0.3 | 0.0 ± 0.3 | 0.3 ± 0.5 | 0.0 ± 0.5 | 0.1 ± 0.5 | 0.3 ± 0.6 | 0.0 ± 0.6 | 0.0 ± 0.6 |
| Q11-13921 | filter blank | AQMD | 2 | IMPROVE_A | 0.6 ± 0.40 | ND | 0.6 ± 0.40 | 0.1 | 0.2 | 0.3 | 0.0 | 0.0 |
| Q11-13922 | filter blank | AQMD | 2 | IMPROVE_A | 0.4 ± 0.40 | ND | 0.4 ± 0.40 | 0.1 | 0.1 | 0.2 | 0.0 | 0.0 |
| Q11-13923 | filter blank | NAREL | 2 | IMPROVE_A | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| Q11-13924 | filter blank | NAREL | 2 | IMPROVE_A | 0.2 ± 0.2 | 0.2 ± 0.2 | 0.5 ± 0.3 | 0.1 | 0.0 | 0.0 | 0.1 | 0.0 |
| Q11-13891 | 216-hr event 01/07/11 | RTI | T | CSN | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13891 | 216-hr event 01/07/11 | RTI | R | CSN | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.1 ± 0.3 | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13892 | 216-hr event 01/07/11 | RTI | T | CSN | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.1 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13892 | 216-hr event 01/07/11 | RTI | R | CSN | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13895 | 216-hr event 01/07/11 | NAREL | 1 | CSN | 27.2 ± 1.6 | 1.8 ± 0.3 | 29.0 ± 1.8 | 7.0 | 3.0 | 1.7 | 2.3 | 13.2 |
| Q11-13896 | 216-hr event 01/07/11 | NAREL | 1 | CSN | 27.3 ± 1.6 | 1.6 ± 0.3 | 29.0 ± 1.7 | 6.9 | 3.0 | 1.8 | 2.3 | 13.2 |
| Q11-13903 | 221-hr event 06/14/11 | RTI | T | CSN | 14.7 ± 0.9 | 1.1 ± 0.3 | 15.8 ± 1.1 | 4.4 ± 0.4 | 1.6 ± 0.3 | 1.4 ± 0.4 | 2.9 ± 0.6 | 4.2 ± 6.1 |
| Q11-13903 | 221-hr event 06/14/11 | RTI | R | CSN | 14.5 ± 0.9 | 0.8 ± 0.2 | 15.3 ± 1.1 | 4.5 ± 0.4 | 2.4 ± 0.3 | 1.9 ± 0.4 | 5.0 ± 0.8 | 0.7 ± 1.2 |
| Q11-13904 | 221-hr event 06/14/11 | RTI | T | CSN | 13.7 ± 0.9 | 1.3 ± 0.3 | 15.1 ± 1.1 | 4.1 ± 0.4 | 1.6 ± 0.3 | 1.4 ± 0.4 | 2.6 ± 0.6 | 4.0 ± 5.8 |
| Q11-13904 | 221-hr event 06/14/11 | RTI | R | CSN | 14.5 ± 0.9 | 0.9 ± 0.2 | 15.5 ± 1.1 | 4.4 ± 0.4 | 2.5 ± 0.3 | 1.9 ± 0.4 | 5.3 ± 0.8 | 0.5 ± 0.9 |
| Q11-13907 | 221-hr event 06/14/11 | NAREL | 1 | CSN | 13.7 ± 0.9 | 1.3 ± 0.3 | 15.0 ± 1.1 | 3.8 | 1.8 | 1.0 | 1.3 | 5.8 |
| Q11-13909 | 221-hr event 06/14/11 | NAREL | 1 | CSN | 14.2 ± 0.9 | 1.3 ± 0.3 | 15.6 ± 1.1 | 4.3 | 1.8 | 1.0 | 1.3 | 5.7 |
| Q11-13919 | filter blank | RTI | T | CSN | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13919 | filter blank | RTI | R | CSN | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.1 ± 0.3 | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13920 | filter blank | RTI | T | CSN | 0.1 ± 0.2 | 0.0 ± 0.2 | 0.1 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13920 | filter blank | RTI | R | CSN | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 ± 0.2 | 0.1 ± 0.2 | 0.0 ± 0.3 | 0.0 ± 0.3 | 0.0 ± 0.2 |
| Q11-13923 | filter blank | NAREL | 1 | CSN | 0.3 ± 0.2 | 0.0 ± 0.2 | 0.3 ± 0.3 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Q11-13924 | filter blank | NAREL | 1 | CSN | 0.2 ± 0.2 | 0.0 ± 0.2 | 0.2 ± 0.3 | 0.1 | 0.1 | 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 | |
| 165-hr event | T11-13844 | CARB | Na | 11 | ----- | ----- | ----- | 11.560 | 0.961 | 0.303 | ----- |
| 165-hr event | T11-13844 | CARB | Mg | 12 | ----- | ----- | ----- | 1.825 | 0.137 | 0.114 | ----- |
| 165-hr event | T11-13844 | CARB | Al | 13 | 2.810 | 0.340 | 0.200 | 2.113 | 0.212 | 0.129 | 2.520 |
| 165-hr event | T11-13844 | CARB | Si | 14 | 7.320 | 0.400 | 0.060 | 7.469 | 0.504 | 0.093 | 7.355 |
| 165-hr event | T11-13844 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.095 | 0.155 | ----- |
| 165-hr event | T11-13844 | CARB | S | 16 | 75.150 | 3.770 | 0.050 | 70.682 | 3.544 | 0.095 | 73.228 |
| 165-hr event | T11-13844 | CARB | Cl | 17 | 0.600 | 0.060 | 0.060 | 0.516 | 0.043 | 0.075 | ----- |
| 165-hr event | T11-13844 | CARB | K | 19 | 6.080 | 0.310 | 0.070 | 5.968 | 0.301 | 0.070 | 5.920 |
| 165-hr event | T11-13844 | CARB | Ca | 20 | 3.370 | 0.170 | 0.060 | 3.208 | 0.163 | 0.073 | 3.254 |
| 165-hr event | T11-13844 | CARB | Ti | 22 | 0.250 | 0.030 | 0.040 | 0.235 | 0.029 | 0.051 | 0.249 |
| 165-hr event | T11-13844 | CARB | V | 23 | 0.100 | 0.020 | 0.030 | 0.081 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13844 | CARB | Cr | 24 | 0.050 | 0.010 | 0.030 | 0.046 | 0.012 | 0.025 | ----- |
| 165-hr event | T11-13844 | CARB | Mn | 25 | 0.100 | 0.010 | 0.030 | 0.075 | 0.013 | 0.018 | ----- |
| 165-hr event | T11-13844 | CARB | Fe | 26 | 3.090 | 0.160 | 0.040 | 3.059 | 0.155 | 0.016 | 3.110 |
| 165-hr event | T11-13844 | CARB | Co | 27 | 0.050 | 0.010 | 0.030 | 0.000 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13844 | CARB | Ni | 28 | 0.070 | 0.010 | 0.030 | 0.032 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13844 | CARB | Cu | 29 | 0.160 | 0.020 | 0.040 | 0.133 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13844 | CARB | Zn | 30 | 2.420 | 0.130 | 0.020 | 2.356 | 0.120 | 0.017 | 2.415 |
| 165-hr event | T11-13844 | CARB | As | 33 | 0.050 | 0.020 | 0.020 | 0.051 | 0.020 | 0.009 | ----- |
| 165-hr event | T11-13844 | CARB | Se | 34 | 0.030 | 0.010 | 0.020 | 0.032 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13844 | CARB | Br | 35 | 0.400 | 0.030 | 0.020 | 0.428 | 0.030 | 0.013 | 0.409 |
| 165-hr event | T11-13844 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.019 | ----- |
| 165-hr event | T11-13844 | CARB | Sr | 38 | <0.03 | ND | 0.030 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13844 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13844 | CARB | Ag | 47 | ----- | ----- | ----- | 0.011 | 0.147 | 0.126 | ----- |
| 165-hr event | T11-13844 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13844 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.069 | 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 | |
| 165-hr event | T11-13844 | CARB | Sn | 50 | <0.2 | ND | 0.200 | 0.136 | 0.362 | 0.196 | ----- |
| 165-hr event | T11-13844 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.000 | 0.115 | 0.377 | ----- |
| 165-hr event | T11-13844 | CARB | Cs | 55 | ----- | ----- | ----- | 0.076 | 0.069 | 0.110 | ----- |
| 165-hr event | T11-13844 | CARB | Ba | 56 | 0.240 | 0.080 | 0.200 | 0.174 | 0.087 | 0.105 | ----- |
| 165-hr event | T11-13844 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 165-hr event | T11-13844 | CARB | Pb | 82 | 0.210 | 0.030 | 0.030 | 0.147 | 0.037 | 0.025 | ----- |
| 165-hr event | T11-13845 | CARB | Na | 11 | ----- | ----- | ----- | 11.910 | 0.991 | 0.303 | ----- |
| 165-hr event | T11-13845 | CARB | Mg | 12 | ----- | ----- | ----- | 1.770 | 0.133 | 0.114 | ----- |
| 165-hr event | T11-13845 | CARB | Al | 13 | 2.910 | 0.330 | 0.200 | 2.023 | 0.200 | 0.129 | 2.520 |
| 165-hr event | T11-13845 | CARB | Si | 14 | 7.320 | 0.400 | 0.060 | 7.239 | 0.489 | 0.093 | 7.355 |
| 165-hr event | T11-13845 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.093 | 0.155 | ----- |
| 165-hr event | T11-13845 | CARB | S | 16 | 73.210 | 3.670 | 0.050 | 68.252 | 3.422 | 0.095 | 73.228 |
| 165-hr event | T11-13845 | CARB | Cl | 17 | 0.560 | 0.060 | 0.060 | 0.588 | 0.044 | 0.075 | ----- |
| 165-hr event | T11-13845 | CARB | K | 19 | 5.920 | 0.300 | 0.070 | 5.893 | 0.297 | 0.070 | 5.920 |
| 165-hr event | T11-13845 | CARB | Ca | 20 | 3.300 | 0.170 | 0.060 | 3.163 | 0.160 | 0.073 | 3.254 |
| 165-hr event | T11-13845 | CARB | Ti | 22 | 0.240 | 0.030 | 0.040 | 0.180 | 0.027 | 0.051 | 0.249 |
| 165-hr event | T11-13845 | CARB | V | 23 | 0.100 | 0.020 | 0.030 | 0.131 | 0.018 | 0.037 | ----- |
| 165-hr event | T11-13845 | CARB | Cr | 24 | 0.040 | 0.010 | 0.030 | 0.035 | 0.010 | 0.025 | ----- |
| 165-hr event | T11-13845 | CARB | Mn | 25 | 0.090 | 0.010 | 0.030 | 0.096 | 0.010 | 0.018 | ----- |
| 165-hr event | T11-13845 | CARB | Fe | 26 | 3.050 | 0.160 | 0.040 | 3.136 | 0.159 | 0.016 | 3.110 |
| 165-hr event | T11-13845 | CARB | Co | 27 | <0.03 | ND | 0.030 | 0.001 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13845 | CARB | Ni | 28 | 0.070 | 0.010 | 0.030 | 0.033 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13845 | CARB | Cu | 29 | 0.150 | 0.020 | 0.040 | 0.126 | 0.009 | 0.016 | 0.139 |
| 165-hr event | T11-13845 | CARB | Zn | 30 | 2.370 | 0.130 | 0.020 | 2.287 | 0.116 | 0.017 | 2.415 |
| 165-hr event | T11-13845 | CARB | As | 33 | 0.050 | 0.020 | 0.020 | 0.026 | 0.019 | 0.009 | ----- |
| 165-hr event | T11-13845 | CARB | Se | 34 | 0.040 | 0.010 | 0.020 | 0.041 | 0.010 | 0.013 | ----- |
| 165-hr event | T11-13845 | CARB | Br | 35 | 0.360 | 0.020 | 0.020 | 0.386 | 0.027 | 0.013 | 0.409 |
| 165-hr event | T11-13845 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.014 | 0.014 | 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 | |
| 165-hr event | T11-13845 | CARB | Sr | 38 | 0.040 | 0.010 | 0.030 | 0.106 | 0.111 | 0.023 | ----- |
| 165-hr event | T11-13845 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13845 | CARB | Ag | 47 | ----- | ----- | ----- | 0.045 | 0.158 | 0.126 | ----- |
| 165-hr event | T11-13845 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13845 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13845 | CARB | Sn | 50 | <0.2 | ND | 0.200 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13845 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.011 | 0.463 | 0.377 | ----- |
| 165-hr event | T11-13845 | CARB | Cs | 55 | ----- | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| 165-hr event | T11-13845 | CARB | Ba | 56 | 0.270 | 0.080 | 0.200 | 0.099 | 0.083 | 0.105 | ----- |
| 165-hr event | T11-13845 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 165-hr event | T11-13845 | CARB | Pb | 82 | 0.190 | 0.030 | 0.030 | 0.189 | 0.035 | 0.025 | ----- |
| 165-hr event | T11-13846 | DRI | Na | 11 | 0.000 | 3.468 | 0.734 | 13.085 | 1.087 | 0.303 | ----- |
| 165-hr event | T11-13846 | DRI | Mg | 12 | 0.936 | 0.399 | 0.503 | 2.092 | 0.154 | 0.114 | ----- |
| 165-hr event | T11-13846 | DRI | Al | 13 | 3.033 | 0.148 | 0.151 | 2.249 | 0.219 | 0.129 | 2.520 |
| 165-hr event | T11-13846 | DRI | Si | 14 | 6.304 | 0.046 | 0.077 | 8.441 | 0.567 | 0.093 | 7.355 |
| 165-hr event | T11-13846 | DRI | P | 15 | 0.000 | 0.017 | 0.013 | 0.000 | 0.095 | 0.155 | ----- |
| 165-hr event | T11-13846 | DRI | S | 16 | 81.860 | 0.419 | 0.012 | 72.478 | 3.634 | 0.095 | 73.228 |
| 165-hr event | T11-13846 | DRI | Cl | 17 | 0.311 | 0.017 | 0.032 | 0.614 | 0.046 | 0.075 | ----- |
| 165-hr event | T11-13846 | DRI | K | 19 | 6.122 | 0.024 | 0.018 | 6.260 | 0.315 | 0.070 | 5.920 |
| 165-hr event | T11-13846 | DRI | Ca | 20 | 4.183 | 0.064 | 0.032 | 3.843 | 0.194 | 0.073 | 3.254 |
| 165-hr event | T11-13846 | DRI | Ti | 22 | 0.230 | 0.017 | 0.026 | 0.271 | 0.031 | 0.051 | 0.249 |
| 165-hr event | T11-13846 | DRI | V | 23 | 0.085 | 0.017 | 0.004 | 0.128 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13846 | DRI | Cr | 24 | 0.000 | 0.017 | 0.006 | 0.014 | 0.011 | 0.025 | ----- |
| 165-hr event | T11-13846 | DRI | Mn | 25 | 0.032 | 0.017 | 0.015 | 0.102 | 0.013 | 0.018 | ----- |
| 165-hr event | T11-13846 | DRI | Fe | 26 | 3.825 | 0.028 | 0.021 | 3.441 | 0.174 | 0.016 | 3.110 |
| 165-hr event | T11-13846 | DRI | Co | 27 | 0.000 | 0.017 | 0.004 | 0.008 | 0.009 | 0.013 | ----- |
| 165-hr event | T11-13846 | DRI | Ni | 28 | 0.016 | 0.017 | 0.005 | 0.033 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13846 | DRI | Cu | 29 | 0.212 | 0.017 | 0.015 | 0.131 | 0.010 | 0.016 | 0.139 |

## 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 | |
| 165-hr event | T11-13846 | DRI | Zn | 30 | 2.758 | 0.023 | 0.013 | 2.441 | 0.124 | 0.017 | 2.415 |
| 165-hr event | T11-13846 | DRI | As | 33 | 0.016 | 0.017 | 0.006 | 0.049 | 0.020 | 0.009 | ----- |
| 165-hr event | T11-13846 | DRI | Se | 34 | 0.000 | 0.017 | 0.040 | 0.021 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13846 | DRI | Br | 35 | 0.391 | 0.017 | 0.011 | 0.453 | 0.031 | 0.013 | 0.409 |
| 165-hr event | T11-13846 | DRI | Rb | 37 | 0.000 | 0.017 | 0.006 | 0.002 | 0.014 | 0.019 | ----- |
| 165-hr event | T11-13846 | DRI | Sr | 38 | 0.085 | 0.017 | 0.006 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13846 | DRI | Zr | 40 | 0.042 | 0.018 | 0.023 | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13846 | DRI | Ag | 47 | 0.010 | 0.017 | 0.040 | 0.045 | 0.147 | 0.126 | ----- |
| 165-hr event | T11-13846 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.068 | 0.192 | 0.166 | ----- |
| 165-hr event | T11-13846 | DRI | In | 49 | 0.000 | 0.017 | 0.047 | 0.102 | 0.260 | 0.154 | ----- |
| 165-hr event | T11-13846 | DRI | Sn | 50 | 0.000 | 0.026 | 0.062 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13846 | DRI | Sb | 51 | 0.000 | 0.098 | 0.071 | 0.000 | 0.115 | 0.377 | ----- |
| 165-hr event | T11-13846 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.000 | 0.054 | 0.110 | ----- |
| 165-hr event | T11-13846 | DRI | Ba | 56 | 0.098 | 0.104 | 0.136 | 0.085 | 0.090 | 0.105 | ----- |
| 165-hr event | T11-13846 | DRI | Ce | 58 | 0.000 | 0.077 | 0.138 | 0.072 | 0.048 | 0.094 | ----- |
| 165-hr event | T11-13846 | DRI | Pb | 82 | 0.229 | 0.029 | 0.021 | 0.177 | 0.038 | 0.025 | ----- |
| 165-hr event | T11-13847 | DRI | Na | 11 | 0.000 | 3.713 | 0.734 | 11.854 | 0.987 | 0.303 | ----- |
| 165-hr event | T11-13847 | DRI | Mg | 12 | 0.280 | 0.394 | 0.503 | 1.791 | 0.135 | 0.114 | ----- |
| 165-hr event | T11-13847 | DRI | Al | 13 | 1.609 | 0.141 | 0.151 | 2.362 | 0.224 | 0.129 | 2.520 |
| 165-hr event | T11-13847 | DRI | Si | 14 | 5.351 | 0.042 | 0.077 | 7.967 | 0.536 | 0.093 | 7.355 |
| 165-hr event | T11-13847 | DRI | P | 15 | 0.000 | 0.017 | 0.013 | 0.000 | 0.095 | 0.155 | ----- |
| 165-hr event | T11-13847 | DRI | S | 16 | 78.788 | 0.407 | 0.012 | 73.981 | 3.710 | 0.095 | 73.228 |
| 165-hr event | T11-13847 | DRI | Cl | 17 | 0.304 | 0.017 | 0.032 | 0.545 | 0.043 | 0.075 | ----- |
| 165-hr event | T11-13847 | DRI | K | 19 | 5.822 | 0.023 | 0.018 | 6.330 | 0.319 | 0.070 | 5.920 |
| 165-hr event | T11-13847 | DRI | Ca | 20 | 3.618 | 0.062 | 0.032 | 3.489 | 0.177 | 0.073 | 3.254 |
| 165-hr event | T11-13847 | DRI | Ti | 22 | 0.300 | 0.017 | 0.026 | 0.255 | 0.030 | 0.051 | 0.249 |
| 165-hr event | T11-13847 | DRI | V | 23 | 0.067 | 0.017 | 0.004 | 0.132 | 0.018 | 0.037 | ----- |
| 165-hr event | T11-13847 | DRI | Cr | 24 | 0.059 | 0.017 | 0.006 | 0.043 | 0.011 | 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 | |
| 165-hr event | T11-13847 | DRI | Mn | 25 | 0.116 | 0.017 | 0.015 | 0.101 | 0.011 | 0.018 | ----- |
| 165-hr event | T11-13847 | DRI | Fe | 26 | 3.526 | 0.027 | 0.021 | 3.237 | 0.164 | 0.016 | 3.110 |
| 165-hr event | T11-13847 | DRI | Co | 27 | 0.013 | 0.017 | 0.004 | 0.000 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13847 | DRI | Ni | 28 | 0.023 | 0.017 | 0.005 | 0.034 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13847 | DRI | Cu | 29 | 0.160 | 0.017 | 0.015 | 0.135 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13847 | DRI | Zn | 30 | 2.554 | 0.022 | 0.013 | 2.424 | 0.123 | 0.017 | 2.415 |
| 165-hr event | T11-13847 | DRI | As | 33 | 0.011 | 0.017 | 0.006 | 0.029 | 0.022 | 0.009 | ----- |
| 165-hr event | T11-13847 | DRI | Se | 34 | 0.000 | 0.017 | 0.040 | 0.032 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13847 | DRI | Br | 35 | 0.389 | 0.017 | 0.011 | 0.429 | 0.030 | 0.013 | 0.409 |
| 165-hr event | T11-13847 | DRI | Rb | 37 | 0.000 | 0.017 | 0.006 | 0.015 | 0.014 | 0.019 | ----- |
| 165-hr event | T11-13847 | DRI | Sr | 38 | 0.021 | 0.017 | 0.006 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13847 | DRI | Zr | 40 | 0.003 | 0.017 | 0.023 | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13847 | DRI | Ag | 47 | 0.000 | 0.017 | 0.040 | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13847 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13847 | DRI | In | 49 | 0.000 | 0.017 | 0.047 | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13847 | DRI | Sn | 50 | 0.000 | 0.026 | 0.062 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13847 | DRI | Sb | 51 | 0.000 | 0.099 | 0.071 | 0.000 | 0.115 | 0.377 | ----- |
| 165-hr event | T11-13847 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.003 | 0.069 | 0.110 | ----- |
| 165-hr event | T11-13847 | DRI | Ba | 56 | 0.000 | 0.105 | 0.136 | 0.035 | 0.086 | 0.105 | ----- |
| 165-hr event | T11-13847 | DRI | Ce | 58 | 0.000 | 0.076 | 0.138 | 0.029 | 0.046 | 0.094 | ----- |
| 165-hr event | T11-13847 | DRI | Pb | 82 | 0.208 | 0.029 | 0.021 | 0.192 | 0.039 | 0.025 | ----- |
| 165-hr event | T11-13848 | ODEQ | Na | 11 | 14.200 | 1.300 | 0.626 | 11.707 | 0.973 | 0.303 | ----- |
| 165-hr event | T11-13848 | ODEQ | Mg | 12 | 2.120 | 0.201 | 0.260 | 1.723 | 0.130 | 0.114 | ----- |
| 165-hr event | T11-13848 | ODEQ | Al | 13 | 3.100 | 0.296 | 0.355 | 2.305 | 0.213 | 0.129 | 2.520 |
| 165-hr event | T11-13848 | ODEQ | Si | 14 | 7.520 | 0.556 | 0.075 | 6.781 | 0.460 | 0.093 | 7.355 |
| 165-hr event | T11-13848 | ODEQ | P | 15 | 0.185 | 0.047 | 0.130 | 0.000 | 0.091 | 0.155 | ----- |
| 165-hr event | T11-13848 | ODEQ | S | 16 | 72.900 | 5.080 | 0.047 | 66.930 | 3.356 | 0.095 | 73.228 |
| 165-hr event | T11-13848 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.450 | 0.041 | 0.075 | ----- |

## 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 | |
| 165-hr event | T11-13848 | ODEQ | K | 19 | 5.330 | 0.378 | 0.034 | 5.594 | 0.282 | 0.070 | 5.920 |
| 165-hr event | T11-13848 | ODEQ | Ca | 20 | 3.710 | 0.260 | 0.046 | 3.162 | 0.160 | 0.073 | 3.254 |
| 165-hr event | T11-13848 | ODEQ | Ti | 22 | 0.275 | 0.025 | 0.045 | 0.247 | 0.030 | 0.051 | 0.249 |
| 165-hr event | T11-13848 | ODEQ | V | 23 | 0.080 | 0.009 | 0.023 | 0.092 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13848 | ODEQ | Cr | 24 | <0.024 | 0.008 | 0.024 | 0.029 | 0.011 | 0.025 | ----- |
| 165-hr event | T11-13848 | ODEQ | Mn | 25 | 0.102 | 0.009 | 0.012 | 0.095 | 0.010 | 0.018 | ----- |
| 165-hr event | T11-13848 | ODEQ | Fe | 26 | 3.150 | 0.225 | 0.033 | 2.976 | 0.151 | 0.016 | 3.110 |
| 165-hr event | T11-13848 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.000 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13848 | ODEQ | Ni | 28 | 0.030 | 0.003 | 0.006 | 0.026 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13848 | ODEQ | Cu | 29 | 0.127 | 0.032 | 0.090 | 0.134 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13848 | ODEQ | Zn | 30 | 2.410 | 0.165 | 0.019 | 2.220 | 0.113 | 0.017 | 2.415 |
| 165-hr event | T11-13848 | ODEQ | As | 33 | 0.053 | 0.008 | 0.021 | 0.045 | 0.020 | 0.009 | ----- |
| 165-hr event | T11-13848 | ODEQ | Se | 34 | 0.035 | 0.006 | 0.017 | 0.024 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13848 | ODEQ | Br | 35 | 0.376 | 0.027 | 0.013 | 0.367 | 0.027 | 0.013 | 0.409 |
| 165-hr event | T11-13848 | ODEQ | Rb | 37 | <0.007 | 0.002 | 0.007 | 0.000 | 0.006 | 0.019 | ----- |
| 165-hr event | T11-13848 | ODEQ | Sr | 38 | 0.042 | 0.009 | 0.024 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13848 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13848 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13848 | ODEQ | Cd | 48 | <0.142 | 0.049 | 0.142 | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13848 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13848 | ODEQ | Sn | 50 | <0.284 | 0.093 | 0.284 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13848 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.000 | 0.115 | 0.377 | ----- |
| 165-hr event | T11-13848 | ODEQ | Cs | 55 | <0.089 | 0.030 | 0.089 | 0.000 | 0.054 | 0.110 | ----- |
| 165-hr event | T11-13848 | ODEQ | Ba | 56 | <0.089 | 0.030 | 0.089 | 0.000 | 0.045 | 0.105 | ----- |
| 165-hr event | T11-13848 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.060 | 0.046 | 0.094 | ----- |
| 165-hr event | T11-13848 | ODEQ | Pb | 82 | 0.186 | 0.020 | 0.045 | 0.174 | 0.037 | 0.025 | ----- |
| 165-hr event | T11-13849 | ODEQ | Na | 11 | 14.600 | 1.300 | 0.626 | 12.419 | 1.033 | 0.303 | ----- |
| 165-hr event | T11-13849 | ODEQ | Mg | 12 | 1.890 | 0.189 | 0.260 | 1.813 | 0.136 | 0.114 | ----- |

## 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 | |
| 165-hr event | T11-13849 | ODEQ | Al | 13 | 3.410 | 0.319 | 0.355 | 2.667 | 0.239 | 0.129 | 2.520 |
| 165-hr event | T11-13849 | ODEQ | Si | 14 | 8.410 | 0.615 | 0.075 | 8.204 | 0.552 | 0.093 | 7.355 |
| 165-hr event | T11-13849 | ODEQ | P | 15 | 0.200 | 0.047 | 0.130 | 0.000 | 0.098 | 0.155 | ----- |
| 165-hr event | T11-13849 | ODEQ | S | 16 | 80.700 | 5.670 | 0.047 | 75.473 | 3.784 | 0.095 | 73.228 |
| 165-hr event | T11-13849 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.601 | 0.046 | 0.075 | ----- |
| 165-hr event | T11-13849 | ODEQ | K | 19 | 5.920 | 0.414 | 0.034 | 6.374 | 0.321 | 0.070 | 5.920 |
| 165-hr event | T11-13849 | ODEQ | Ca | 20 | 4.110 | 0.296 | 0.046 | 3.604 | 0.182 | 0.073 | 3.254 |
| 165-hr event | T11-13849 | ODEQ | Ti | 22 | 0.319 | 0.027 | 0.045 | 0.261 | 0.031 | 0.051 | 0.249 |
| 165-hr event | T11-13849 | ODEQ | V | 23 | 0.097 | 0.010 | 0.023 | 0.108 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13849 | ODEQ | Cr | 24 | 0.033 | 0.009 | 0.024 | 0.050 | 0.012 | 0.025 | ----- |
| 165-hr event | T11-13849 | ODEQ | Mn | 25 | 0.099 | 0.008 | 0.012 | 0.114 | 0.011 | 0.018 | ----- |
| 165-hr event | T11-13849 | ODEQ | Fe | 26 | 3.570 | 0.260 | 0.033 | 3.354 | 0.170 | 0.016 | 3.110 |
| 165-hr event | T11-13849 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.000 | 0.009 | 0.013 | ----- |
| 165-hr event | T11-13849 | ODEQ | Ni | 28 | 0.044 | 0.004 | 0.006 | 0.028 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13849 | ODEQ | Cu | 29 | 0.149 | 0.033 | 0.090 | 0.139 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13849 | ODEQ | Zn | 30 | 2.700 | 0.189 | 0.019 | 2.480 | 0.126 | 0.017 | 2.415 |
| 165-hr event | T11-13849 | ODEQ | As | 33 | <0.021 | 0.007 | 0.021 | 0.037 | 0.022 | 0.009 | ----- |
| 165-hr event | T11-13849 | ODEQ | Se | 34 | 0.049 | 0.006 | 0.017 | 0.004 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13849 | ODEQ | Br | 35 | 0.422 | 0.030 | 0.013 | 0.499 | 0.033 | 0.013 | 0.409 |
| 165-hr event | T11-13849 | ODEQ | Rb | 37 | 0.040 | 0.004 | 0.007 | 0.000 | 0.007 | 0.019 | ----- |
| 165-hr event | T11-13849 | ODEQ | Sr | 38 | 0.040 | 0.009 | 0.024 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13849 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13849 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13849 | ODEQ | Cd | 48 | <0.142 | 0.049 | 0.142 | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13849 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13849 | ODEQ | Sn | 50 | <0.284 | 0.093 | 0.284 | 0.011 | 0.373 | 0.196 | ----- |
| 165-hr event | T11-13849 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.158 | 0.486 | 0.377 | ----- |
| 165-hr event | T11-13849 | ODEQ | Cs | 55 | 0.105 | 0.031 | 0.089 | 0.025 | 0.073 | 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 | |
| 165-hr event | T11-13849 | ODEQ | Ba | 56 | 0.144 | 0.031 | 0.089 | 0.034 | 0.090 | 0.105 | ----- |
| 165-hr event | T11-13849 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.000 | 0.036 | 0.094 | ----- |
| 165-hr event | T11-13849 | ODEQ | Pb | 82 | 0.277 | 0.025 | 0.045 | 0.216 | 0.039 | 0.025 | ----- |
| 165-hr event | T11-13850 | AQMD | Na | 11 | ----- | ----- | ----- | 11.854 | 0.987 | 0.303 | ----- |
| 165-hr event | T11-13850 | AQMD | Mg | 12 | 1.920 | ----- | 0.339 | 1.741 | 0.131 | 0.114 | ----- |
| 165-hr event | T11-13850 | AQMD | Al | 13 | 3.790 | ----- | 0.565 | 2.373 | 0.225 | 0.129 | 2.520 |
| 165-hr event | T11-13850 | AQMD | Si | 14 | 8.010 | ----- | 0.113 | 7.390 | 0.499 | 0.093 | 7.355 |
| 165-hr event | T11-13850 | AQMD | P | 15 | 2.180 | ----- | 0.023 | 0.000 | 0.095 | 0.155 | ----- |
| 165-hr event | T11-13850 | AQMD | S | 16 | 60.100 | ----- | 0.113 | 72.377 | 3.629 | 0.095 | 73.228 |
| 165-hr event | T11-13850 | AQMD | Cl | 17 | 0.058 | ----- | 0.113 | 0.583 | 0.045 | 0.075 | ----- |
| 165-hr event | T11-13850 | AQMD | K | 19 | 5.270 | ----- | 0.113 | 6.119 | 0.308 | 0.070 | 5.920 |
| 165-hr event | T11-13850 | AQMD | Ca | 20 | 3.060 | ----- | 0.113 | 3.415 | 0.173 | 0.073 | 3.254 |
| 165-hr event | T11-13850 | AQMD | Ti | 22 | 0.290 | ----- | 0.113 | 0.315 | 0.030 | 0.051 | 0.249 |
| 165-hr event | T11-13850 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.104 | 0.018 | 0.037 | ----- |
| 165-hr event | T11-13850 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.041 | 0.010 | 0.025 | ----- |
| 165-hr event | T11-13850 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.070 | 0.012 | 0.018 | ----- |
| 165-hr event | T11-13850 | AQMD | Fe | 26 | 3.130 | ----- | 0.113 | 3.189 | 0.162 | 0.016 | 3.110 |
| 165-hr event | T11-13850 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.005 | 0.009 | 0.013 | ----- |
| 165-hr event | T11-13850 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.033 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13850 | AQMD | Cu | 29 | 0.147 | ----- | 0.113 | 0.139 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13850 | AQMD | Zn | 30 | 2.090 | ----- | 0.023 | 2.401 | 0.122 | 0.017 | 2.415 |
| 165-hr event | T11-13850 | AQMD | As | 33 | < 0.1 | ----- | 0.113 | 0.000 | 0.008 | 0.009 | ----- |
| 165-hr event | T11-13850 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.014 | 0.010 | 0.013 | ----- |
| 165-hr event | T11-13850 | AQMD | Br | 35 | 0.401 | ----- | 0.113 | 0.405 | 0.029 | 0.013 | 0.409 |
| 165-hr event | T11-13850 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.000 | 0.006 | 0.019 | ----- |
| 165-hr event | T11-13850 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.127 | 0.106 | 0.023 | ----- |
| 165-hr event | T11-13850 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13850 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.068 | 0.147 | 0.126 | ----- |

## 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 | |
| 165-hr event | T11-13850 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.045 | 0.181 | 0.166 | ----- |
| 165-hr event | T11-13850 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.000 | 0.050 | 0.154 | ----- |
| 165-hr event | T11-13850 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13850 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.226 | 0.452 | 0.377 | ----- |
| 165-hr event | T11-13850 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.055 | 0.069 | 0.110 | ----- |
| 165-hr event | T11-13850 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.045 | 0.105 | ----- |
| 165-hr event | T11-13850 | AQMD | Ce | 58 | ----- | ----- | ----- | 0.034 | 0.045 | 0.094 | ----- |
| 165-hr event | T11-13850 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.243 | 0.026 | 0.025 | ----- |
| 165-hr event | T11-13851 | AQMD | Na | 11 | ----- | ----- | ----- | 10.927 | 0.910 | 0.303 | ----- |
| 165-hr event | T11-13851 | AQMD | Mg | 12 | 2.340 | ----- | 0.339 | 1.567 | 0.121 | 0.114 | ----- |
| 165-hr event | T11-13851 | AQMD | Al | 13 | 3.900 | ----- | 0.565 | 1.865 | 0.202 | 0.129 | 2.520 |
| 165-hr event | T11-13851 | AQMD | Si | 14 | 7.770 | ----- | 0.113 | 7.044 | 0.477 | 0.093 | 7.355 |
| 165-hr event | T11-13851 | AQMD | P | 15 | 2.080 | ----- | 0.023 | 0.000 | 0.093 | 0.155 | ----- |
| 165-hr event | T11-13851 | AQMD | S | 16 | 58.900 | ----- | 0.113 | 69.145 | 3.467 | 0.095 | 73.228 |
| 165-hr event | T11-13851 | AQMD | Cl | 17 | 0.066 | ----- | 0.113 | 0.524 | 0.043 | 0.075 | ----- |
| 165-hr event | T11-13851 | AQMD | K | 19 | 5.050 | ----- | 0.113 | 5.907 | 0.298 | 0.070 | 5.920 |
| 165-hr event | T11-13851 | AQMD | Ca | 20 | 3.110 | ----- | 0.113 | 3.193 | 0.162 | 0.073 | 3.254 |
| 165-hr event | T11-13851 | AQMD | Ti | 22 | 0.190 | ----- | 0.113 | 0.215 | 0.029 | 0.051 | 0.249 |
| 165-hr event | T11-13851 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.132 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13851 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.007 | 0.011 | 0.025 | ----- |
| 165-hr event | T11-13851 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.119 | 0.011 | 0.018 | ----- |
| 165-hr event | T11-13851 | AQMD | Fe | 26 | 2.950 | ----- | 0.113 | 2.985 | 0.152 | 0.016 | 3.110 |
| 165-hr event | T11-13851 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.000 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13851 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.021 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13851 | AQMD | Cu | 29 | 0.144 | ----- | 0.113 | 0.128 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13851 | AQMD | Zn | 30 | 2.090 | ----- | 0.023 | 2.318 | 0.118 | 0.017 | 2.415 |
| 165-hr event | T11-13851 | AQMD | As | 33 | 0.096 | ----- | 0.113 | 0.023 | 0.021 | 0.009 | ----- |
| 165-hr event | T11-13851 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.029 | 0.011 | 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 | |
| 165-hr event | T11-13851 | AQMD | Br | 35 | 0.373 | ----- | 0.113 | 0.414 | 0.029 | 0.013 | 0.409 |
| 165-hr event | T11-13851 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.003 | 0.015 | 0.019 | ----- |
| 165-hr event | T11-13851 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.000 | 0.081 | 0.023 | ----- |
| 165-hr event | T11-13851 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13851 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13851 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13851 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13851 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13851 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.000 | 0.115 | 0.377 | ----- |
| 165-hr event | T11-13851 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.000 | 0.054 | 0.110 | ----- |
| 165-hr event | T11-13851 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.045 | 0.105 | ----- |
| 165-hr event | T11-13851 | AQMD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.036 | 0.094 | ----- |
| 165-hr event | T11-13851 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.194 | 0.040 | 0.025 | ----- |
| 165-hr event | T11-13852 | UCD | Na | 11 | 10.176 | ----- | ----- | 11.131 | 0.926 | 0.303 | ----- |
| 165-hr event | T11-13852 | UCD | Mg | 12 | 1.738 | ----- | ----- | 1.766 | 0.133 | 0.114 | ----- |
| 165-hr event | T11-13852 | UCD | Al | 13 | 3.515 | ----- | ----- | 1.819 | 0.191 | 0.129 | 2.520 |
| 165-hr event | T11-13852 | UCD | Si | 14 | 6.672 | ----- | ----- | 6.627 | 0.450 | 0.093 | 7.355 |
| 165-hr event | T11-13852 | UCD | P | 15 | 0.000 | ----- | ----- | 0.000 | 0.095 | 0.155 | ----- |
| 165-hr event | T11-13852 | UCD | S | 16 | 77.926 | ----- | ----- | 73.247 | 3.672 | 0.095 | 73.228 |
| 165-hr event | T11-13852 | UCD | Cl | 17 | 0.377 | ----- | ----- | 0.560 | 0.044 | 0.075 | ----- |
| 165-hr event | T11-13852 | UCD | K | 19 | 5.538 | ----- | ----- | 5.923 | 0.299 | 0.070 | 5.920 |
| 165-hr event | T11-13852 | UCD | Ca | 20 | 2.890 | ----- | ----- | 2.779 | 0.141 | 0.073 | 3.254 |
| 165-hr event | T11-13852 | UCD | Ti | 22 | 0.187 | ----- | ----- | 0.219 | 0.028 | 0.051 | 0.249 |
| 165-hr event | T11-13852 | UCD | V | 23 | 0.122 | ----- | ----- | 0.097 | 0.019 | 0.037 | ----- |
| 165-hr event | T11-13852 | UCD | Cr | 24 | 0.035 | ----- | ----- | 0.050 | 0.011 | 0.025 | ----- |
| 165-hr event | T11-13852 | UCD | Mn | 25 | 0.073 | ----- | ----- | 0.096 | 0.010 | 0.018 | ----- |
| 165-hr event | T11-13852 | UCD | Fe | 26 | 2.995 | ----- | ----- | 2.832 | 0.144 | 0.016 | 3.110 |
| 165-hr event | T11-13852 | UCD | Co | 27 | -0.007 | ----- | ----- | 0.001 | 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 | |
| 165-hr event | T11-13852 | UCD | Ni | 28 | 0.038 | ----- | ----- | 0.035 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13852 | UCD | Cu | 29 | 0.143 | ----- | ----- | 0.131 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13852 | UCD | Zn | 30 | 2.568 | ----- | ----- | 2.402 | 0.122 | 0.017 | 2.415 |
| 165-hr event | T11-13852 | UCD | As | 33 | 0.052 | ----- | ----- | 0.036 | 0.020 | 0.009 | ----- |
| 165-hr event | T11-13852 | UCD | Se | 34 | 0.011 | ----- | ----- | 0.033 | 0.011 | 0.013 | ----- |
| 165-hr event | T11-13852 | UCD | Br | 35 | 0.481 | ----- | ----- | 0.487 | 0.032 | 0.013 | 0.409 |
| 165-hr event | T11-13852 | UCD | Rb | 37 | 0.031 | ----- | ----- | 0.006 | 0.014 | 0.019 | ----- |
| 165-hr event | T11-13852 | UCD | Sr | 38 | 0.037 | ----- | ----- | 0.043 | 0.111 | 0.023 | ----- |
| 165-hr event | T11-13852 | UCD | Zr | 40 | 0.020 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13852 | UCD | Ag | 47 | 0.101 | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13852 | UCD | Cd | 48 | -0.057 | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13852 | UCD | In | 49 | 0.248 | ----- | ----- | 0.000 | 0.069 | 0.154 | ----- |
| 165-hr event | T11-13852 | UCD | Sn | 50 | 0.061 | ----- | ----- | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13852 | UCD | Sb | 51 | 0.121 | ----- | ----- | 0.271 | 0.486 | 0.377 | ----- |
| 165-hr event | T11-13852 | UCD | Cs | 55 | -0.085 | ----- | ----- | 0.105 | 0.069 | 0.110 | ----- |
| 165-hr event | T11-13852 | UCD | Ba | 56 | 0.057 | ----- | ----- | 0.000 | 0.045 | 0.105 | ----- |
| 165-hr event | T11-13852 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.036 | 0.094 | ----- |
| 165-hr event | T11-13852 | UCD | Pb | 82 | 0.091 | ----- | ----- | 0.197 | 0.039 | 0.025 | ----- |
| 165-hr event | T11-13853 | UCD | Na | 11 | 12.721 | ----- | ----- | 11.707 | 0.975 | 0.303 | ----- |
| 165-hr event | T11-13853 | UCD | Mg | 12 | 2.793 | ----- | ----- | 1.787 | 0.134 | 0.114 | ----- |
| 165-hr event | T11-13853 | UCD | Al | 13 | 3.311 | ----- | ----- | 2.181 | 0.216 | 0.129 | 2.520 |
| 165-hr event | T11-13853 | UCD | Si | 14 | 7.297 | ----- | ----- | 7.447 | 0.503 | 0.093 | 7.355 |
| 165-hr event | T11-13853 | UCD | P | 15 | 0.000 | ----- | ----- | 0.000 | 0.098 | 0.155 | ----- |
| 165-hr event | T11-13853 | UCD | S | 16 | 77.681 | ----- | ----- | 77.880 | 3.904 | 0.095 | 73.228 |
| 165-hr event | T11-13853 | UCD | Cl | 17 | 0.361 | ----- | ----- | 0.590 | 0.045 | 0.075 | ----- |
| 165-hr event | T11-13853 | UCD | K | 19 | 5.503 | ----- | ----- | 6.382 | 0.321 | 0.070 | 5.920 |
| 165-hr event | T11-13853 | UCD | Ca | 20 | 2.931 | ----- | ----- | 3.058 | 0.155 | 0.073 | 3.254 |
| 165-hr event | T11-13853 | UCD | Ti | 22 | 0.211 | ----- | ----- | 0.251 | 0.029 | 0.051 | 0.249 |

## 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 | |
| 165-hr event | T11-13853 | UCD | V | 23 | 0.093 | ----- | ----- | 0.123 | 0.018 | 0.037 | ----- |
| 165-hr event | T11-13853 | UCD | Cr | 24 | 0.003 | ----- | ----- | 0.000 | 0.008 | 0.025 | ----- |
| 165-hr event | T11-13853 | UCD | Mn | 25 | 0.072 | ----- | ----- | 0.092 | 0.010 | 0.018 | ----- |
| 165-hr event | T11-13853 | UCD | Fe | 26 | 2.949 | ----- | ----- | 2.932 | 0.149 | 0.016 | 3.110 |
| 165-hr event | T11-13853 | UCD | Co | 27 | -0.014 | ----- | ----- | 0.013 | 0.008 | 0.013 | ----- |
| 165-hr event | T11-13853 | UCD | Ni | 28 | 0.014 | ----- | ----- | 0.035 | 0.005 | 0.012 | ----- |
| 165-hr event | T11-13853 | UCD | Cu | 29 | 0.095 | ----- | ----- | 0.143 | 0.010 | 0.016 | 0.139 |
| 165-hr event | T11-13853 | UCD | Zn | 30 | 2.704 | ----- | ----- | 2.581 | 0.131 | 0.017 | 2.415 |
| 165-hr event | T11-13853 | UCD | As | 33 | -0.001 | ----- | ----- | 0.027 | 0.020 | 0.009 | ----- |
| 165-hr event | T11-13853 | UCD | Se | 34 | 0.044 | ----- | ----- | 0.026 | 0.010 | 0.013 | ----- |
| 165-hr event | T11-13853 | UCD | Br | 35 | 0.473 | ----- | ----- | 0.451 | 0.031 | 0.013 | 0.409 |
| 165-hr event | T11-13853 | UCD | Rb | 37 | 0.030 | ----- | ----- | 0.000 | 0.006 | 0.019 | ----- |
| 165-hr event | T11-13853 | UCD | Sr | 38 | 0.022 | ----- | ----- | 0.045 | 0.113 | 0.023 | ----- |
| 165-hr event | T11-13853 | UCD | Zr | 40 | -0.225 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 165-hr event | T11-13853 | UCD | Ag | 47 | -0.027 | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| 165-hr event | T11-13853 | UCD | Cd | 48 | 0.097 | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 165-hr event | T11-13853 | UCD | In | 49 | 0.365 | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| 165-hr event | T11-13853 | UCD | Sn | 50 | 0.013 | ----- | ----- | 0.000 | 0.086 | 0.196 | ----- |
| 165-hr event | T11-13853 | UCD | Sb | 51 | -0.094 | ----- | ----- | 0.542 | 0.475 | 0.377 | ----- |
| 165-hr event | T11-13853 | UCD | Cs | 55 | 0.084 | ----- | ----- | 0.106 | 0.069 | 0.110 | ----- |
| 165-hr event | T11-13853 | UCD | Ba | 56 | 0.261 | ----- | ----- | 0.140 | 0.083 | 0.105 | ----- |
| 165-hr event | T11-13853 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 165-hr event | T11-13853 | UCD | Pb | 82 | 0.121 | ----- | ----- | 0.260 | 0.038 | 0.025 | ----- |
| 120-hr event | T11-13860 | CARB | Na | 11 | ----- | ----- | ----- | 2.938 | 0.272 | 0.303 | ----- |
| 120-hr event | T11-13860 | CARB | Mg | 12 | ----- | ----- | ----- | 0.195 | 0.053 | 0.114 | ----- |
| 120-hr event | T11-13860 | CARB | Al | 13 | 2.290 | 0.320 | 0.200 | 1.526 | 0.188 | 0.129 | 1.755 |
| 120-hr event | T11-13860 | CARB | Si | 14 | 7.200 | 0.400 | 0.060 | 7.017 | 0.475 | 0.093 | 7.000 |
| 120-hr event | T11-13860 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.100 | 0.155 | ----- |

## 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 | |
| 120-hr event | T11-13860 | CARB | S | 16 | 87.290 | 4.370 | 0.050 | 85.191 | 4.271 | 0.095 | 82.244 |
| 120-hr event | T11-13860 | CARB | Cl | 17 | 0.430 | 0.060 | 0.060 | 0.421 | 0.039 | 0.075 | ----- |
| 120-hr event | T11-13860 | CARB | K | 19 | 3.780 | 0.190 | 0.070 | 3.826 | 0.194 | 0.070 | 3.540 |
| 120-hr event | T11-13860 | CARB | Ca | 20 | 2.060 | 0.110 | 0.060 | 2.024 | 0.104 | 0.073 | 1.911 |
| 120-hr event | T11-13860 | CARB | Ti | 22 | 0.190 | 0.030 | 0.040 | 0.157 | 0.025 | 0.051 | 0.184 |
| 120-hr event | T11-13860 | CARB | V | 23 | 0.030 | 0.020 | 0.030 | 0.023 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13860 | CARB | Cr | 24 | <0.03 | ND | 0.030 | 0.002 | 0.009 | 0.025 | ----- |
| 120-hr event | T11-13860 | CARB | Mn | 25 | 0.070 | 0.010 | 0.030 | 0.065 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13860 | CARB | Fe | 26 | 2.120 | 0.110 | 0.040 | 2.210 | 0.113 | 0.016 | 2.113 |
| 120-hr event | T11-13860 | CARB | Co | 27 | <0.03 | ND | 0.030 | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13860 | CARB | Ni | 28 | <0.03 | ND | 0.030 | 0.005 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13860 | CARB | Cu | 29 | 0.070 | 0.020 | 0.040 | 0.044 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13860 | CARB | Zn | 30 | 0.970 | 0.060 | 0.020 | 0.993 | 0.051 | 0.017 | 0.946 |
| 120-hr event | T11-13860 | CARB | As | 33 | <0.02 | ND | 0.020 | 0.028 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13860 | CARB | Se | 34 | 0.040 | 0.010 | 0.020 | 0.017 | 0.010 | 0.013 | ----- |
| 120-hr event | T11-13860 | CARB | Br | 35 | 0.170 | 0.020 | 0.020 | 0.192 | 0.018 | 0.013 | 0.173 |
| 120-hr event | T11-13860 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.009 | 0.012 | 0.019 | ----- |
| 120-hr event | T11-13860 | CARB | Sr | 38 | <0.03 | ND | 0.030 | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13860 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13860 | CARB | Ag | 47 | ----- | ----- | ----- | 0.136 | 0.147 | 0.126 | ----- |
| 120-hr event | T11-13860 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13860 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| 120-hr event | T11-13860 | CARB | Sn | 50 | <0.2 | ND | 0.200 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13860 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.655 | 0.464 | 0.377 | ----- |
| 120-hr event | T11-13860 | CARB | Cs | 55 | ----- | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13860 | CARB | Ba | 56 | <0.2 | ND | 0.200 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13860 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13860 | CARB | Pb | 82 | 0.200 | 0.030 | 0.030 | 0.153 | 0.036 | 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 | |
| 120-hr event | T11-13861 | CARB | Na | 11 | ----- | ----- | ----- | 2.644 | 0.250 | 0.303 | ----- |
| 120-hr event | T11-13861 | CARB | Mg | 12 | ----- | ----- | ----- | 0.358 | 0.055 | 0.114 | ----- |
| 120-hr event | T11-13861 | CARB | Al | 13 | 2.150 | 0.310 | 0.200 | 1.232 | 0.169 | 0.129 | 1.755 |
| 120-hr event | T11-13861 | CARB | Si | 14 | 6.820 | 0.380 | 0.060 | 6.314 | 0.430 | 0.093 | 7.000 |
| 120-hr event | T11-13861 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.098 | 0.155 | ----- |
| 120-hr event | T11-13861 | CARB | S | 16 | 82.370 | 4.130 | 0.050 | 77.032 | 3.862 | 0.095 | 82.244 |
| 120-hr event | T11-13861 | CARB | Cl | 17 | 0.380 | 0.050 | 0.060 | 0.371 | 0.038 | 0.075 | ----- |
| 120-hr event | T11-13861 | CARB | K | 19 | 3.620 | 0.190 | 0.070 | 3.482 | 0.177 | 0.070 | 3.540 |
| 120-hr event | T11-13861 | CARB | Ca | 20 | 1.990 | 0.110 | 0.060 | 1.860 | 0.096 | 0.073 | 1.911 |
| 120-hr event | T11-13861 | CARB | Ti | 22 | 0.160 | 0.030 | 0.040 | 0.180 | 0.025 | 0.051 | 0.184 |
| 120-hr event | T11-13861 | CARB | V | 23 | 0.040 | 0.020 | 0.030 | 0.037 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13861 | CARB | Cr | 24 | <0.03 | ND | 0.030 | 0.015 | 0.009 | 0.025 | ----- |
| 120-hr event | T11-13861 | CARB | Mn | 25 | 0.060 | 0.010 | 0.030 | 0.068 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13861 | CARB | Fe | 26 | 2.070 | 0.110 | 0.040 | 2.011 | 0.103 | 0.016 | 2.113 |
| 120-hr event | T11-13861 | CARB | Co | 27 | <0.03 | ND | 0.030 | 0.009 | 0.008 | 0.013 | ----- |
| 120-hr event | T11-13861 | CARB | Ni | 28 | <0.03 | ND | 0.030 | 0.005 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13861 | CARB | Cu | 29 | 0.070 | 0.020 | 0.040 | 0.046 | 0.006 | 0.016 | 0.056 |
| 120-hr event | T11-13861 | CARB | Zn | 30 | 0.940 | 0.060 | 0.020 | 0.883 | 0.046 | 0.017 | 0.946 |
| 120-hr event | T11-13861 | CARB | As | 33 | <0.02 | ND | 0.020 | 0.011 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13861 | CARB | Se | 34 | 0.040 | 0.010 | 0.020 | 0.045 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13861 | CARB | Br | 35 | 0.160 | 0.010 | 0.020 | 0.182 | 0.018 | 0.013 | 0.173 |
| 120-hr event | T11-13861 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13861 | CARB | Sr | 38 | <0.03 | ND | 0.030 | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13861 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13861 | CARB | Ag | 47 | ----- | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| 120-hr event | T11-13861 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13861 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13861 | CARB | Sn | 50 | 0.220 | 0.110 | 0.200 | 0.000 | 0.086 | 0.196 | ----- |

## 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 | |
| 120-hr event | T11-13861 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.000 | 0.100 | 0.377 | ----- |
| 120-hr event | T11-13861 | CARB | Cs | 55 | ----- | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13861 | CARB | Ba | 56 | <0.2 | ND | 0.200 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13861 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13861 | CARB | Pb | 82 | 0.190 | 0.030 | 0.030 | 0.150 | 0.034 | 0.025 | ----- |
| 120-hr event | T11-13862 | DRI | Na | 11 | 0.000 | 4.038 | 0.734 | 2.825 | 0.263 | 0.303 | ----- |
| 120-hr event | T11-13862 | DRI | Mg | 12 | 0.000 | 0.391 | 0.503 | 0.296 | 0.054 | 0.114 | ----- |
| 120-hr event | T11-13862 | DRI | Al | 13 | 1.782 | 0.142 | 0.151 | 1.322 | 0.172 | 0.129 | 1.755 |
| 120-hr event | T11-13862 | DRI | Si | 14 | 4.757 | 0.039 | 0.077 | 6.825 | 0.463 | 0.093 | 7.000 |
| 120-hr event | T11-13862 | DRI | P | 15 | 0.000 | 0.017 | 0.013 | 0.000 | 0.098 | 0.155 | ----- |
| 120-hr event | T11-13862 | DRI | S | 16 | 87.423 | 0.439 | 0.012 | 79.835 | 4.003 | 0.095 | 82.244 |
| 120-hr event | T11-13862 | DRI | Cl | 17 | 0.120 | 0.017 | 0.032 | 0.350 | 0.036 | 0.075 | ----- |
| 120-hr event | T11-13862 | DRI | K | 19 | 3.447 | 0.020 | 0.018 | 3.538 | 0.179 | 0.070 | 3.540 |
| 120-hr event | T11-13862 | DRI | Ca | 20 | 1.947 | 0.059 | 0.032 | 1.846 | 0.095 | 0.073 | 1.911 |
| 120-hr event | T11-13862 | DRI | Ti | 22 | 0.202 | 0.017 | 0.026 | 0.157 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13862 | DRI | V | 23 | 0.000 | 0.017 | 0.004 | 0.060 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13862 | DRI | Cr | 24 | 0.011 | 0.017 | 0.006 | 0.000 | 0.008 | 0.025 | ----- |
| 120-hr event | T11-13862 | DRI | Mn | 25 | 0.066 | 0.017 | 0.015 | 0.074 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13862 | DRI | Fe | 26 | 2.253 | 0.025 | 0.021 | 1.993 | 0.102 | 0.016 | 2.113 |
| 120-hr event | T11-13862 | DRI | Co | 27 | 0.000 | 0.017 | 0.004 | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13862 | DRI | Ni | 28 | 0.008 | 0.017 | 0.005 | 0.014 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13862 | DRI | Cu | 29 | 0.077 | 0.017 | 0.015 | 0.053 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13862 | DRI | Zn | 30 | 1.032 | 0.019 | 0.013 | 0.902 | 0.047 | 0.017 | 0.946 |
| 120-hr event | T11-13862 | DRI | As | 33 | 0.000 | 0.017 | 0.006 | 0.051 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13862 | DRI | Se | 34 | 0.000 | 0.017 | 0.040 | 0.022 | 0.010 | 0.013 | ----- |
| 120-hr event | T11-13862 | DRI | Br | 35 | 0.173 | 0.017 | 0.011 | 0.168 | 0.017 | 0.013 | 0.173 |
| 120-hr event | T11-13862 | DRI | Rb | 37 | 0.000 | 0.017 | 0.006 | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13862 | DRI | Sr | 38 | 0.029 | 0.017 | 0.006 | 0.000 | 0.081 | 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 | |
| 120-hr event | T11-13862 | DRI | Zr | 40 | 0.023 | 0.018 | 0.023 | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13862 | DRI | Ag | 47 | 0.000 | 0.017 | 0.040 | 0.011 | 0.147 | 0.126 | ----- |
| 120-hr event | T11-13862 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13862 | DRI | In | 49 | 0.000 | 0.017 | 0.047 | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13862 | DRI | Sn | 50 | 0.000 | 0.026 | 0.062 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13862 | DRI | Sb | 51 | 0.000 | 0.098 | 0.071 | 0.045 | 0.463 | 0.377 | ----- |
| 120-hr event | T11-13862 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.092 | 0.063 | 0.110 | ----- |
| 120-hr event | T11-13862 | DRI | Ba | 56 | 0.000 | 0.104 | 0.136 | 0.006 | 0.077 | 0.105 | ----- |
| 120-hr event | T11-13862 | DRI | Ce | 58 | 0.000 | 0.075 | 0.138 | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13862 | DRI | Pb | 82 | 0.186 | 0.029 | 0.021 | 0.140 | 0.036 | 0.025 | ----- |
| 120-hr event | T11-13863 | DRI | Na | 11 | 0.000 | 2.935 | 0.734 | 2.712 | 0.255 | 0.303 | ----- |
| 120-hr event | T11-13863 | DRI | Mg | 12 | 0.510 | 0.396 | 0.503 | 0.400 | 0.057 | 0.114 | ----- |
| 120-hr event | T11-13863 | DRI | Al | 13 | 1.969 | 0.143 | 0.151 | 1.469 | 0.177 | 0.129 | 1.755 |
| 120-hr event | T11-13863 | DRI | Si | 14 | 4.966 | 0.040 | 0.077 | 6.983 | 0.473 | 0.093 | 7.000 |
| 120-hr event | T11-13863 | DRI | P | 15 | 0.000 | 0.017 | 0.013 | 0.000 | 0.098 | 0.155 | ----- |
| 120-hr event | T11-13863 | DRI | S | 16 | 87.829 | 0.440 | 0.012 | 79.360 | 3.979 | 0.095 | 82.244 |
| 120-hr event | T11-13863 | DRI | Cl | 17 | 0.154 | 0.017 | 0.032 | 0.323 | 0.036 | 0.075 | ----- |
| 120-hr event | T11-13863 | DRI | K | 19 | 3.554 | 0.021 | 0.018 | 3.541 | 0.180 | 0.070 | 3.540 |
| 120-hr event | T11-13863 | DRI | Ca | 20 | 2.069 | 0.059 | 0.032 | 1.888 | 0.097 | 0.073 | 1.911 |
| 120-hr event | T11-13863 | DRI | Ti | 22 | 0.173 | 0.017 | 0.026 | 0.195 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13863 | DRI | V | 23 | 0.000 | 0.017 | 0.004 | 0.016 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13863 | DRI | Cr | 24 | 0.000 | 0.017 | 0.006 | 0.016 | 0.010 | 0.025 | ----- |
| 120-hr event | T11-13863 | DRI | Mn | 25 | 0.035 | 0.017 | 0.015 | 0.057 | 0.011 | 0.018 | ----- |
| 120-hr event | T11-13863 | DRI | Fe | 26 | 2.327 | 0.025 | 0.021 | 2.106 | 0.107 | 0.016 | 2.113 |
| 120-hr event | T11-13863 | DRI | Co | 27 | 0.000 | 0.017 | 0.004 | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13863 | DRI | Ni | 28 | 0.000 | 0.017 | 0.005 | 0.003 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13863 | DRI | Cu | 29 | 0.062 | 0.017 | 0.015 | 0.055 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13863 | DRI | Zn | 30 | 1.091 | 0.019 | 0.013 | 0.881 | 0.046 | 0.017 | 0.946 |

## 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 | |
| 120-hr event | T11-13863 | DRI | As | 33 | 0.000 | 0.017 | 0.006 | 0.032 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13863 | DRI | Se | 34 | 0.000 | 0.017 | 0.040 | 0.040 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13863 | DRI | Br | 35 | 0.104 | 0.017 | 0.011 | 0.167 | 0.017 | 0.013 | 0.173 |
| 120-hr event | T11-13863 | DRI | Rb | 37 | 0.000 | 0.017 | 0.006 | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13863 | DRI | Sr | 38 | 0.034 | 0.017 | 0.006 | 0.116 | 0.105 | 0.023 | ----- |
| 120-hr event | T11-13863 | DRI | Zr | 40 | 0.000 | 0.017 | 0.023 | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13863 | DRI | Ag | 47 | 0.000 | 0.017 | 0.040 | 0.079 | 0.147 | 0.126 | ----- |
| 120-hr event | T11-13863 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13863 | DRI | In | 49 | 0.000 | 0.017 | 0.047 | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13863 | DRI | Sn | 50 | 0.000 | 0.026 | 0.062 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13863 | DRI | Sb | 51 | 0.000 | 0.098 | 0.071 | 0.090 | 0.452 | 0.377 | ----- |
| 120-hr event | T11-13863 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.007 | 0.063 | 0.110 | ----- |
| 120-hr event | T11-13863 | DRI | Ba | 56 | 0.000 | 0.107 | 0.136 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13863 | DRI | Ce | 58 | 0.000 | 0.072 | 0.138 | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13863 | DRI | Pb | 82 | 0.206 | 0.029 | 0.021 | 0.157 | 0.034 | 0.025 | ----- |
| 120-hr event | T11-13864 | ODEQ | Na | 11 | 2.550 | 0.319 | 0.626 | 2.848 | 0.265 | 0.303 | ----- |
| 120-hr event | T11-13864 | ODEQ | Mg | 12 | 0.520 | 0.103 | 0.260 | 0.327 | 0.055 | 0.114 | ----- |
| 120-hr event | T11-13864 | ODEQ | Al | 13 | 2.680 | 0.272 | 0.355 | 1.729 | 0.187 | 0.129 | 1.755 |
| 120-hr event | T11-13864 | ODEQ | Si | 14 | 7.380 | 0.544 | 0.075 | 6.430 | 0.438 | 0.093 | 7.000 |
| 120-hr event | T11-13864 | ODEQ | P | 15 | 0.138 | 0.046 | 0.130 | 0.000 | 0.100 | 0.155 | ----- |
| 120-hr event | T11-13864 | ODEQ | S | 16 | 87.900 | 6.150 | 0.047 | 80.716 | 4.047 | 0.095 | 82.244 |
| 120-hr event | T11-13864 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.294 | 0.036 | 0.075 | ----- |
| 120-hr event | T11-13864 | ODEQ | K | 19 | 3.350 | 0.236 | 0.034 | 3.602 | 0.183 | 0.070 | 3.540 |
| 120-hr event | T11-13864 | ODEQ | Ca | 20 | 2.170 | 0.154 | 0.046 | 1.792 | 0.092 | 0.073 | 1.911 |
| 120-hr event | T11-13864 | ODEQ | Ti | 22 | 0.173 | 0.020 | 0.045 | 0.167 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13864 | ODEQ | V | 23 | 0.060 | 0.009 | 0.023 | 0.043 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13864 | ODEQ | Cr | 24 | <0.024 | 0.008 | 0.024 | 0.005 | 0.010 | 0.025 | ----- |
| 120-hr event | T11-13864 | ODEQ | Mn | 25 | 0.062 | 0.006 | 0.012 | 0.080 | 0.009 | 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 | |
| 120-hr event | T11-13864 | ODEQ | Fe | 26 | 2.190 | 0.154 | 0.033 | 2.032 | 0.104 | 0.016 | 2.113 |
| 120-hr event | T11-13864 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.005 | 0.008 | 0.013 | ----- |
| 120-hr event | T11-13864 | ODEQ | Ni | 28 | 0.015 | 0.002 | 0.006 | 0.009 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13864 | ODEQ | Cu | 29 | <0.090 | 0.031 | 0.090 | 0.047 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13864 | ODEQ | Zn | 30 | 0.970 | 0.070 | 0.019 | 0.918 | 0.048 | 0.017 | 0.946 |
| 120-hr event | T11-13864 | ODEQ | As | 33 | 0.025 | 0.007 | 0.021 | 0.008 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13864 | ODEQ | Se | 34 | 0.025 | 0.006 | 0.017 | 0.033 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13864 | ODEQ | Br | 35 | 0.148 | 0.011 | 0.013 | 0.192 | 0.019 | 0.013 | 0.173 |
| 120-hr event | T11-13864 | ODEQ | Rb | 37 | 0.014 | 0.003 | 0.007 | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13864 | ODEQ | Sr | 38 | <0.024 | 0.008 | 0.024 | 0.033 | 0.105 | 0.023 | ----- |
| 120-hr event | T11-13864 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13864 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| 120-hr event | T11-13864 | ODEQ | Cd | 48 | <0.142 | 0.049 | 0.142 | 0.068 | 0.181 | 0.166 | ----- |
| 120-hr event | T11-13864 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13864 | ODEQ | Sn | 50 | 0.360 | 0.097 | 0.284 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13864 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.000 | 0.115 | 0.377 | ----- |
| 120-hr event | T11-13864 | ODEQ | Cs | 55 | <0.089 | 0.030 | 0.089 | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13864 | ODEQ | Ba | 56 | <0.089 | 0.030 | 0.089 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13864 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13864 | ODEQ | Pb | 82 | 0.191 | 0.020 | 0.045 | 0.184 | 0.036 | 0.025 | ----- |
| 120-hr event | T11-13865 | ODEQ | Na | 11 | 3.340 | 0.378 | 0.626 | 2.701 | 0.254 | 0.303 | ----- |
| 120-hr event | T11-13865 | ODEQ | Mg | 12 | 0.634 | 0.108 | 0.260 | 0.235 | 0.052 | 0.114 | ----- |
| 120-hr event | T11-13865 | ODEQ | Al | 13 | 2.510 | 0.260 | 0.355 | 1.266 | 0.170 | 0.129 | 1.755 |
| 120-hr event | T11-13865 | ODEQ | Si | 14 | 7.390 | 0.544 | 0.075 | 6.746 | 0.458 | 0.093 | 7.000 |
| 120-hr event | T11-13865 | ODEQ | P | 15 | <0.13 | 0.045 | 0.130 | 0.000 | 0.100 | 0.155 | ----- |
| 120-hr event | T11-13865 | ODEQ | S | 16 | 90.900 | 6.380 | 0.047 | 82.739 | 4.148 | 0.095 | 82.244 |
| 120-hr event | T11-13865 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.315 | 0.036 | 0.075 | ----- |
| 120-hr event | T11-13865 | ODEQ | K | 19 | 3.510 | 0.248 | 0.034 | 3.682 | 0.187 | 0.070 | 3.540 |

## 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 | |
| 120-hr event | T11-13865 | ODEQ | Ca | 20 | 2.200 | 0.154 | 0.046 | 1.935 | 0.099 | 0.073 | 1.911 |
| 120-hr event | T11-13865 | ODEQ | Ti | 22 | 0.173 | 0.020 | 0.045 | 0.207 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13865 | ODEQ | V | 23 | 0.048 | 0.008 | 0.023 | 0.029 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13865 | ODEQ | Cr | 24 | <0.024 | 0.008 | 0.024 | 0.000 | 0.008 | 0.025 | ----- |
| 120-hr event | T11-13865 | ODEQ | Mn | 25 | 0.067 | 0.006 | 0.012 | 0.079 | 0.011 | 0.018 | ----- |
| 120-hr event | T11-13865 | ODEQ | Fe | 26 | 2.290 | 0.165 | 0.033 | 2.076 | 0.106 | 0.016 | 2.113 |
| 120-hr event | T11-13865 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.008 | 0.008 | 0.013 | ----- |
| 120-hr event | T11-13865 | ODEQ | Ni | 28 | 0.007 | 0.002 | 0.006 | 0.004 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13865 | ODEQ | Cu | 29 | <0.090 | 0.031 | 0.090 | 0.049 | 0.006 | 0.016 | 0.056 |
| 120-hr event | T11-13865 | ODEQ | Zn | 30 | 0.996 | 0.072 | 0.019 | 0.938 | 0.049 | 0.017 | 0.946 |
| 120-hr event | T11-13865 | ODEQ | As | 33 | 0.045 | 0.008 | 0.021 | 0.024 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13865 | ODEQ | Se | 34 | 0.039 | 0.006 | 0.017 | 0.044 | 0.012 | 0.013 | ----- |
| 120-hr event | T11-13865 | ODEQ | Br | 35 | 0.150 | 0.012 | 0.013 | 0.185 | 0.018 | 0.013 | 0.173 |
| 120-hr event | T11-13865 | ODEQ | Rb | 37 | <0.007 | 0.002 | 0.007 | 0.006 | 0.012 | 0.019 | ----- |
| 120-hr event | T11-13865 | ODEQ | Sr | 38 | <0.024 | 0.008 | 0.024 | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13865 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13865 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| 120-hr event | T11-13865 | ODEQ | Cd | 48 | <0.142 | 0.049 | 0.142 | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13865 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.050 | 0.154 | ----- |
| 120-hr event | T11-13865 | ODEQ | Sn | 50 | <0.284 | 0.093 | 0.284 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13865 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.000 | 0.100 | 0.377 | ----- |
| 120-hr event | T11-13865 | ODEQ | Cs | 55 | <0.089 | 0.030 | 0.089 | 0.058 | 0.063 | 0.110 | ----- |
| 120-hr event | T11-13865 | ODEQ | Ba | 56 | 0.108 | 0.031 | 0.089 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13865 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13865 | ODEQ | Pb | 82 | 0.196 | 0.020 | 0.045 | 0.160 | 0.036 | 0.025 | ----- |
| 120-hr event | T11-13866 | AQMD | Na | 11 | ----- | ----- | ----- | 2.949 | 0.272 | 0.303 | ----- |
| 120-hr event | T11-13866 | AQMD | Mg | 12 | 1.100 | ----- | 0.339 | 0.449 | 0.059 | 0.114 | ----- |
| 120-hr event | T11-13866 | AQMD | Al | 13 | 3.280 | ----- | 0.565 | 1.514 | 0.179 | 0.129 | 1.755 |

## 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 | |
| 120-hr event | T11-13866 | AQMD | Si | 14 | 7.890 | ----- | 0.113 | 7.085 | 0.480 | 0.093 | 7.000 |
| 120-hr event | T11-13866 | AQMD | P | 15 | 2.670 | ----- | 0.023 | 0.000 | 0.100 | 0.155 | ----- |
| 120-hr event | T11-13866 | AQMD | S | 16 | 81.800 | ----- | 0.113 | 82.117 | 4.117 | 0.095 | 82.244 |
| 120-hr event | T11-13866 | AQMD | Cl | 17 | < 0.1 | ----- | 0.113 | 0.391 | 0.038 | 0.075 | ----- |
| 120-hr event | T11-13866 | AQMD | K | 19 | 3.320 | ----- | 0.113 | 3.591 | 0.182 | 0.070 | 3.540 |
| 120-hr event | T11-13866 | AQMD | Ca | 20 | 1.660 | ----- | 0.113 | 1.938 | 0.100 | 0.073 | 1.911 |
| 120-hr event | T11-13866 | AQMD | Ti | 22 | 0.187 | ----- | 0.113 | 0.193 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13866 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.044 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13866 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.013 | 0.009 | 0.025 | ----- |
| 120-hr event | T11-13866 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.065 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13866 | AQMD | Fe | 26 | 2.330 | ----- | 0.113 | 2.158 | 0.110 | 0.016 | 2.113 |
| 120-hr event | T11-13866 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.009 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13866 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.006 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13866 | AQMD | Cu | 29 | 0.058 | ----- | 0.113 | 0.057 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13866 | AQMD | Zn | 30 | 0.804 | ----- | 0.023 | 0.951 | 0.049 | 0.017 | 0.946 |
| 120-hr event | T11-13866 | AQMD | As | 33 | < 0.1 | ----- | 0.113 | 0.023 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13866 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.029 | 0.010 | 0.013 | ----- |
| 120-hr event | T11-13866 | AQMD | Br | 35 | 0.176 | ----- | 0.113 | 0.195 | 0.019 | 0.013 | 0.173 |
| 120-hr event | T11-13866 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.010 | 0.012 | 0.019 | ----- |
| 120-hr event | T11-13866 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.111 | 0.103 | 0.023 | ----- |
| 120-hr event | T11-13866 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13866 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.000 | 0.046 | 0.126 | ----- |
| 120-hr event | T11-13866 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.034 | 0.192 | 0.166 | ----- |
| 120-hr event | T11-13866 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.000 | 0.050 | 0.154 | ----- |
| 120-hr event | T11-13866 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13866 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.000 | 0.100 | 0.377 | ----- |
| 120-hr event | T11-13866 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13866 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.045 | 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 | |
| 120-hr event | T11-13866 | AQMD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13866 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.148 | 0.036 | 0.025 | ----- |
| 120-hr event | T11-13867 | AQMD | Na | 11 | ----- | ----- | ----- | 2.644 | 0.250 | 0.303 | ----- |
| 120-hr event | T11-13867 | AQMD | Mg | 12 | 1.510 | ----- | 0.339 | 0.372 | 0.056 | 0.114 | ----- |
| 120-hr event | T11-13867 | AQMD | Al | 13 | 3.240 | ----- | 0.565 | 1.424 | 0.175 | 0.129 | 1.755 |
| 120-hr event | T11-13867 | AQMD | Si | 14 | 7.380 | ----- | 0.113 | 6.788 | 0.461 | 0.093 | 7.000 |
| 120-hr event | T11-13867 | AQMD | P | 15 | 2.440 | ----- | 0.023 | 0.034 | 0.101 | 0.155 | ----- |
| 120-hr event | T11-13867 | AQMD | S | 16 | 73.200 | ----- | 0.113 | 77.914 | 3.906 | 0.095 | 82.244 |
| 120-hr event | T11-13867 | AQMD | Cl | 17 | < 0.1 | ----- | 0.113 | 0.416 | 0.039 | 0.075 | ----- |
| 120-hr event | T11-13867 | AQMD | K | 19 | 3.110 | ----- | 0.113 | 3.483 | 0.177 | 0.070 | 3.540 |
| 120-hr event | T11-13867 | AQMD | Ca | 20 | 1.780 | ----- | 0.113 | 1.833 | 0.094 | 0.073 | 1.911 |
| 120-hr event | T11-13867 | AQMD | Ti | 22 | 0.203 | ----- | 0.113 | 0.176 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13867 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.049 | 0.017 | 0.037 | ----- |
| 120-hr event | T11-13867 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.002 | 0.010 | 0.025 | ----- |
| 120-hr event | T11-13867 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.053 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13867 | AQMD | Fe | 26 | 2.140 | ----- | 0.113 | 2.016 | 0.103 | 0.016 | 2.113 |
| 120-hr event | T11-13867 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13867 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.002 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13867 | AQMD | Cu | 29 | 0.062 | ----- | 0.113 | 0.047 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13867 | AQMD | Zn | 30 | 0.766 | ----- | 0.023 | 0.893 | 0.047 | 0.017 | 0.946 |
| 120-hr event | T11-13867 | AQMD | As | 33 | < 0.1 | ----- | 0.113 | 0.017 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13867 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.029 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13867 | AQMD | Br | 35 | 0.157 | ----- | 0.113 | 0.172 | 0.018 | 0.013 | 0.173 |
| 120-hr event | T11-13867 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13867 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13867 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13867 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.034 | 0.158 | 0.126 | ----- |
| 120-hr event | T11-13867 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.000 | 0.048 | 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 | |
| 120-hr event | T11-13867 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13867 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.068 | 0.373 | 0.196 | ----- |
| 120-hr event | T11-13867 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.000 | 0.115 | 0.377 | ----- |
| 120-hr event | T11-13867 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13867 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13867 | AQMD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13867 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.122 | 0.034 | 0.025 | ----- |
| 120-hr event | T11-13868 | UCD | Na | 11 | 12.721 | ----- | ----- | 2.554 | 0.244 | 0.303 | ----- |
| 120-hr event | T11-13868 | UCD | Mg | 12 | 2.793 | ----- | ----- | 0.293 | 0.054 | 0.114 | ----- |
| 120-hr event | T11-13868 | UCD | Al | 13 | 3.311 | ----- | ----- | 1.051 | 0.163 | 0.129 | 1.755 |
| 120-hr event | T11-13868 | UCD | Si | 14 | 7.297 | ----- | ----- | 6.183 | 0.422 | 0.093 | 7.000 |
| 120-hr event | T11-13868 | UCD | P | 15 | 0.000 | ----- | ----- | 0.000 | 0.098 | 0.155 | ----- |
| 120-hr event | T11-13868 | UCD | S | 16 | 77.681 | ----- | ----- | 78.320 | 3.926 | 0.095 | 82.244 |
| 120-hr event | T11-13868 | UCD | Cl | 17 | 0.361 | ----- | ----- | 0.332 | 0.036 | 0.075 | ----- |
| 120-hr event | T11-13868 | UCD | K | 19 | 5.503 | ----- | ----- | 3.410 | 0.173 | 0.070 | 3.540 |
| 120-hr event | T11-13868 | UCD | Ca | 20 | 2.931 | ----- | ----- | 1.634 | 0.084 | 0.073 | 1.911 |
| 120-hr event | T11-13868 | UCD | Ti | 22 | 0.211 | ----- | ----- | 0.188 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13868 | UCD | V | 23 | 0.093 | ----- | ----- | 0.019 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13868 | UCD | Cr | 24 | 0.003 | ----- | ----- | 0.001 | 0.010 | 0.025 | ----- |
| 120-hr event | T11-13868 | UCD | Mn | 25 | 0.072 | ----- | ----- | 0.058 | 0.009 | 0.018 | ----- |
| 120-hr event | T11-13868 | UCD | Fe | 26 | 2.949 | ----- | ----- | 1.949 | 0.100 | 0.016 | 2.113 |
| 120-hr event | T11-13868 | UCD | Co | 27 | -0.014 | ----- | ----- | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13868 | UCD | Ni | 28 | 0.014 | ----- | ----- | 0.010 | 0.004 | 0.012 | ----- |
| 120-hr event | T11-13868 | UCD | Cu | 29 | 0.095 | ----- | ----- | 0.039 | 0.006 | 0.016 | 0.056 |
| 120-hr event | T11-13868 | UCD | Zn | 30 | 2.704 | ----- | ----- | 0.889 | 0.046 | 0.017 | 0.946 |
| 120-hr event | T11-13868 | UCD | As | 33 | -0.001 | ----- | ----- | 0.044 | 0.019 | 0.009 | ----- |
| 120-hr event | T11-13868 | UCD | Se | 34 | 0.044 | ----- | ----- | 0.027 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13868 | UCD | Br | 35 | 0.473 | ----- | ----- | 0.171 | 0.017 | 0.013 | 0.173 |

## 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 | |
| 120-hr event | T11-13868 | UCD | Rb | 37 | 0.030 | ----- | ----- | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13868 | UCD | Sr | 38 | 0.022 | ----- | ----- | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13868 | UCD | Zr | 40 | -0.225 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13868 | UCD | Ag | 47 | -0.027 | ----- | ----- | 0.045 | 0.147 | 0.126 | ----- |
| 120-hr event | T11-13868 | UCD | Cd | 48 | 0.097 | ----- | ----- | 0.079 | 0.192 | 0.166 | ----- |
| 120-hr event | T11-13868 | UCD | In | 49 | 0.365 | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| 120-hr event | T11-13868 | UCD | Sn | 50 | 0.013 | ----- | ----- | 0.000 | 0.086 | 0.196 | ----- |
| 120-hr event | T11-13868 | UCD | Sb | 51 | -0.094 | ----- | ----- | 0.158 | 0.463 | 0.377 | ----- |
| 120-hr event | T11-13868 | UCD | Cs | 55 | 0.084 | ----- | ----- | 0.011 | 0.063 | 0.110 | ----- |
| 120-hr event | T11-13868 | UCD | Ba | 56 | 0.261 | ----- | ----- | 0.000 | 0.032 | 0.105 | ----- |
| 120-hr event | T11-13868 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13868 | UCD | Pb | 82 | 0.121 | ----- | ----- | 0.155 | 0.036 | 0.025 | ----- |
| 120-hr event | T11-13869 | UCD | Na | 11 | 3.383 | ----- | ----- | 2.656 | 0.251 | 0.303 | ----- |
| 120-hr event | T11-13869 | UCD | Mg | 12 | 0.395 | ----- | ----- | 0.245 | 0.052 | 0.114 | ----- |
| 120-hr event | T11-13869 | UCD | Al | 13 | 2.894 | ----- | ----- | 1.322 | 0.172 | 0.129 | 1.755 |
| 120-hr event | T11-13869 | UCD | Si | 14 | 7.082 | ----- | ----- | 7.085 | 0.480 | 0.093 | 7.000 |
| 120-hr event | T11-13869 | UCD | P | 15 | 0.000 | ----- | ----- | 0.000 | 0.102 | 0.155 | ----- |
| 120-hr event | T11-13869 | UCD | S | 16 | 86.476 | ----- | ----- | 86.163 | 4.319 | 0.095 | 82.244 |
| 120-hr event | T11-13869 | UCD | Cl | 17 | 0.198 | ----- | ----- | 0.431 | 0.039 | 0.075 | ----- |
| 120-hr event | T11-13869 | UCD | K | 19 | 3.405 | ----- | ----- | 3.796 | 0.192 | 0.070 | 3.540 |
| 120-hr event | T11-13869 | UCD | Ca | 20 | 1.817 | ----- | ----- | 1.859 | 0.096 | 0.073 | 1.911 |
| 120-hr event | T11-13869 | UCD | Ti | 22 | 0.189 | ----- | ----- | 0.181 | 0.026 | 0.051 | 0.184 |
| 120-hr event | T11-13869 | UCD | V | 23 | 0.009 | ----- | ----- | 0.038 | 0.016 | 0.037 | ----- |
| 120-hr event | T11-13869 | UCD | Cr | 24 | 0.013 | ----- | ----- | 0.007 | 0.009 | 0.025 | ----- |
| 120-hr event | T11-13869 | UCD | Mn | 25 | 0.050 | ----- | ----- | 0.063 | 0.011 | 0.018 | ----- |
| 120-hr event | T11-13869 | UCD | Fe | 26 | 1.997 | ----- | ----- | 2.098 | 0.107 | 0.016 | 2.113 |
| 120-hr event | T11-13869 | UCD | Co | 27 | -0.005 | ----- | ----- | 0.000 | 0.007 | 0.013 | ----- |
| 120-hr event | T11-13869 | UCD | Ni | 28 | -0.005 | ----- | ----- | 0.011 | 0.004 | 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 | |
| 120-hr event | T11-13869 | UCD | Cu | 29 | 0.047 | ----- | ----- | 0.066 | 0.007 | 0.016 | 0.056 |
| 120-hr event | T11-13869 | UCD | Zn | 30 | 1.032 | ----- | ----- | 0.958 | 0.050 | 0.017 | 0.946 |
| 120-hr event | T11-13869 | UCD | As | 33 | -0.002 | ----- | ----- | 0.032 | 0.020 | 0.009 | ----- |
| 120-hr event | T11-13869 | UCD | Se | 34 | 0.052 | ----- | ----- | 0.032 | 0.011 | 0.013 | ----- |
| 120-hr event | T11-13869 | UCD | Br | 35 | 0.176 | ----- | ----- | 0.176 | 0.018 | 0.013 | 0.173 |
| 120-hr event | T11-13869 | UCD | Rb | 37 | 0.065 | ----- | ----- | 0.000 | 0.006 | 0.019 | ----- |
| 120-hr event | T11-13869 | UCD | Sr | 38 | 0.062 | ----- | ----- | 0.000 | 0.081 | 0.023 | ----- |
| 120-hr event | T11-13869 | UCD | Zr | 40 | 0.035 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| 120-hr event | T11-13869 | UCD | Ag | 47 | 0.045 | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| 120-hr event | T11-13869 | UCD | Cd | 48 | -0.056 | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| 120-hr event | T11-13869 | UCD | In | 49 | 0.232 | ----- | ----- | 0.000 | 0.069 | 0.154 | ----- |
| 120-hr event | T11-13869 | UCD | Sn | 50 | 0.114 | ----- | ----- | 0.147 | 0.362 | 0.196 | ----- |
| 120-hr event | T11-13869 | UCD | Sb | 51 | -0.098 | ----- | ----- | 0.000 | 0.115 | 0.377 | ----- |
| 120-hr event | T11-13869 | UCD | Cs | 55 | -0.467 | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| 120-hr event | T11-13869 | UCD | Ba | 56 | 0.240 | ----- | ----- | 0.000 | 0.045 | 0.105 | ----- |
| 120-hr event | T11-13869 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| 120-hr event | T11-13869 | UCD | Pb | 82 | 0.148 | ----- | ----- | 0.171 | 0.036 | 0.025 | ----- |
| blank filter | T11-13876 | CARB | Na | 11 | ----- | ----- | ----- | 0.000 | 0.095 | 0.303 | ----- |
| blank filter | T11-13876 | CARB | Mg | 12 | ----- | ----- | ----- | 0.000 | 0.030 | 0.114 | ----- |
| blank filter | T11-13876 | CARB | Al | 13 | <0.2 | ND | 0.200 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13876 | CARB | Si | 14 | <0.06 | ND | 0.060 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13876 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13876 | CARB | S | 16 | <0.05 | ND | 0.050 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13876 | CARB | Cl | 17 | <0.06 | ND | 0.060 | 0.000 | 0.015 | 0.075 | ----- |
| blank filter | T11-13876 | CARB | K | 19 | <0.07 | ND | 0.070 | 0.000 | 0.015 | 0.070 | ----- |
| blank filter | T11-13876 | CARB | Ca | 20 | <0.06 | ND | 0.060 | 0.000 | 0.015 | 0.073 | ----- |
| blank filter | T11-13876 | CARB | Ti | 22 | <0.04 | ND | 0.040 | 0.006 | 0.017 | 0.051 | ----- |
| blank filter | T11-13876 | CARB | V | 23 | <0.03 | ND | 0.030 | 0.000 | 0.011 | 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 | |
| blank filter | T11-13876 | CARB | Cr | 24 | <0.03 | ND | 0.030 | 0.005 | 0.008 | 0.025 | ----- |
| blank filter | T11-13876 | CARB | Mn | 25 | <0.03 | ND | 0.030 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13876 | CARB | Fe | 26 | <0.04 | ND | 0.040 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13876 | CARB | Co | 27 | <0.03 | ND | 0.030 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13876 | CARB | Ni | 28 | <0.03 | ND | 0.030 | 0.002 | 0.004 | 0.012 | ----- |
| blank filter | T11-13876 | CARB | Cu | 29 | <0.04 | ND | 0.040 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13876 | CARB | Zn | 30 | <0.02 | ND | 0.020 | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13876 | CARB | As | 33 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13876 | CARB | Se | 34 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13876 | CARB | Br | 35 | <0.02 | ND | 0.020 | 0.000 | 0.005 | 0.013 | ----- |
| blank filter | T11-13876 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13876 | CARB | Sr | 38 | <0.03 | ND | 0.030 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13876 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13876 | CARB | Ag | 47 | ----- | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13876 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13876 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13876 | CARB | Sn | 50 | <0.2 | ND | 0.200 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13876 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13876 | CARB | Cs | 55 | ----- | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13876 | CARB | Ba | 56 | <0.2 | ND | 0.200 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13876 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13876 | CARB | Pb | 82 | <0.03 | ND | 0.030 | 0.009 | 0.014 | 0.025 | ----- |
| blank filter | T11-13877 | CARB | Na | 11 | ----- | ----- | ----- | 0.000 | 0.095 | 0.303 | ----- |
| blank filter | T11-13877 | CARB | Mg | 12 | ----- | ----- | ----- | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13877 | CARB | Al | 13 | <0.2 | ND | 0.200 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13877 | CARB | Si | 14 | <0.06 | ND | 0.060 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13877 | CARB | P | 15 | <0.04 | ND | 0.040 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13877 | CARB | S | 16 | <0.05 | ND | 0.050 | 0.000 | 0.021 | 0.095 | ----- |

## 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 | T11-13877 | CARB | Cl | 17 | <0.06 | ND | 0.060 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13877 | CARB | K | 19 | <0.07 | ND | 0.070 | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13877 | CARB | Ca | 20 | <0.06 | ND | 0.060 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13877 | CARB | Ti | 22 | <0.04 | ND | 0.040 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13877 | CARB | V | 23 | <0.03 | ND | 0.030 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13877 | CARB | Cr | 24 | <0.03 | ND | 0.030 | 0.009 | 0.009 | 0.025 | ----- |
| blank filter | T11-13877 | CARB | Mn | 25 | <0.03 | ND | 0.030 | 0.001 | 0.006 | 0.018 | ----- |
| blank filter | T11-13877 | CARB | Fe | 26 | <0.04 | ND | 0.040 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13877 | CARB | Co | 27 | <0.03 | ND | 0.030 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13877 | CARB | Ni | 28 | <0.03 | ND | 0.030 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13877 | CARB | Cu | 29 | <0.04 | ND | 0.040 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13877 | CARB | Zn | 30 | <0.02 | ND | 0.020 | 0.001 | 0.006 | 0.017 | ----- |
| blank filter | T11-13877 | CARB | As | 33 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13877 | CARB | Se | 34 | <0.02 | ND | 0.020 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13877 | CARB | Br | 35 | <0.02 | ND | 0.020 | 0.000 | 0.005 | 0.013 | ----- |
| blank filter | T11-13877 | CARB | Rb | 37 | <0.02 | ND | 0.020 | 0.006 | 0.010 | 0.019 | ----- |
| blank filter | T11-13877 | CARB | Sr | 38 | <0.03 | ND | 0.030 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13877 | CARB | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13877 | CARB | Ag | 47 | ----- | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13877 | CARB | Cd | 48 | ----- | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13877 | CARB | In | 49 | ----- | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13877 | CARB | Sn | 50 | <0.2 | ND | 0.200 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13877 | CARB | Sb | 51 | <0.2 | ND | 0.200 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13877 | CARB | Cs | 55 | ----- | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13877 | CARB | Ba | 56 | <0.2 | ND | 0.200 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13877 | CARB | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13877 | CARB | Pb | 82 | <0.03 | ND | 0.030 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13878 | DRI | Na | 11 | 0.000 | 1.918 | 0.734 | 0.000 | 0.095 | 0.303 | ----- |

## 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 | T11-13878 | DRI | Mg | 12 | 0.605 | 0.397 | 0.503 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13878 | DRI | Al | 13 | 0.000 | 0.132 | 0.151 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13878 | DRI | Si | 14 | 0.000 | 0.017 | 0.077 | 0.043 | 0.035 | 0.093 | ----- |
| blank filter | T11-13878 | DRI | P | 15 | 0.046 | 0.017 | 0.013 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13878 | DRI | S | 16 | 0.000 | 0.136 | 0.012 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13878 | DRI | Cl | 17 | 0.000 | 0.017 | 0.032 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13878 | DRI | K | 19 | 0.000 | 0.017 | 0.018 | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13878 | DRI | Ca | 20 | 0.000 | 0.053 | 0.032 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13878 | DRI | Ti | 22 | 0.000 | 0.017 | 0.026 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13878 | DRI | V | 23 | 0.000 | 0.017 | 0.004 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13878 | DRI | Cr | 24 | 0.006 | 0.017 | 0.006 | 0.008 | 0.008 | 0.025 | ----- |
| blank filter | T11-13878 | DRI | Mn | 25 | 0.000 | 0.017 | 0.015 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13878 | DRI | Fe | 26 | 0.000 | 0.020 | 0.021 | 0.003 | 0.006 | 0.016 | ----- |
| blank filter | T11-13878 | DRI | Co | 27 | 0.000 | 0.017 | 0.004 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13878 | DRI | Ni | 28 | 0.000 | 0.017 | 0.005 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13878 | DRI | Cu | 29 | 0.000 | 0.017 | 0.015 | 0.005 | 0.005 | 0.016 | ----- |
| blank filter | T11-13878 | DRI | Zn | 30 | 0.000 | 0.017 | 0.013 | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13878 | DRI | As | 33 | 0.000 | 0.017 | 0.006 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13878 | DRI | Se | 34 | 0.014 | 0.017 | 0.040 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13878 | DRI | Br | 35 | 0.010 | 0.017 | 0.011 | 0.007 | 0.009 | 0.013 | ----- |
| blank filter | T11-13878 | DRI | Rb | 37 | 0.004 | 0.017 | 0.006 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13878 | DRI | Sr | 38 | 0.000 | 0.017 | 0.006 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13878 | DRI | Zr | 40 | 0.013 | 0.017 | 0.023 | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13878 | DRI | Ag | 47 | 0.000 | 0.017 | 0.040 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13878 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13878 | DRI | In | 49 | 0.000 | 0.017 | 0.047 | 0.068 | 0.237 | 0.154 | ----- |
| blank filter | T11-13878 | DRI | Sn | 50 | 0.000 | 0.026 | 0.062 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13878 | DRI | Sb | 51 | 0.018 | 0.098 | 0.071 | 0.000 | 0.100 | 0.377 | ----- |

## 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 | T11-13878 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13878 | DRI | Ba | 56 | 0.000 | 0.103 | 0.136 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13878 | DRI | Ce | 58 | 0.000 | 0.073 | 0.138 | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13878 | DRI | Pb | 82 | 0.006 | 0.028 | 0.021 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13879 | DRI | Na | 11 | 0.000 | 2.054 | 0.734 | 0.000 | 0.100 | 0.303 | ----- |
| blank filter | T11-13879 | DRI | Mg | 12 | 0.944 | 0.400 | 0.503 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13879 | DRI | Al | 13 | 0.343 | 0.135 | 0.151 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13879 | DRI | Si | 14 | 0.000 | 0.017 | 0.077 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13879 | DRI | P | 15 | 0.000 | 0.017 | 0.013 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13879 | DRI | S | 16 | 0.000 | 0.136 | 0.012 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13879 | DRI | Cl | 17 | 0.023 | 0.017 | 0.032 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13879 | DRI | K | 19 | 0.015 | 0.017 | 0.018 | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13879 | DRI | Ca | 20 | 0.007 | 0.053 | 0.032 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13879 | DRI | Ti | 22 | 0.000 | 0.017 | 0.026 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13879 | DRI | V | 23 | 0.000 | 0.017 | 0.004 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13879 | DRI | Cr | 24 | 0.022 | 0.017 | 0.006 | 0.012 | 0.009 | 0.025 | ----- |
| blank filter | T11-13879 | DRI | Mn | 25 | 0.000 | 0.017 | 0.015 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13879 | DRI | Fe | 26 | 0.000 | 0.020 | 0.021 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13879 | DRI | Co | 27 | 0.000 | 0.017 | 0.004 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13879 | DRI | Ni | 28 | 0.000 | 0.017 | 0.005 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13879 | DRI | Cu | 29 | 0.000 | 0.017 | 0.015 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13879 | DRI | Zn | 30 | 0.000 | 0.017 | 0.013 | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13879 | DRI | As | 33 | 0.000 | 0.017 | 0.006 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13879 | DRI | Se | 34 | 0.000 | 0.017 | 0.040 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13879 | DRI | Br | 35 | 0.000 | 0.017 | 0.011 | 0.006 | 0.009 | 0.013 | ----- |
| blank filter | T11-13879 | DRI | Rb | 37 | 0.000 | 0.017 | 0.006 | 0.008 | 0.010 | 0.019 | ----- |
| blank filter | T11-13879 | DRI | Sr | 38 | 0.000 | 0.017 | 0.006 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13879 | DRI | Zr | 40 | 0.000 | 0.017 | 0.023 | 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 | |
| blank filter | T11-13879 | DRI | Ag | 47 | 0.000 | 0.017 | 0.040 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13879 | DRI | Cd | 48 | 0.000 | 0.017 | 0.057 | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13879 | DRI | In | 49 | 0.007 | 0.017 | 0.047 | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13879 | DRI | Sn | 50 | 0.000 | 0.025 | 0.062 | 0.023 | 0.339 | 0.196 | ----- |
| blank filter | T11-13879 | DRI | Sb | 51 | 0.000 | 0.098 | 0.071 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13879 | DRI | Cs | 55 | 0.000 | 0.166 | 0.012 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13879 | DRI | Ba | 56 | 0.000 | 0.101 | 0.136 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13879 | DRI | Ce | 58 | 0.000 | 0.072 | 0.138 | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13879 | DRI | Pb | 82 | 0.000 | 0.028 | 0.021 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13880 | ODEQ | Na | 11 | <0.626 | 0.213 | 0.626 | 0.000 | 0.100 | 0.303 | ----- |
| blank filter | T11-13880 | ODEQ | Mg | 12 | <0.260 | 0.088 | 0.260 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13880 | ODEQ | Al | 13 | <0.355 | 0.130 | 0.355 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13880 | ODEQ | Si | 14 | <0.074 | 0.025 | 0.075 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13880 | ODEQ | P | 15 | <0.13 | 0.045 | 0.130 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13880 | ODEQ | S | 16 | <0.047 | 0.017 | 0.047 | 0.001 | 0.019 | 0.095 | ----- |
| blank filter | T11-13880 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13880 | ODEQ | K | 19 | <0.034 | 0.011 | 0.034 | 0.000 | 0.018 | 0.070 | ----- |
| blank filter | T11-13880 | ODEQ | Ca | 20 | <0.046 | 0.015 | 0.046 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13880 | ODEQ | Ti | 22 | <0.045 | 0.015 | 0.045 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13880 | ODEQ | V | 23 | <0.022 | 0.008 | 0.023 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13880 | ODEQ | Cr | 24 | <0.024 | 0.008 | 0.024 | 0.000 | 0.008 | 0.025 | ----- |
| blank filter | T11-13880 | ODEQ | Mn | 25 | <0.012 | 0.004 | 0.012 | 0.007 | 0.006 | 0.018 | ----- |
| blank filter | T11-13880 | ODEQ | Fe | 26 | <0.033 | 0.011 | 0.033 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13880 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13880 | ODEQ | Ni | 28 | <0.006 | 0.002 | 0.006 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13880 | ODEQ | Cu | 29 | <0.090 | 0.031 | 0.090 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13880 | ODEQ | Zn | 30 | <0.019 | 0.006 | 0.019 | 0.000 | 0.005 | 0.017 | ----- |
| blank filter | T11-13880 | ODEQ | As | 33 | <0.021 | 0.007 | 0.021 | 0.003 | 0.008 | 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 | |
| blank filter | T11-13880 | ODEQ | Se | 34 | <0.016 | 0.005 | 0.017 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13880 | ODEQ | Br | 35 | <0.013 | 0.004 | 0.013 | 0.017 | 0.008 | 0.013 | ----- |
| blank filter | T11-13880 | ODEQ | Rb | 37 | 0.011 | 0.003 | 0.007 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13880 | ODEQ | Sr | 38 | <0.024 | 0.008 | 0.024 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13880 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13880 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13880 | ODEQ | Cd | 48 | <0.142 | 0.050 | 0.142 | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13880 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13880 | ODEQ | Sn | 50 | <0.284 | 0.093 | 0.284 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13880 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.036 | 0.452 | 0.377 | ----- |
| blank filter | T11-13880 | ODEQ | Cs | 55 | <0.089 | 0.030 | 0.089 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13880 | ODEQ | Ba | 56 | <0.089 | 0.030 | 0.089 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13880 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13880 | ODEQ | Pb | 82 | <0.045 | 0.015 | 0.045 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13881 | ODEQ | Na | 11 | <0.626 | 0.213 | 0.626 | 0.000 | 0.100 | 0.303 | ----- |
| blank filter | T11-13881 | ODEQ | Mg | 12 | <0.260 | 0.091 | 0.260 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13881 | ODEQ | Al | 13 | <0.355 | 0.130 | 0.355 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13881 | ODEQ | Si | 14 | <0.074 | 0.025 | 0.075 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13881 | ODEQ | P | 15 | <0.13 | 0.045 | 0.130 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13881 | ODEQ | S | 16 | <0.047 | 0.015 | 0.047 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13881 | ODEQ | Cl | 17 | <0.079 | 0.026 | 0.079 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13881 | ODEQ | K | 19 | <0.034 | 0.011 | 0.034 | 0.015 | 0.014 | 0.070 | ----- |
| blank filter | T11-13881 | ODEQ | Ca | 20 | <0.046 | 0.015 | 0.046 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13881 | ODEQ | Ti | 22 | <0.045 | 0.015 | 0.045 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13881 | ODEQ | V | 23 | <0.022 | 0.007 | 0.023 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13881 | ODEQ | Cr | 24 | <0.024 | 0.008 | 0.024 | 0.014 | 0.009 | 0.025 | ----- |
| blank filter | T11-13881 | ODEQ | Mn | 25 | <0.012 | 0.004 | 0.012 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13881 | ODEQ | Fe | 26 | <0.033 | 0.011 | 0.033 | 0.000 | 0.005 | 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 | |
| blank filter | T11-13881 | ODEQ | Co | 27 | <0.013 | 0.004 | 0.013 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13881 | ODEQ | Ni | 28 | <0.006 | 0.002 | 0.006 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13881 | ODEQ | Cu | 29 | <0.090 | 0.031 | 0.090 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13881 | ODEQ | Zn | 30 | <0.019 | 0.006 | 0.019 | 0.000 | 0.005 | 0.017 | ----- |
| blank filter | T11-13881 | ODEQ | As | 33 | <0.021 | 0.007 | 0.021 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13881 | ODEQ | Se | 34 | <0.016 | 0.005 | 0.017 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13881 | ODEQ | Br | 35 | <0.013 | 0.004 | 0.013 | 0.008 | 0.008 | 0.013 | ----- |
| blank filter | T11-13881 | ODEQ | Rb | 37 | <0.007 | 0.002 | 0.007 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13881 | ODEQ | Sr | 38 | <0.024 | 0.008 | 0.024 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13881 | ODEQ | Zr | 40 | <0.089 | 0.030 | 0.089 | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13881 | ODEQ | Ag | 47 | <0.26 | 0.089 | 0.260 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13881 | ODEQ | Cd | 48 | <0.142 | 0.049 | 0.142 | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13881 | ODEQ | In | 49 | <0.402 | 0.130 | 0.402 | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13881 | ODEQ | Sn | 50 | <0.284 | 0.093 | 0.284 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13881 | ODEQ | Sb | 51 | <0.981 | 0.331 | 0.981 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13881 | ODEQ | Cs | 55 | <0.089 | 0.030 | 0.089 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13881 | ODEQ | Ba | 56 | <0.089 | 0.030 | 0.089 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13881 | ODEQ | Ce | 58 | <0.089 | 0.030 | 0.089 | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13881 | ODEQ | Pb | 82 | <0.045 | 0.014 | 0.045 | 0.002 | 0.014 | 0.025 | ----- |
| blank filter | T11-13882 | AQMD | Na | 11 | ----- | ----- | ----- | 0.000 | 0.095 | 0.303 | ----- |
| blank filter | T11-13882 | AQMD | Mg | 12 | < 0.3 | ----- | 0.339 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13882 | AQMD | Al | 13 | < 0.6 | ----- | 0.565 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13882 | AQMD | Si | 14 | < 0.1 | ----- | 0.113 | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13882 | AQMD | P | 15 | < 0.02 | ----- | 0.023 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13882 | AQMD | S | 16 | < 0.1 | ----- | 0.113 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13882 | AQMD | Cl | 17 | < 0.1 | ----- | 0.113 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13882 | AQMD | K | 19 | < 0.1 | ----- | 0.113 | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13882 | AQMD | Ca | 20 | < 0.1 | ----- | 0.113 | 0.000 | 0.016 | 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 | T11-13882 | AQMD | Ti | 22 | < 0.1 | ----- | 0.113 | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13882 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13882 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.000 | 0.008 | 0.025 | ----- |
| blank filter | T11-13882 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13882 | AQMD | Fe | 26 | < 0.1 | ----- | 0.113 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13882 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13882 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13882 | AQMD | Cu | 29 | < 0.1 | ----- | 0.113 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13882 | AQMD | Zn | 30 | < 0.02 | ----- | 0.023 | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13882 | AQMD | As | 33 | < 0.1 | ----- | 0.113 | 0.006 | 0.012 | 0.009 | ----- |
| blank filter | T11-13882 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13882 | AQMD | Br | 35 | < 0.1 | ----- | 0.113 | 0.000 | 0.005 | 0.013 | ----- |
| blank filter | T11-13882 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13882 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13882 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13882 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13882 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.079 | 0.181 | 0.166 | ----- |
| blank filter | T11-13882 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.012 | 0.237 | 0.154 | ----- |
| blank filter | T11-13882 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.027 | 0.339 | 0.196 | ----- |
| blank filter | T11-13882 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13882 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13882 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13882 | AQMD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13882 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13883 | AQMD | Na | 11 | ----- | ----- | ----- | 0.000 | 0.100 | 0.303 | ----- |
| blank filter | T11-13883 | AQMD | Mg | 12 | < 0.3 | ----- | 0.339 | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13883 | AQMD | Al | 13 | < 0.6 | ----- | 0.565 | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13883 | AQMD | Si | 14 | < 0.1 | ----- | 0.113 | 0.007 | 0.035 | 0.093 | ----- |

## 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 | T11-13883 | AQMD | P | 15 | < 0.02 | ----- | 0.023 | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13883 | AQMD | S | 16 | < 0.1 | ----- | 0.113 | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13883 | AQMD | Cl | 17 | < 0.1 | ----- | 0.113 | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13883 | AQMD | K | 19 | < 0.1 | ----- | 0.113 | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13883 | AQMD | Ca | 20 | < 0.1 | ----- | 0.113 | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13883 | AQMD | Ti | 22 | < 0.1 | ----- | 0.113 | 0.010 | 0.018 | 0.051 | ----- |
| blank filter | T11-13883 | AQMD | V | 23 | < 0.1 | ----- | 0.113 | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13883 | AQMD | Cr | 24 | < 0.1 | ----- | 0.113 | 0.000 | 0.008 | 0.025 | ----- |
| blank filter | T11-13883 | AQMD | Mn | 25 | < 0.3 | ----- | 0.339 | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13883 | AQMD | Fe | 26 | < 0.1 | ----- | 0.113 | 0.000 | 0.005 | 0.016 | ----- |
| blank filter | T11-13883 | AQMD | Co | 27 | < 0.1 | ----- | 0.113 | 0.001 | 0.005 | 0.013 | ----- |
| blank filter | T11-13883 | AQMD | Ni | 28 | < 0.1 | ----- | 0.113 | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13883 | AQMD | Cu | 29 | < 0.1 | ----- | 0.113 | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13883 | AQMD | Zn | 30 | < 0.02 | ----- | 0.023 | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13883 | AQMD | As | 33 | < 0.1 | ----- | 0.113 | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13883 | AQMD | Se | 34 | < 0.2 | ----- | 0.226 | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13883 | AQMD | Br | 35 | < 0.1 | ----- | 0.113 | 0.005 | 0.008 | 0.013 | ----- |
| blank filter | T11-13883 | AQMD | Rb | 37 | < 0.1 | ----- | 0.113 | 0.000 | 0.004 | 0.019 | ----- |
| blank filter | T11-13883 | AQMD | Sr | 38 | < 0.1 | ----- | 0.113 | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13883 | AQMD | Zr | 40 | ----- | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13883 | AQMD | Ag | 47 | < 0.2 | ----- | 0.226 | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13883 | AQMD | Cd | 48 | < 0.2 | ----- | 0.226 | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13883 | AQMD | In | 49 | < 0.9 | ----- | 0.904 | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13883 | AQMD | Sn | 50 | < 0.3 | ----- | 0.339 | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13883 | AQMD | Sb | 51 | < 0.3 | ----- | 0.339 | 0.000 | 0.100 | 0.377 | ----- |
| blank filter | T11-13883 | AQMD | Cs | 55 | < 0.7 | ----- | 0.678 | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13883 | AQMD | Ba | 56 | < 0.8 | ----- | 0.791 | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13883 | AQMD | 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 | |
| blank filter | T11-13883 | AQMD | Pb | 82 | < 0.3 | ----- | 0.339 | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13884 | UCD | Na | 11 | -0.670 | ----- | ----- | 0.000 | 0.095 | 0.303 | ----- |
| blank filter | T11-13884 | UCD | Mg | 12 | -0.162 | ----- | ----- | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13884 | UCD | Al | 13 | 0.137 | ----- | ----- | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13884 | UCD | Si | 14 | 0.068 | ----- | ----- | 0.000 | 0.042 | 0.093 | ----- |
| blank filter | T11-13884 | UCD | P | 15 | 0.049 | ----- | ----- | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13884 | UCD | S | 16 | 0.000 | ----- | ----- | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13884 | UCD | Cl | 17 | 0.007 | ----- | ----- | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13884 | UCD | K | 19 | 0.013 | ----- | ----- | 0.000 | 0.017 | 0.070 | ----- |
| blank filter | T11-13884 | UCD | Ca | 20 | -0.004 | ----- | ----- | 0.000 | 0.016 | 0.073 | ----- |
| blank filter | T11-13884 | UCD | Ti | 22 | 0.000 | ----- | ----- | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13884 | UCD | V | 23 | -0.010 | ----- | ----- | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13884 | UCD | Cr | 24 | -0.004 | ----- | ----- | 0.004 | 0.009 | 0.025 | ----- |
| blank filter | T11-13884 | UCD | Mn | 25 | -0.019 | ----- | ----- | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13884 | UCD | Fe | 26 | 0.093 | ----- | ----- | 0.101 | 0.009 | 0.016 | ----- |
| blank filter | T11-13884 | UCD | Co | 27 | -0.013 | ----- | ----- | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13884 | UCD | Ni | 28 | -0.009 | ----- | ----- | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13884 | UCD | Cu | 29 | -0.011 | ----- | ----- | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13884 | UCD | Zn | 30 | 0.032 | ----- | ----- | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13884 | UCD | As | 33 | 0.001 | ----- | ----- | 0.003 | 0.008 | 0.009 | ----- |
| blank filter | T11-13884 | UCD | Se | 34 | 0.046 | ----- | ----- | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13884 | UCD | Br | 35 | 0.058 | ----- | ----- | 0.004 | 0.009 | 0.013 | ----- |
| blank filter | T11-13884 | UCD | Rb | 37 | 0.015 | ----- | ----- | 0.002 | 0.010 | 0.019 | ----- |
| blank filter | T11-13884 | UCD | Sr | 38 | 0.005 | ----- | ----- | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13884 | UCD | Zr | 40 | -0.185 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13884 | UCD | Ag | 47 | 0.149 | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13884 | UCD | Cd | 48 | 0.100 | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13884 | UCD | In | 49 | 0.346 | ----- | ----- | 0.000 | 0.050 | 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 | T11-13884 | UCD | Sn | 50 | 0.163 | ----- | ----- | 0.000 | 0.086 | 0.196 | ----- |
| blank filter | T11-13884 | UCD | Sb | 51 | -0.058 | ----- | ----- | 0.016 | 0.475 | 0.377 | ----- |
| blank filter | T11-13884 | UCD | Cs | 55 | -0.380 | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13884 | UCD | Ba | 56 | 0.056 | ----- | ----- | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13884 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13884 | UCD | Pb | 82 | -0.076 | ----- | ----- | 0.000 | 0.013 | 0.025 | ----- |
| blank filter | T11-13885 | UCD | Na | 11 | -0.659 | ----- | ----- | 0.000 | 0.095 | 0.303 | ----- |
| blank filter | T11-13885 | UCD | Mg | 12 | 0.200 | ----- | ----- | 0.000 | 0.032 | 0.114 | ----- |
| blank filter | T11-13885 | UCD | Al | 13 | -0.060 | ----- | ----- | 0.000 | 0.085 | 0.129 | ----- |
| blank filter | T11-13885 | UCD | Si | 14 | 0.000 | ----- | ----- | 0.008 | 0.034 | 0.093 | ----- |
| blank filter | T11-13885 | UCD | P | 15 | 0.005 | ----- | ----- | 0.000 | 0.031 | 0.155 | ----- |
| blank filter | T11-13885 | UCD | S | 16 | 0.000 | ----- | ----- | 0.000 | 0.021 | 0.095 | ----- |
| blank filter | T11-13885 | UCD | Cl | 17 | -0.005 | ----- | ----- | 0.000 | 0.019 | 0.075 | ----- |
| blank filter | T11-13885 | UCD | K | 19 | 0.005 | ----- | ----- | 0.001 | 0.014 | 0.070 | ----- |
| blank filter | T11-13885 | UCD | Ca | 20 | -0.026 | ----- | ----- | 0.000 | 0.015 | 0.073 | ----- |
| blank filter | T11-13885 | UCD | Ti | 22 | 0.000 | ----- | ----- | 0.000 | 0.013 | 0.051 | ----- |
| blank filter | T11-13885 | UCD | V | 23 | -0.010 | ----- | ----- | 0.000 | 0.011 | 0.037 | ----- |
| blank filter | T11-13885 | UCD | Cr | 24 | -0.006 | ----- | ----- | 0.003 | 0.009 | 0.025 | ----- |
| blank filter | T11-13885 | UCD | Mn | 25 | -0.032 | ----- | ----- | 0.000 | 0.006 | 0.018 | ----- |
| blank filter | T11-13885 | UCD | Fe | 26 | 0.084 | ----- | ----- | 0.039 | 0.007 | 0.016 | ----- |
| blank filter | T11-13885 | UCD | Co | 27 | -0.009 | ----- | ----- | 0.000 | 0.004 | 0.013 | ----- |
| blank filter | T11-13885 | UCD | Ni | 28 | -0.010 | ----- | ----- | 0.000 | 0.003 | 0.012 | ----- |
| blank filter | T11-13885 | UCD | Cu | 29 | -0.023 | ----- | ----- | 0.000 | 0.004 | 0.016 | ----- |
| blank filter | T11-13885 | UCD | Zn | 30 | 0.022 | ----- | ----- | 0.000 | 0.004 | 0.017 | ----- |
| blank filter | T11-13885 | UCD | As | 33 | 0.001 | ----- | ----- | 0.000 | 0.006 | 0.009 | ----- |
| blank filter | T11-13885 | UCD | Se | 34 | -0.017 | ----- | ----- | 0.000 | 0.006 | 0.013 | ----- |
| blank filter | T11-13885 | UCD | Br | 35 | -0.004 | ----- | ----- | 0.000 | 0.005 | 0.013 | ----- |
| blank filter | T11-13885 | UCD | Rb | 37 | 0.034 | ----- | ----- | 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 | T11-13885 | UCD | Sr | 38 | 0.006 | ----- | ----- | 0.000 | 0.081 | 0.023 | ----- |
| blank filter | T11-13885 | UCD | Zr | 40 | -0.177 | ----- | ----- | 0.000 | 0.085 | 0.032 | ----- |
| blank filter | T11-13885 | UCD | Ag | 47 | 0.214 | ----- | ----- | 0.000 | 0.046 | 0.126 | ----- |
| blank filter | T11-13885 | UCD | Cd | 48 | 0.057 | ----- | ----- | 0.000 | 0.048 | 0.166 | ----- |
| blank filter | T11-13885 | UCD | In | 49 | 0.237 | ----- | ----- | 0.000 | 0.050 | 0.154 | ----- |
| blank filter | T11-13885 | UCD | Sn | 50 | 0.327 | ----- | ----- | 0.012 | 0.339 | 0.196 | ----- |
| blank filter | T11-13885 | UCD | Sb | 51 | 0.089 | ----- | ----- | 0.024 | 0.463 | 0.377 | ----- |
| blank filter | T11-13885 | UCD | Cs | 55 | -0.135 | ----- | ----- | 0.000 | 0.039 | 0.110 | ----- |
| blank filter | T11-13885 | UCD | Ba | 56 | 0.249 | ----- | ----- | 0.000 | 0.032 | 0.105 | ----- |
| blank filter | T11-13885 | UCD | Ce | 58 | ----- | ----- | ----- | 0.000 | 0.026 | 0.094 | ----- |
| blank filter | T11-13885 | UCD | Pb | 82 | -0.051 | ----- | ----- | 0.000 | 0.013 | 0.025 | ----- |

**** Median was calculated only when the result from 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) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 165-hr event | T11-13839 | DRI | Na | 11 | 0.000 | 1.701 | 0.219 | 18.532 | 1.788 | 0.155 | ----- |
| 165-hr event | T11-13839 | DRI | Mg | 12 | 0.716 | 0.110 | 0.151 | 3.405 | 0.768 | 0.304 | ----- |
| 165-hr event | T11-13839 | DRI | Al | 13 | 1.994 | 0.046 | 0.045 | 4.522 | 0.465 | 0.639 | 2.831 |
| 165-hr event | T11-13839 | DRI | Si | 14 | 4.852 | 0.029 | 0.023 | 9.521 | 0.649 | 0.074 | 7.300 |
| 165-hr event | T11-13839 | DRI | P | 15 | 0.000 | 0.005 | 0.004 | 0.344 | 0.127 | 0.018 | ----- |
| 165-hr event | T11-13839 | DRI | S | 16 | 67.564 | 0.285 | 0.004 | 81.498 | 2.009 | 0.018 | 63.986 |
| 165-hr event | T11-13839 | DRI | Cl | 17 | 0.311 | 0.005 | 0.009 | 0.564 | 0.025 | 0.014 | ----- |
| 165-hr event | T11-13839 | DRI | K | 19 | 4.476 | 0.011 | 0.005 | 5.720 | 0.137 | 0.007 | 4.438 |
| 165-hr event | T11-13839 | DRI | Ca | 20 | 2.617 | 0.022 | 0.009 | 3.288 | 0.086 | 0.021 | 3.304 |
| 165-hr event | T11-13839 | DRI | Ti | 22 | 0.243 | 0.005 | 0.008 | 0.191 | 0.013 | 0.032 | 0.272 |
| 165-hr event | T11-13839 | DRI | V | 23 | 0.098 | 0.005 | 0.001 | 0.103 | 0.008 | 0.011 | ----- |
| 165-hr event | T11-13839 | DRI | Cr | 24 | 0.005 | 0.005 | 0.002 | 0.018 | 0.004 | 0.011 | ----- |
| 165-hr event | T11-13839 | DRI | Mn | 25 | 0.093 | 0.005 | 0.005 | 0.113 | 0.015 | 0.028 | ----- |
| 165-hr event | T11-13839 | DRI | Fe | 26 | 2.917 | 0.011 | 0.006 | 3.087 | 0.095 | 0.032 | 3.428 |
| 165-hr event | T11-13839 | DRI | Ni | 28 | 0.028 | 0.005 | 0.001 | 0.043 | 0.007 | 0.007 | ----- |
| 165-hr event | T11-13839 | DRI | Cu | 29 | 0.152 | 0.005 | 0.005 | 0.189 | 0.010 | 0.018 | 0.154 |
| 165-hr event | T11-13839 | DRI | Zn | 30 | 2.728 | 0.012 | 0.004 | 2.991 | 0.086 | 0.014 | 2.871 |
| 165-hr event | T11-13839 | DRI | As | 33 | 0.000 | 0.005 | 0.002 | 0.070 | 0.014 | 0.049 | ----- |
| 165-hr event | T11-13839 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.065 | 0.012 | 0.035 | ----- |
| 165-hr event | T11-13839 | DRI | Br | 35 | 0.404 | 0.006 | 0.003 | 0.489 | 0.022 | 0.014 | 0.421 |
| 165-hr event | T11-13839 | DRI | Rb | 37 | 0.017 | 0.005 | 0.002 | 0.030 | 0.008 | 0.021 | ----- |
| 165-hr event | T11-13839 | DRI | Sr | 38 | 0.026 | 0.005 | 0.002 | 0.032 | 0.016 | 0.032 | ----- |
| 165-hr event | T11-13839 | DRI | Zr | 40 | 0.016 | 0.005 | 0.007 | 0.029 | 0.014 | 0.053 | ----- |
| 165-hr event | T11-13839 | DRI | Pb | 82 | 0.205 | 0.009 | 0.006 | 0.290 | 0.028 | 0.088 | ----- |
| 165-hr event | T11-13840 | DRI | Na | 11 | 0.000 | 1.741 | 0.219 | 18.232 | 1.663 | 0.155 | ----- |
| 165-hr event | T11-13840 | DRI | Mg | 12 | 0.200 | 0.106 | 0.151 | 1.379 | 1.040 | 0.304 | ----- |
| 165-hr event | T11-13840 | DRI | Al | 13 | 2.179 | 0.047 | 0.045 | 4.708 | 0.413 | 0.639 | 2.831 |
| 165-hr event | T11-13840 | DRI | Si | 14 | 5.424 | 0.032 | 0.023 | 10.683 | 0.709 | 0.074 | 7.300 |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 165-hr event | T11-13840 | DRI | P | 15 | 0.000 | 0.005 | 0.004 | 0.096 | 0.128 | 0.018 | ----- |
| 165-hr event | T11-13840 | DRI | S | 16 | 59.978 | 0.257 | 0.004 | 71.689 | 1.756 | 0.018 | 63.986 |
| 165-hr event | T11-13840 | DRI | Cl | 17 | 0.307 | 0.005 | 0.009 | 0.546 | 0.024 | 0.014 | ----- |
| 165-hr event | T11-13840 | DRI | K | 19 | 4.276 | 0.010 | 0.005 | 5.367 | 0.129 | 0.007 | 4.438 |
| 165-hr event | T11-13840 | DRI | Ca | 20 | 3.209 | 0.023 | 0.009 | 3.918 | 0.100 | 0.021 | 3.304 |
| 165-hr event | T11-13840 | DRI | Ti | 22 | 0.278 | 0.005 | 0.008 | 0.237 | 0.014 | 0.032 | 0.272 |
| 165-hr event | T11-13840 | DRI | V | 23 | 0.104 | 0.005 | 0.001 | 0.099 | 0.008 | 0.011 | ----- |
| 165-hr event | T11-13840 | DRI | Cr | 24 | 0.012 | 0.005 | 0.002 | 0.020 | 0.004 | 0.011 | ----- |
| 165-hr event | T11-13840 | DRI | Mn | 25 | 0.101 | 0.005 | 0.005 | 0.098 | 0.015 | 0.028 | ----- |
| 165-hr event | T11-13840 | DRI | Fe | 26 | 3.353 | 0.012 | 0.006 | 3.556 | 0.108 | 0.032 | 3.428 |
| 165-hr event | T11-13840 | DRI | Ni | 28 | 0.020 | 0.005 | 0.001 | 0.046 | 0.007 | 0.007 | ----- |
| 165-hr event | T11-13840 | DRI | Cu | 29 | 0.160 | 0.005 | 0.005 | 0.202 | 0.011 | 0.018 | 0.154 |
| 165-hr event | T11-13840 | DRI | Zn | 30 | 2.496 | 0.011 | 0.004 | 2.792 | 0.080 | 0.014 | 2.871 |
| 165-hr event | T11-13840 | DRI | As | 33 | 0.000 | 0.005 | 0.002 | 0.055 | 0.014 | 0.049 | ----- |
| 165-hr event | T11-13840 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.077 | 0.012 | 0.035 | ----- |
| 165-hr event | T11-13840 | DRI | Br | 35 | 0.379 | 0.006 | 0.003 | 0.428 | 0.020 | 0.014 | 0.421 |
| 165-hr event | T11-13840 | DRI | Rb | 37 | 0.000 | 0.005 | 0.002 | 0.032 | 0.008 | 0.021 | ----- |
| 165-hr event | T11-13840 | DRI | Sr | 38 | 0.017 | 0.005 | 0.002 | 0.064 | 0.017 | 0.032 | ----- |
| 165-hr event | T11-13840 | DRI | Zr | 40 | 0.023 | 0.005 | 0.007 | 0.025 | 0.013 | 0.053 | ----- |
| 165-hr event | T11-13840 | DRI | Pb | 82 | 0.240 | 0.009 | 0.006 | 0.270 | 0.028 | 0.088 | ----- |
| 165-hr event | T11-13841 | UCD | Na | 11 | 7.681 | ----- | ----- | 18.820 | 1.760 | 0.155 | ----- |
| 165-hr event | T11-13841 | UCD | Mg | 12 | 1.409 | ----- | ----- | 3.016 | 0.750 | 0.304 | ----- |
| 165-hr event | T11-13841 | UCD | Al | 13 | 3.861 | ----- | ----- | 4.201 | 0.456 | 0.639 | 2.831 |
| 165-hr event | T11-13841 | UCD | Si | 14 | 9.720 | ----- | ----- | 10.766 | 0.694 | 0.074 | 7.300 |
| 165-hr event | T11-13841 | UCD | P | 15 | 0.000 | ----- | ----- | 0.446 | 0.153 | 0.018 | ----- |
| 165-hr event | T11-13841 | UCD | S | 16 | 60.408 | ----- | ----- | 70.644 | 1.735 | 0.018 | 63.986 |
| 165-hr event | T11-13841 | UCD | Cl | 17 | 0.409 | ----- | ----- | 0.582 | 0.024 | 0.014 | ----- |
| 165-hr event | T11-13841 | UCD | K | 19 | 4.400 | ----- | ----- | 5.412 | 0.129 | 0.007 | 4.438 |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 165-hr event | T11-13841 | UCD | Ca | 20 | 3.400 | ----- | ----- | 4.016 | 0.102 | 0.021 | 3.304 |
| 165-hr event | T11-13841 | UCD | Ti | 22 | 0.278 | ----- | ----- | 0.240 | 0.014 | 0.032 | 0.272 |
| 165-hr event | T11-13841 | UCD | V | 23 | 0.150 | ----- | ----- | 0.106 | 0.008 | 0.011 | ----- |
| 165-hr event | T11-13841 | UCD | Cr | 24 | 0.011 | ----- | ----- | 0.016 | 0.004 | 0.011 | ----- |
| 165-hr event | T11-13841 | UCD | Mn | 25 | 0.119 | ----- | ----- | 0.105 | 0.015 | 0.028 | ----- |
| 165-hr event | T11-13841 | UCD | Fe | 26 | 3.504 | ----- | ----- | 3.733 | 0.112 | 0.032 | 3.428 |
| 165-hr event | T11-13841 | UCD | Ni | 28 | 0.036 | ----- | ----- | 0.040 | 0.007 | 0.007 | ----- |
| 165-hr event | T11-13841 | UCD | Cu | 29 | 0.156 | ----- | ----- | 0.198 | 0.011 | 0.018 | 0.154 |
| 165-hr event | T11-13841 | UCD | Zn | 30 | 3.020 | ----- | ----- | 2.920 | 0.084 | 0.014 | 2.871 |
| 165-hr event | T11-13841 | UCD | As | 33 | 0.037 | ----- | ----- | 0.064 | 0.014 | 0.049 | ----- |
| 165-hr event | T11-13841 | UCD | Se | 34 | 0.031 | ----- | ----- | 0.070 | 0.012 | 0.035 | ----- |
| 165-hr event | T11-13841 | UCD | Br | 35 | 0.450 | ----- | ----- | 0.435 | 0.021 | 0.014 | 0.421 |
| 165-hr event | T11-13841 | UCD | Rb | 37 | 0.008 | ----- | ----- | 0.033 | 0.008 | 0.021 | ----- |
| 165-hr event | T11-13841 | UCD | Sr | 38 | 0.039 | ----- | ----- | 0.076 | 0.018 | 0.032 | ----- |
| 165-hr event | T11-13841 | UCD | Zr | 40 | 0.062 | ----- | ----- | 0.047 | 0.014 | 0.053 | ----- |
| 165-hr event | T11-13841 | UCD | Pb | 82 | 0.277 | ----- | ----- | 0.278 | 0.028 | 0.088 | ----- |
| 165-hr event | T11-13842 | UCD | Na | 11 | 9.894 | ----- | ----- | 19.801 | 1.807 | 0.155 | ----- |
| 165-hr event | T11-13842 | UCD | Mg | 12 | 2.381 | ----- | ----- | 5.025 | 0.765 | 0.304 | ----- |
| 165-hr event | T11-13842 | UCD | Al | 13 | 3.484 | ----- | ----- | 5.485 | 0.444 | 0.639 | 2.831 |
| 165-hr event | T11-13842 | UCD | Si | 14 | 9.176 | ----- | ----- | 10.931 | 0.715 | 0.074 | 7.300 |
| 165-hr event | T11-13842 | UCD | P | 15 | 0.000 | ----- | ----- | 0.219 | 0.089 | 0.018 | ----- |
| 165-hr event | T11-13842 | UCD | S | 16 | 69.667 | ----- | ----- | 81.267 | 1.984 | 0.018 | 63.986 |
| 165-hr event | T11-13842 | UCD | Cl | 17 | 0.377 | ----- | ----- | 0.572 | 0.024 | 0.014 | ----- |
| 165-hr event | T11-13842 | UCD | K | 19 | 5.018 | ----- | ----- | 6.032 | 0.143 | 0.007 | 4.438 |
| 165-hr event | T11-13842 | UCD | Ca | 20 | 3.484 | ----- | ----- | 4.148 | 0.105 | 0.021 | 3.304 |
| 165-hr event | T11-13842 | UCD | Ti | 22 | 0.267 | ----- | ----- | 0.231 | 0.014 | 0.032 | 0.272 |
| 165-hr event | T11-13842 | UCD | V | 23 | 0.124 | ----- | ----- | 0.108 | 0.008 | 0.011 | ----- |
| 165-hr event | T11-13842 | UCD | Cr | 24 | 0.023 | ----- | ----- | 0.016 | 0.004 | 0.011 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 165-hr event | T11-13842 | UCD | Mn | 25 | 0.102 | ----- | ----- | 0.128 | 0.016 | 0.028 | ----- |
| 165-hr event | T11-13842 | UCD | Fe | 26 | 3.531 | ----- | ----- | 3.681 | 0.111 | 0.032 | 3.428 |
| 165-hr event | T11-13842 | UCD | Ni | 28 | 0.029 | ----- | ----- | 0.040 | 0.007 | 0.007 | ----- |
| 165-hr event | T11-13842 | UCD | Cu | 29 | 0.152 | ----- | ----- | 0.182 | 0.010 | 0.018 | 0.154 |
| 165-hr event | T11-13842 | UCD | Zn | 30 | 3.013 | ----- | ----- | 2.954 | 0.085 | 0.014 | 2.871 |
| 165-hr event | T11-13842 | UCD | As | 33 | 0.065 | ----- | ----- | 0.049 | 0.014 | 0.049 | ----- |
| 165-hr event | T11-13842 | UCD | Se | 34 | 0.021 | ----- | ----- | 0.067 | 0.012 | 0.035 | ----- |
| 165-hr event | T11-13842 | UCD | Br | 35 | 0.438 | ----- | ----- | 0.438 | 0.020 | 0.014 | 0.421 |
| 165-hr event | T11-13842 | UCD | Rb | 37 | -0.007 | ----- | ----- | 0.026 | 0.007 | 0.021 | ----- |
| 165-hr event | T11-13842 | UCD | Sr | 38 | 0.043 | ----- | ----- | 0.050 | 0.017 | 0.032 | ----- |
| 165-hr event | T11-13842 | UCD | Zr | 40 | 0.003 | ----- | ----- | 0.028 | 0.013 | 0.053 | ----- |
| 165-hr event | T11-13842 | UCD | Pb | 82 | 0.186 | ----- | ----- | 0.297 | 0.029 | 0.088 | ----- |
| 120-hr event | T11-13855 | DRI | Na | 11 | 0.000 | 1.952 | 0.219 | 4.876 | 0.615 | 0.155 | ----- |
| 120-hr event | T11-13855 | DRI | Mg | 12 | 0.427 | 0.108 | 0.151 | 2.895 | 0.366 | 0.304 | ----- |
| 120-hr event | T11-13855 | DRI | Al | 13 | 1.755 | 0.045 | 0.045 | 3.700 | 0.354 | 0.639 | 2.392 |
| 120-hr event | T11-13855 | DRI | Si | 14 | 5.241 | 0.031 | 0.023 | 10.230 | 0.696 | 0.074 | 7.003 |
| 120-hr event | T11-13855 | DRI | P | 15 | 0.000 | 0.005 | 0.004 | 0.428 | 0.132 | 0.018 | ----- |
| 120-hr event | T11-13855 | DRI | S | 16 | 78.781 | 0.328 | 0.004 | 94.728 | 2.333 | 0.018 | 78.413 |
| 120-hr event | T11-13855 | DRI | Cl | 17 | 0.180 | 0.005 | 0.009 | 0.289 | 0.017 | 0.014 | ----- |
| 120-hr event | T11-13855 | DRI | K | 19 | 2.948 | 0.008 | 0.005 | 3.718 | 0.091 | 0.007 | 2.971 |
| 120-hr event | T11-13855 | DRI | Ca | 20 | 1.952 | 0.020 | 0.009 | 2.348 | 0.065 | 0.021 | 2.098 |
| 120-hr event | T11-13855 | DRI | Ti | 22 | 0.178 | 0.005 | 0.008 | 0.168 | 0.012 | 0.032 | 0.195 |
| 120-hr event | T11-13855 | DRI | V | 23 | 0.027 | 0.005 | 0.001 | 0.030 | 0.005 | 0.011 | ----- |
| 120-hr event | T11-13855 | DRI | Cr | 24 | 0.009 | 0.005 | 0.002 | 0.012 | 0.003 | 0.011 | ----- |
| 120-hr event | T11-13855 | DRI | Mn | 25 | 0.040 | 0.005 | 0.005 | 0.088 | 0.013 | 0.028 | ----- |
| 120-hr event | T11-13855 | DRI | Fe | 26 | 2.319 | 0.010 | 0.006 | 2.492 | 0.079 | 0.032 | 2.415 |
| 120-hr event | T11-13855 | DRI | Ni | 28 | 0.007 | 0.005 | 0.001 | 0.010 | 0.005 | 0.007 | ----- |
| 120-hr event | T11-13855 | DRI | Cu | 29 | 0.068 | 0.005 | 0.005 | 0.085 | 0.007 | 0.018 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 120-hr event | T11-13855 | DRI | Zn | 30 | 1.162 | 0.008 | 0.004 | 1.238 | 0.038 | 0.014 | 1.170 |
| 120-hr event | T11-13855 | DRI | As | 33 | 0.000 | 0.005 | 0.002 | 0.032 | 0.014 | 0.049 | ----- |
| 120-hr event | T11-13855 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.074 | 0.012 | 0.035 | ----- |
| 120-hr event | T11-13855 | DRI | Br | 35 | 0.155 | 0.005 | 0.003 | 0.194 | 0.014 | 0.014 | 0.174 |
| 120-hr event | T11-13855 | DRI | Rb | 37 | 0.004 | 0.005 | 0.002 | 0.019 | 0.007 | 0.021 | ----- |
| 120-hr event | T11-13855 | DRI | Sr | 38 | 0.015 | 0.005 | 0.002 | 0.058 | 0.017 | 0.032 | ----- |
| 120-hr event | T11-13855 | DRI | Zr | 40 | 0.018 | 0.005 | 0.007 | 0.015 | 0.013 | 0.053 | ----- |
| 120-hr event | T11-13855 | DRI | Pb | 82 | 0.199 | 0.009 | 0.006 | 0.282 | 0.028 | 0.088 | ----- |
| 120-hr event | T11-13856 | DRI | Na | 11 | 0.000 | 1.789 | 0.219 | 6.025 | 0.712 | 0.155 | ----- |
| 120-hr event | T11-13856 | DRI | Mg | 12 | 0.000 | 0.103 | 0.151 | 1.907 | 0.356 | 0.304 | ----- |
| 120-hr event | T11-13856 | DRI | Al | 13 | 1.899 | 0.045 | 0.045 | 4.778 | 0.401 | 0.639 | 2.392 |
| 120-hr event | T11-13856 | DRI | Si | 14 | 5.349 | 0.032 | 0.023 | 11.304 | 0.642 | 0.074 | 7.003 |
| 120-hr event | T11-13856 | DRI | P | 15 | 0.000 | 0.005 | 0.004 | 0.129 | 0.128 | 0.018 | ----- |
| 120-hr event | T11-13856 | DRI | S | 16 | 74.657 | 0.312 | 0.004 | 90.468 | 2.233 | 0.018 | 78.413 |
| 120-hr event | T11-13856 | DRI | Cl | 17 | 0.169 | 0.005 | 0.009 | 0.305 | 0.017 | 0.014 | ----- |
| 120-hr event | T11-13856 | DRI | K | 19 | 2.846 | 0.008 | 0.005 | 3.577 | 0.088 | 0.007 | 2.971 |
| 120-hr event | T11-13856 | DRI | Ca | 20 | 2.117 | 0.020 | 0.009 | 2.668 | 0.072 | 0.021 | 2.098 |
| 120-hr event | T11-13856 | DRI | Ti | 22 | 0.191 | 0.005 | 0.008 | 0.178 | 0.012 | 0.032 | 0.195 |
| 120-hr event | T11-13856 | DRI | V | 23 | 0.033 | 0.005 | 0.001 | 0.036 | 0.006 | 0.011 | ----- |
| 120-hr event | T11-13856 | DRI | Cr | 24 | 0.010 | 0.005 | 0.002 | 0.008 | 0.003 | 0.011 | ----- |
| 120-hr event | T11-13856 | DRI | Mn | 25 | 0.052 | 0.005 | 0.005 | 0.104 | 0.014 | 0.028 | ----- |
| 120-hr event | T11-13856 | DRI | Fe | 26 | 2.413 | 0.011 | 0.006 | 2.778 | 0.086 | 0.032 | 2.415 |
| 120-hr event | T11-13856 | DRI | Ni | 28 | 0.006 | 0.005 | 0.001 | 0.014 | 0.005 | 0.007 | ----- |
| 120-hr event | T11-13856 | DRI | Cu | 29 | 0.067 | 0.005 | 0.005 | 0.085 | 0.007 | 0.018 | ----- |
| 120-hr event | T11-13856 | DRI | Zn | 30 | 0.974 | 0.007 | 0.004 | 1.133 | 0.035 | 0.014 | 1.170 |
| 120-hr event | T11-13856 | DRI | As | 33 | 0.004 | 0.005 | 0.002 | 0.040 | 0.014 | 0.049 | ----- |
| 120-hr event | T11-13856 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.066 | 0.012 | 0.035 | ----- |
| 120-hr event | T11-13856 | DRI | Br | 35 | 0.154 | 0.005 | 0.003 | 0.177 | 0.014 | 0.014 | 0.174 |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 120-hr event | T11-13856 | DRI | Rb | 37 | 0.000 | 0.005 | 0.002 | 0.022 | 0.007 | 0.021 | ----- |
| 120-hr event | T11-13856 | DRI | Sr | 38 | 0.012 | 0.005 | 0.002 | 0.050 | 0.016 | 0.032 | ----- |
| 120-hr event | T11-13856 | DRI | Zr | 40 | 0.022 | 0.005 | 0.007 | 0.014 | 0.013 | 0.053 | ----- |
| 120-hr event | T11-13856 | DRI | Pb | 82 | 0.182 | 0.009 | 0.006 | 0.250 | 0.027 | 0.088 | ----- |
| 120-hr event | T11-13857 | UCD | Na | 11 | 1.533 | ----- | ----- | 6.395 | 0.752 | 0.155 | ----- |
| 120-hr event | T11-13857 | UCD | Mg | 12 | 0.090 | ----- | ----- | 2.681 | 0.432 | 0.304 | ----- |
| 120-hr event | T11-13857 | UCD | Al | 13 | 2.889 | ----- | ----- | 4.563 | 0.444 | 0.639 | 2.392 |
| 120-hr event | T11-13857 | UCD | Si | 14 | 9.016 | ----- | ----- | 11.225 | 0.656 | 0.074 | 7.003 |
| 120-hr event | T11-13857 | UCD | P | 15 | 0.033 | ----- | ----- | 0.039 | 0.105 | 0.018 | ----- |
| 120-hr event | T11-13857 | UCD | S | 16 | 78.044 | ----- | ----- | 91.512 | 2.261 | 0.018 | 78.413 |
| 120-hr event | T11-13857 | UCD | Cl | 17 | 0.250 | ----- | ----- | 0.333 | 0.018 | 0.014 | ----- |
| 120-hr event | T11-13857 | UCD | K | 19 | 2.995 | ----- | ----- | 3.637 | 0.090 | 0.007 | 2.971 |
| 120-hr event | T11-13857 | UCD | Ca | 20 | 2.152 | ----- | ----- | 2.535 | 0.069 | 0.021 | 2.098 |
| 120-hr event | T11-13857 | UCD | Ti | 22 | 0.200 | ----- | ----- | 0.178 | 0.012 | 0.032 | 0.195 |
| 120-hr event | T11-13857 | UCD | V | 23 | 0.041 | ----- | ----- | 0.039 | 0.006 | 0.011 | ----- |
| 120-hr event | T11-13857 | UCD | Cr | 24 | 0.011 | ----- | ----- | 0.013 | 0.003 | 0.011 | ----- |
| 120-hr event | T11-13857 | UCD | Mn | 25 | 0.090 | ----- | ----- | 0.100 | 0.014 | 0.028 | ----- |
| 120-hr event | T11-13857 | UCD | Fe | 26 | 2.468 | ----- | ----- | 2.709 | 0.084 | 0.032 | 2.415 |
| 120-hr event | T11-13857 | UCD | Ni | 28 | 0.011 | ----- | ----- | 0.020 | 0.006 | 0.007 | ----- |
| 120-hr event | T11-13857 | UCD | Cu | 29 | 0.054 | ----- | ----- | 0.098 | 0.008 | 0.018 | ----- |
| 120-hr event | T11-13857 | UCD | Zn | 30 | 1.178 | ----- | ----- | 1.178 | 0.036 | 0.014 | 1.170 |
| 120-hr event | T11-13857 | UCD | As | 33 | 0.038 | ----- | ----- | 0.035 | 0.014 | 0.049 | ----- |
| 120-hr event | T11-13857 | UCD | Se | 34 | 0.047 | ----- | ----- | 0.078 | 0.012 | 0.035 | ----- |
| 120-hr event | T11-13857 | UCD | Br | 35 | 0.194 | ----- | ----- | 0.208 | 0.014 | 0.014 | 0.174 |
| 120-hr event | T11-13857 | UCD | Rb | 37 | 0.018 | ----- | ----- | 0.023 | 0.007 | 0.021 | ----- |
| 120-hr event | T11-13857 | UCD | Sr | 38 | 0.022 | ----- | ----- | 0.043 | 0.016 | 0.032 | ----- |
| 120-hr event | T11-13857 | UCD | Zr | 40 | 0.047 | ----- | ----- | 0.001 | 0.013 | 0.053 | ----- |
| 120-hr event | T11-13857 | UCD | Pb | 82 | 0.210 | ----- | ----- | 0.275 | 0.027 | 0.088 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| 120-hr event | T11-13858 | UCD | Na | 11 | 0.406 | ----- | ----- | 5.770 | 0.696 | 0.155 | ----- |
| 120-hr event | T11-13858 | UCD | Mg | 12 | 0.528 | ----- | ----- | 0.776 | 0.570 | 0.304 | ----- |
| 120-hr event | T11-13858 | UCD | Al | 13 | 2.885 | ----- | ----- | 4.720 | 0.405 | 0.639 | 2.392 |
| 120-hr event | T11-13858 | UCD | Si | 14 | 8.657 | ----- | ----- | 10.761 | 0.706 | 0.074 | 7.003 |
| 120-hr event | T11-13858 | UCD | P | 15 | 0.076 | ----- | ----- | 0.019 | 0.147 | 0.018 | ----- |
| 120-hr event | T11-13858 | UCD | S | 16 | 80.142 | ----- | ----- | 94.812 | 2.342 | 0.018 | 78.413 |
| 120-hr event | T11-13858 | UCD | Cl | 17 | 0.228 | ----- | ----- | 0.347 | 0.017 | 0.014 | ----- |
| 120-hr event | T11-13858 | UCD | K | 19 | 3.014 | ----- | ----- | 3.689 | 0.091 | 0.007 | 2.971 |
| 120-hr event | T11-13858 | UCD | Ca | 20 | 2.079 | ----- | ----- | 2.427 | 0.067 | 0.021 | 2.098 |
| 120-hr event | T11-13858 | UCD | Ti | 22 | 0.204 | ----- | ----- | 0.187 | 0.012 | 0.032 | 0.195 |
| 120-hr event | T11-13858 | UCD | V | 23 | 0.037 | ----- | ----- | 0.021 | 0.005 | 0.011 | ----- |
| 120-hr event | T11-13858 | UCD | Cr | 24 | 0.013 | ----- | ----- | 0.015 | 0.003 | 0.011 | ----- |
| 120-hr event | T11-13858 | UCD | Mn | 25 | 0.078 | ----- | ----- | 0.094 | 0.014 | 0.028 | ----- |
| 120-hr event | T11-13858 | UCD | Fe | 26 | 2.417 | ----- | ----- | 2.543 | 0.080 | 0.032 | 2.415 |
| 120-hr event | T11-13858 | UCD | Ni | 28 | 0.007 | ----- | ----- | 0.010 | 0.005 | 0.007 | ----- |
| 120-hr event | T11-13858 | UCD | Cu | 29 | 0.056 | ----- | ----- | 0.094 | 0.007 | 0.018 | ----- |
| 120-hr event | T11-13858 | UCD | Zn | 30 | 1.203 | ----- | ----- | 1.224 | 0.037 | 0.014 | 1.170 |
| 120-hr event | T11-13858 | UCD | As | 33 | -0.002 | ----- | ----- | 0.028 | 0.013 | 0.049 | ----- |
| 120-hr event | T11-13858 | UCD | Se | 34 | 0.037 | ----- | ----- | 0.069 | 0.012 | 0.035 | ----- |
| 120-hr event | T11-13858 | UCD | Br | 35 | 0.197 | ----- | ----- | 0.186 | 0.014 | 0.014 | 0.174 |
| 120-hr event | T11-13858 | UCD | Rb | 37 | 0.000 | ----- | ----- | 0.026 | 0.007 | 0.021 | ----- |
| 120-hr event | T11-13858 | UCD | Sr | 38 | 0.030 | ----- | ----- | 0.044 | 0.016 | 0.032 | ----- |
| 120-hr event | T11-13858 | UCD | Zr | 40 | 0.039 | ----- | ----- | 0.029 | 0.013 | 0.053 | ----- |
| 120-hr event | T11-13858 | UCD | Pb | 82 | 0.209 | ----- | ----- | 0.275 | 0.027 | 0.088 | ----- |
| blank filter | T11-13871 | DRI | Na | 11 | 0.000 | 0.512 | 0.219 | 0.068 | 0.118 | 0.155 | ----- |
| blank filter | T11-13871 | DRI | Mg | 12 | 0.000 | 0.103 | 0.151 | -0.057 | 0.085 | 0.304 | ----- |
| blank filter | T11-13871 | DRI | Al | 13 | 0.000 | 0.036 | 0.045 | 0.084 | 0.070 | 0.639 | ----- |
| blank filter | T11-13871 | DRI | Si | 14 | 0.000 | 0.005 | 0.023 | -0.084 | 0.060 | 0.074 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| blank filter | T11-13871 | DRI | P | 15 | 0.002 | 0.005 | 0.004 | -0.006 | 0.008 | 0.018 | ----- |
| blank filter | T11-13871 | DRI | S | 16 | 0.000 | 0.039 | 0.004 | -0.010 | 0.010 | 0.018 | ----- |
| blank filter | T11-13871 | DRI | Cl | 17 | 0.000 | 0.005 | 0.009 | -0.014 | 0.003 | 0.014 | ----- |
| blank filter | T11-13871 | DRI | K | 19 | 0.000 | 0.005 | 0.005 | -0.002 | 0.006 | 0.007 | ----- |
| blank filter | T11-13871 | DRI | Ca | 20 | 0.000 | 0.015 | 0.009 | -0.010 | 0.005 | 0.021 | ----- |
| blank filter | T11-13871 | DRI | Ti | 22 | 0.000 | 0.005 | 0.008 | 0.000 | 0.005 | 0.032 | ----- |
| blank filter | T11-13871 | DRI | V | 23 | 0.000 | 0.005 | 0.001 | 0.001 | 0.003 | 0.011 | ----- |
| blank filter | T11-13871 | DRI | Cr | 24 | 0.000 | 0.005 | 0.002 | 0.003 | 0.002 | 0.011 | ----- |
| blank filter | T11-13871 | DRI | Mn | 25 | 0.000 | 0.005 | 0.005 | 0.010 | 0.008 | 0.028 | ----- |
| blank filter | T11-13871 | DRI | Fe | 26 | 0.000 | 0.006 | 0.006 | 0.040 | 0.008 | 0.032 | ----- |
| blank filter | T11-13871 | DRI | Ni | 28 | 0.000 | 0.005 | 0.001 | 0.004 | 0.004 | 0.007 | ----- |
| blank filter | T11-13871 | DRI | Cu | 29 | 0.018 | 0.005 | 0.005 | 0.021 | 0.004 | 0.018 | ----- |
| blank filter | T11-13871 | DRI | Zn | 30 | 0.000 | 0.005 | 0.004 | 0.015 | 0.003 | 0.014 | ----- |
| blank filter | T11-13871 | DRI | As | 33 | 0.000 | 0.005 | 0.002 | -0.010 | 0.010 | 0.049 | ----- |
| blank filter | T11-13871 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.012 | 0.011 | 0.035 | ----- |
| blank filter | T11-13871 | DRI | Br | 35 | 0.000 | 0.005 | 0.003 | 0.005 | 0.009 | 0.014 | ----- |
| blank filter | T11-13871 | DRI | Rb | 37 | 0.003 | 0.005 | 0.002 | 0.013 | 0.006 | 0.021 | ----- |
| blank filter | T11-13871 | DRI | Sr | 38 | 0.000 | 0.005 | 0.002 | 0.018 | 0.014 | 0.032 | ----- |
| blank filter | T11-13871 | DRI | Zr | 40 | 0.006 | 0.005 | 0.007 | 0.020 | 0.012 | 0.053 | ----- |
| blank filter | T11-13871 | DRI | Pb | 82 | 0.000 | 0.008 | 0.006 | 0.040 | 0.019 | 0.088 | ----- |
| blank filter | T11-13872 | DRI | Na | 11 | 0.000 | 0.517 | 0.219 | 0.362 | 0.252 | 0.155 | ----- |
| blank filter | T11-13872 | DRI | Mg | 12 | 0.000 | 0.103 | 0.151 | 0.143 | 0.177 | 0.304 | ----- |
| blank filter | T11-13872 | DRI | Al | 13 | 0.000 | 0.036 | 0.045 | -0.107 | 0.080 | 0.639 | ----- |
| blank filter | T11-13872 | DRI | Si | 14 | 0.218 | 0.006 | 0.023 | 0.233 | 0.079 | 0.074 | ----- |
| blank filter | T11-13872 | DRI | P | 15 | 0.000 | 0.005 | 0.004 | -0.021 | 0.009 | 0.018 | ----- |
| blank filter | T11-13872 | DRI | S | 16 | 0.000 | 0.039 | 0.004 | -0.018 | 0.010 | 0.018 | ----- |
| blank filter | T11-13872 | DRI | Cl | 17 | 0.008 | 0.005 | 0.009 | -0.012 | 0.003 | 0.014 | ----- |
| blank filter | T11-13872 | DRI | K | 19 | 0.002 | 0.005 | 0.005 | 0.003 | 0.004 | 0.007 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| blank filter | T11-13872 | DRI | Ca | 20 | 0.000 | 0.015 | 0.009 | -0.009 | 0.006 | 0.021 | ----- |
| blank filter | T11-13872 | DRI | Ti | 22 | 0.000 | 0.005 | 0.008 | 0.001 | 0.005 | 0.032 | ----- |
| blank filter | T11-13872 | DRI | V | 23 | 0.000 | 0.005 | 0.001 | 0.002 | 0.003 | 0.011 | ----- |
| blank filter | T11-13872 | DRI | Cr | 24 | 0.000 | 0.005 | 0.002 | 0.001 | 0.002 | 0.011 | ----- |
| blank filter | T11-13872 | DRI | Mn | 25 | 0.000 | 0.005 | 0.005 | 0.014 | 0.009 | 0.028 | ----- |
| blank filter | T11-13872 | DRI | Fe | 26 | 0.010 | 0.006 | 0.006 | 0.050 | 0.008 | 0.032 | ----- |
| blank filter | T11-13872 | DRI | Ni | 28 | 0.000 | 0.005 | 0.001 | 0.000 | 0.004 | 0.007 | ----- |
| blank filter | T11-13872 | DRI | Cu | 29 | 0.000 | 0.005 | 0.005 | 0.023 | 0.004 | 0.018 | ----- |
| blank filter | T11-13872 | DRI | Zn | 30 | 0.031 | 0.005 | 0.004 | 0.059 | 0.005 | 0.014 | ----- |
| blank filter | T11-13872 | DRI | As | 33 | 0.000 | 0.005 | 0.002 | 0.001 | 0.010 | 0.049 | ----- |
| blank filter | T11-13872 | DRI | Se | 34 | 0.000 | 0.005 | 0.012 | 0.018 | 0.011 | 0.035 | ----- |
| blank filter | T11-13872 | DRI | Br | 35 | 0.000 | 0.005 | 0.003 | 0.000 | 0.009 | 0.014 | ----- |
| blank filter | T11-13872 | DRI | Rb | 37 | 0.000 | 0.005 | 0.002 | 0.014 | 0.006 | 0.021 | ----- |
| blank filter | T11-13872 | DRI | Sr | 38 | 0.000 | 0.005 | 0.002 | 0.021 | 0.015 | 0.032 | ----- |
| blank filter | T11-13872 | DRI | Zr | 40 | 0.001 | 0.005 | 0.007 | 0.007 | 0.012 | 0.053 | ----- |
| blank filter | T11-13872 | DRI | Pb | 82 | 0.002 | 0.008 | 0.006 | 0.027 | 0.019 | 0.088 | ----- |
| blank filter | T11-13873 | UCD | Na | 11 | 0.043 | ----- | ----- | 0.075 | 0.141 | 0.155 | ----- |
| blank filter | T11-13873 | UCD | Mg | 12 | -0.063 | ----- | ----- | -0.168 | 0.078 | 0.304 | ----- |
| blank filter | T11-13873 | UCD | Al | 13 | 0.064 | ----- | ----- | -0.185 | 0.082 | 0.639 | ----- |
| blank filter | T11-13873 | UCD | Si | 14 | -0.051 | ----- | ----- | -0.117 | 0.084 | 0.074 | ----- |
| blank filter | T11-13873 | UCD | P | 15 | 0.003 | ----- | ----- | -0.013 | 0.010 | 0.018 | ----- |
| blank filter | T11-13873 | UCD | S | 16 | 0.000 | ----- | ----- | -0.036 | 0.013 | 0.018 | ----- |
| blank filter | T11-13873 | UCD | Cl | 17 | -0.001 | ----- | ----- | -0.021 | 0.003 | 0.014 | ----- |
| blank filter | T11-13873 | UCD | K | 19 | 0.002 | ----- | ----- | -0.001 | 0.005 | 0.007 | ----- |
| blank filter | T11-13873 | UCD | Ca | 20 | -0.008 | ----- | ----- | -0.014 | 0.006 | 0.021 | ----- |
| blank filter | T11-13873 | UCD | Ti | 22 | -0.001 | ----- | ----- | 0.000 | 0.005 | 0.032 | ----- |
| blank filter | T11-13873 | UCD | V | 23 | 0.001 | ----- | ----- | 0.000 | 0.003 | 0.011 | ----- |
| blank filter | T11-13873 | UCD | Cr | 24 | 0.002 | ----- | ----- | 0.005 | 0.003 | 0.011 | ----- |

## Table 13. XRF PT Results (25-mm Filters)

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| blank filter | T11-13873 | UCD | Mn | 25 | 0.004 | ----- | ----- | 0.022 | 0.009 | 0.028 | ----- |
| blank filter | T11-13873 | UCD | Fe | 26 | 0.024 | ----- | ----- | 0.040 | 0.008 | 0.032 | ----- |
| blank filter | T11-13873 | UCD | Ni | 28 | -0.004 | ----- | ----- | -0.002 | 0.004 | 0.007 | ----- |
| blank filter | T11-13873 | UCD | Cu | 29 | -0.002 | ----- | ----- | 0.027 | 0.005 | 0.018 | ----- |
| blank filter | T11-13873 | UCD | Zn | 30 | -0.005 | ----- | ----- | 0.022 | 0.004 | 0.014 | ----- |
| blank filter | T11-13873 | UCD | As | 33 | 0.000 | ----- | ----- | -0.011 | 0.011 | 0.049 | ----- |
| blank filter | T11-13873 | UCD | Se | 34 | 0.000 | ----- | ----- | 0.025 | 0.011 | 0.035 | ----- |
| blank filter | T11-13873 | UCD | Br | 35 | -0.003 | ----- | ----- | 0.001 | 0.010 | 0.014 | ----- |
| blank filter | T11-13873 | UCD | Rb | 37 | 0.000 | ----- | ----- | 0.020 | 0.006 | 0.021 | ----- |
| blank filter | T11-13873 | UCD | Sr | 38 | 0.008 | ----- | ----- | 0.033 | 0.016 | 0.032 | ----- |
| blank filter | T11-13873 | UCD | Zr | 40 | 0.022 | ----- | ----- | 0.018 | 0.013 | 0.053 | ----- |
| blank filter | T11-13873 | UCD | Pb | 82 | -0.006 | ----- | ----- | 0.068 | 0.021 | 0.088 | ----- |
| blank filter | T11-13874 | UCD | Na | 11 | -0.010 | ----- | ----- | -0.199 | 0.163 | 0.155 | ----- |
| blank filter | T11-13874 | UCD | Mg | 12 | 0.027 | ----- | ----- | -0.044 | 0.080 | 0.304 | ----- |
| blank filter | T11-13874 | UCD | Al | 13 | 0.022 | ----- | ----- | -0.062 | 0.075 | 0.639 | ----- |
| blank filter | T11-13874 | UCD | Si | 14 | -0.051 | ----- | ----- | -0.066 | 0.062 | 0.074 | ----- |
| blank filter | T11-13874 | UCD | P | 15 | 0.000 | ----- | ----- | 0.002 | 0.013 | 0.018 | ----- |
| blank filter | T11-13874 | UCD | S | 16 | 0.000 | ----- | ----- | -0.043 | 0.011 | 0.018 | ----- |
| blank filter | T11-13874 | UCD | Cl | 17 | -0.001 | ----- | ----- | -0.012 | 0.003 | 0.014 | ----- |
| blank filter | T11-13874 | UCD | K | 19 | 0.006 | ----- | ----- | 0.005 | 0.006 | 0.007 | ----- |
| blank filter | T11-13874 | UCD | Ca | 20 | -0.009 | ----- | ----- | 0.001 | 0.006 | 0.021 | ----- |
| blank filter | T11-13874 | UCD | Ti | 22 | -0.001 | ----- | ----- | 0.001 | 0.005 | 0.032 | ----- |
| blank filter | T11-13874 | UCD | V | 23 | 0.000 | ----- | ----- | 0.003 | 0.003 | 0.011 | ----- |
| blank filter | T11-13874 | UCD | Cr | 24 | 0.000 | ----- | ----- | 0.005 | 0.002 | 0.011 | ----- |
| blank filter | T11-13874 | UCD | Mn | 25 | -0.007 | ----- | ----- | 0.024 | 0.010 | 0.028 | ----- |
| blank filter | T11-13874 | UCD | Fe | 26 | 0.011 | ----- | ----- | 0.049 | 0.008 | 0.032 | ----- |
| blank filter | T11-13874 | UCD | Ni | 28 | -0.003 | ----- | ----- | 0.002 | 0.004 | 0.007 | ----- |
| blank filter | T11-13874 | UCD | Cu | 29 | -0.004 | ----- | ----- | 0.020 | 0.004 | 0.018 | ----- |

**Table 13. XRF PT Results (25-mm Filters)**

| Sample Description | Sample ID | Test Lab | Element | Z | Test Lab (µg/filter) | | | EPA (µg/filter) | | | Median* (µg/filter) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Result | Uncert. | MDL | Result | Uncert. | MDL | |
| blank filter | T11-13874 | UCD | Zn | 30 | -0.005 | ----- | ----- | 0.024 | 0.004 | 0.014 | ----- |
| blank filter | T11-13874 | UCD | As | 33 | 0.000 | ----- | ----- | -0.007 | 0.010 | 0.049 | ----- |
| blank filter | T11-13874 | UCD | Se | 34 | -0.006 | ----- | ----- | 0.015 | 0.011 | 0.035 | ----- |
| blank filter | T11-13874 | UCD | Br | 35 | 0.006 | ----- | ----- | 0.011 | 0.009 | 0.014 | ----- |
| blank filter | T11-13874 | UCD | Rb | 37 | 0.003 | ----- | ----- | 0.017 | 0.006 | 0.021 | ----- |
| blank filter | T11-13874 | UCD | Sr | 38 | 0.005 | ----- | ----- | 0.036 | 0.016 | 0.032 | ----- |
| blank filter | T11-13874 | UCD | Zr | 40 | 0.007 | ----- | ----- | 0.012 | 0.013 | 0.053 | ----- |
| blank filter | T11-13874 | UCD | Pb | 82 | -0.021 | ----- | ----- | 0.063 | 0.020 | 0.088 | ----- |

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