# SPRING AND SEEP SAMPLING AND ANALYSIS REPORT SANTA SUSANA FIELD LABORATORY

## VENTURA COUNTY, CALIFORNIA

## MARCH 2003

**Prepared for:**
**The Boeing Company, Rocketdyne Propulsion and Power**
**National Aeronautics and Space Administration**
**United States Department of Energy**

**Prepared by:**
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**Walnut Creek, California**

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## ABBREVIATIONS

| | |
|---|---|
| $^{2}H$ | deuterium |
| Boeing | The Boeing Company |
| Ceimic | The Ceimic Corporation |
| COPCs | chemicals of potential concern |
| DOE | Department of Energy |
| DTSC | Department of Toxic Substances Control |
| FSDF | Former Sodium Disposal Facility |
| H&A | Haley & Aldrich |
| KLCS | lower Chatsworth Formation |
| KUCS | upper Chatsworth Formation |
| MCL | maximum contaminant level |
| MWL | meteoric water line |
| mg/L | milligrams per liter |
| µg/L | micrograms per liter |
| NASA | National Aeronautics and Space Administration |
| pCi/L | picoCuries per liter |
| PVC | polyvinyl chloride |
| QA | quality assurance |
| RCRA | Resource Conservation Recovery Act |
| RFI | RCRA Facility Investigation |
| SSFL | Santa Susana Field Laboratory |
| TCE | trichloroethylene |
| TDS | total dissolved solids |
| USEPA | United States Environmental Protection Agency |
| VOC | volatile organic compound |

# 1.0 INTRODUCTION

This report presents the results of field sampling activities and analytical testing of springs and seeps currently identified within or near the Santa Susana Field Laboratory (SSFL). The SSFL is jointly owned by The Boeing Company (Boeing) and the National Aeronautics and Space Administration (NASA), and is operated by Boeing. A portion of the SSFL owned by Boeing is occupied by U.S. Department of Energy (DOE) facilities that are undergoing closure. This report has been prepared by MWH on behalf of Boeing, NASA, and DOE.

## 1.1 FACILITY BACKGROUND

The SSFL is located approximately 29 miles northwest of downtown Los Angeles, California, in the southwest corner of Ventura County (Figure 1). The SSFL occupies approximately 2,850 acres of hilly terrain with approximately 700 feet of topographic relief near the crest of the Simi Hills. The SSFL is divided into four administrative areas (Areas I, II, III, and IV), with undeveloped land along the northern and southern boundaries.

The SSFL has been active since 1948 and site activities have included research, development, and testing of primarily liquid propelled rocket engines, water jet pumps, lasers, liquid metal heat exchanger components, nuclear energy research, and related technologies. Six major liquid propelled rocket engine test areas, namely Bowl, Canyon, Alfa, Bravo, Coca, and Delta, were in operation simultaneously in the late 1950s and early 1960s. The Bowl, Canyon and Delta test areas were phased out of operation in the late 1960s and 1970s. The Coca test area was shut down in May 1988. The Alfa and Bravo test areas are currently in operation.

## 1.2 OBJECTIVES AND SCOPE

In March 2002, a work plan (MWH, 2002b) was prepared and submitted to the California Department of Toxic Substances Control (DTSC) that outlined the work to be performed for

collecting and analyzing water from springs and seeps within and adjacent to the SSFL. The objective of this project was to determine if chemicals of potential concern (COPCs) are present in water that emerges from the ground to produce these features. These data are needed to evaluate the potential transport of COPCs in groundwater underlying the SSFL and for use in the Surficial Media Operable Unit risk assessments.

Previous field investigations conducted by Ogden, MWH, and Haley & Aldrich (H&A [formerly GRC]) have identified 28 locations where seeps or springs occur within or adjacent to the SSFL property boundary. The locations of the 28 springs and seeps are shown on Figure 2. It should be noted that some springs and seeps are transient while others are continuous. The spring and seep work plan proposed collecting samples from 13 of the 28 springs and seeps. Samples were actually collected from 7 of the 13 proposed locations. Samples were not collected from 6 of the 13 proposed locations because they were either: dry, redundant, conditions were unsafe due to the presence of bees or access to private property was denied. However, two additional springs/seeps were identified subsequent to the issuance of the work plan. Samples were also collected from these two locations. Hence, samples were collected from a total of 9 locations.

This report describes the sampling methods used (Section 2), conditions at each spring or seep sample location (Section 3), and analytical results of the samples collected (Section 4). Laboratory data for samples collected by MWH during this program are provided in Appendix A.

Peter Bailey, a representative of DTSC, was present during most of this program's field work, and helped select the sampling location and type of sampling technique to be used at each spring or seep. In addition, he collected split samples that were analyzed independently by the DTSC. Analytical laboratory reports from DTSC's sampling effort are provided as Appendix B of this report.

It is worthy to note that spring/seep samples have been collected throughout the history of sampling activities at the SSFL. These data have been previously reported in either the quarterly groundwater monitoring reports or annual groundwater monitoring reports for the SSFL that have been submitted since the mid-1980s.

## 1.3 OVERVIEW OF GEOLOGY, GROUNDWATER OCCURRENCE AND IMPACTS

The following sections briefly describe the geology, the occurrence of groundwater underlying the SSFL and impacts that have resulted from site activities.

### 1.3.1 Geology

The primary geologic units present at the SSFL are the Quaternary Alluvium and the Cretaceous Chatsworth Formation. The alluvium is a mixture comprised principally of sand and silty sand, with minor amounts of silt and clay. The thickness of the alluvium is typically 5 to 15 feet, but in a few locations it is over 30 feet thick. The Chatsworth Formation is a marine turbidite sequence primarily comprised of medium-grained sandstone with interbedded siltstone and shale units that generally strike N70$^0$E and dip to the northwest at approximately 25 to 35 degrees (Montgomery Watson, 2000; MWH, 2002a and c). A geologic map of the SSFL is presented in Figure 3.

The Chatsworth Formation at the SSFL has been divided into stratigraphic units as shown on Figure 3. The lower Chatsworth Formation (KLCS) is located in the eastern and southern parts of the SSFL and is differentiated from the upper Chatsworth Formation (KUCS) by a much higher proportion of fine-grained material. The definition of the Upper Chatsworth Formation has been refined significantly since 1999. In work performed by Dr. Ross Wagner and presented in a report issued in April of 2000 (Montgomery Watson, 2000), the Upper Chatsworth Formation was separated into two sandstone units (Sandstones 1 and 2) and three finer-grained units (Shales 1A and B, 2 and 3). Sandstone 1 was defined as a predominantly sandstone section between the top of the lower Chatsworth Formation and the bottom of Shale 2. Shale 2 is located in the middle of the upper Chatsworth Formation and consists primarily of shale and

siltstones interbedded with fine-grained sandstones. Sandstone 2 was defined as the predominantly sandstone unit which lies between the top of Shale 2 and the bottom of Shale 3. Shale 3 is the stratigraphically uppermost unit in the Chatsworth Formation and has a composition similar to Shale 2. The Simi Conglomerate Member of the Santa Susana Formation lies in depositional contact on Shale 3 (upper Chatsworth Formation).

Additional work performed in the northeast part of the SSFL east of the Shear Zone resulted in redefining Sandstone 1 (MWH, 2002a). Sandstone 1 was divided into three coarser-grained members (sandstones named the Bowl Member, Canyon Member and Sage Member) and two finer-grained members (siltstones/shales named the Happy Valley Member and the Woolsey Member). Furthermore, additional work performed in late 2001 to mid-2002 by Dr. Wagner resulted in redefining Sandstone 2 (MWH, 2002c). Sandstone 2 was divided into three coarser-grained members (the Silvernale Member, Lower Burro Flats Member and the Upper Burro Flats Member) and two finer-grained, siltstone/shale members (the SPA Member and ELV Member).

A number of inactive faults are present at the site, and have two general orientations. The North, Coca, Burro Flats, Woolsey Canyon, IEL, and Happy Valley Faults generally strike east-west, while the Shear Zone and Skyline Fault generally strike northeast-southwest. All faults appear to dip nearly vertically.

It should be noted that characterization of the geologic framework at the SSFL is in progress as of the writing of this report and hence some portions of the SSFL have not been characterized consistent with the definitions of Sandstone 1 defined above. The area of the SSFL currently being characterized for geology generally lies south of the North Fault, west of the Shear Zone, North of the Burro Flats Fault and below Shale 2 (Figure 3).

### 1.3.2 Groundwater Occurrence

Groundwater occurs at the SSFL in the alluvium, weathered bedrock, and unweathered bedrock (MWH, 2001). First-encountered groundwater typically exists under water table conditions and may be encountered in any of these media. At certain locations within the SSFL, groundwater is vertically continuous (i.e., not separated by a vadose zone) downward through the media in which it first occurs into the underlying media. Perched groundwater also occurs at certain locations within the SSFL. At these locations, a vadose zone within the unweathered Chatsworth Formation may locally separate perched groundwater from saturated unweathered Chatsworth Formation bedrock.

### 1.3.3 Groundwater Impacts

Previous subsurface investigations (since approximately 1984) and quarterly groundwater monitoring have identified releases of various COPCs to groundwater underlying the SSFL. Specific chemicals and concentrations are presented in the 2001 Annual Groundwater Monitoring Report (H&A, 2002) and by MWH in the Draft Shallow Groundwater Technical Memorandum (MWH, 2001). The facility now monitors approximately 340 groundwater wells/piezometers. The COPCs detected in groundwater at the SSFL with the most frequency are volatile organic compounds (VOCs) with trichloroethylene (TCE) occurring the most frequently and in the highest concentration of any of the VOCs. Perchlorate is also a COPC at the SSFL, but is only detected frequently in four areas onsite (MWH 2003).

## 2.0 TECHNIQUES USED TO SAMPLE SPRINGS AND SEEPS

Springs and seeps require special care when collecting groundwater samples to be submitted for analysis of VOCs because of the potential mass loss to the atmosphere. First, springs and seeps at or near the SSFL commonly produce little water and hence can require a considerable length of time to collect a representative sample. Second, they often emerge from a relatively large surface area, producing a thin sheet of flowing water. Because of these two characteristics, special sampling techniques were used for low yield springs or seeps as described below. Table

1 identifies the sampling method used at each of the nine springs/seeps where samples were collected. Three general methods were used to collect samples, each of which is described below. Plate 1 shows the location of the springs and seeps sampled during this program, and includes photographs of each.

## 2.1 DIRECT COLLECTION

If the flow rate from a spring was sufficiently high, a sample container was directly filled with the water emerging from the ground. If a pool of water was created by the spring/seep, a sample was collected directly from the pool by using a plastic syringe. Two springs/seeps, S17 and S18, were sampled using this technique (Plate 1).

## 2.2 TEMPORARY SAMPLING POINTS

Six springs did not produce sufficient water to collect groundwater samples directly from the flow emerging at the surface. In these cases, a temporary sampling point was placed into the soil or weathered bedrock to concentrate flow. If the flow from the spring or seep was diffuse and discharged over a relatively large area, the sampling point was constructed below the discharge area with the highest flow. When these conditions existed, the sampling point was constructed in a joint, bedding plane, or soft soil zone within the spring/seep. In soft soil or very weathered bedrock, the sampling point was constructed by digging a small hole and installing a short length of perforated polyvinyl chloride (PVC) pipe that was closed at the discharge. Groundwater samples were collected from these sampling points by gravity flow through the PVC pipe. This method was used at springs/seeps S16, S19, S21, S22, S22A and S29 (Plate 1).

## 2.3 DAM CONSTRUCTION

In one case, S14, a dam was constructed with a silicone-based sealant at the periphery of a seep to allow water to accumulate so samples could be collected (Plate 1). A plastic syringe was used to sample water pooled behind the silicone-dam constructed around seep S14.

## 3.0 DESCRIPTION OF SAMPLE LOCATIONS AND EVENTS

The following descriptions provide additional details about the sample locations, events, and methods.

### 3.1 SAMPLE LOCATION 1

Sample Location 1 is located north of the Former Sodium Disposal Facility (FSDF) and is immediately adjacent to the RD-59 well cluster. This location is stratigraphically in the uppermost part of the Upper Burro Flats Member of the Chatsworth Formation, just below the contact with Shale 3. As shown on Figure 2, at this location there are two springs (S19 and S21), both located near the RD-59 well cluster.

The southernmost spring (S21) emerges from a fairly large surface area; however, most of the flow emerges from the colluvium at the base of a road cut. This spring was sampled using a temporary sampling point installed in the colluvium at the base of the road cut. Samples were collected on June 10, 2002.

The other spring (S19) is located northeast of spring S21 and emerges from bedrock (Shale 3). Samples were collected from this spring on June 12, 2002 using a temporary sampling point.

### 3.2 SAMPLE LOCATION 2

Sample Location 2 is a developed spring (S18) located on the north side of the SSFL. The spring is located stratigraphically in the Upper Burro Flats Member of the Chatsworth Formation, just below the contact with Shale 3. The spring was previously developed by others through the construction of a 5- to 6-foot deep tunnel in the bedrock of Sandstone 2. The entrance to the water tunnel was partially sealed with concrete. The sample was collected at this location on June 10, 2002 from sheet flow at the mouth of the tunnel.

## 3.3 SAMPLE LOCATION 3

Sample Location 3 is located on the north side of the SSFL within the Upper Burro Flats Member. At this location there is a seep (S25) historically reported as a "perennial seep along canyon bottom" and possible spring (S17) reported as "beginning of flow in creek". The spring sample (S17) was collected on June 10, 2002 from a pool in a sandstone outcrop. The seep at S25 was not sampled because it was downstream from S17 and hence the source of water at this location was at least, if not completely, derived from S17.

## 3.4 SAMPLE LOCATION 4

Sample Location 4 is a spring (S13) located further down the same drainage (northward) from Sample Location 3 within the Simi Conglomerate. A sample was not collected from the spring (S13) due to the presence of a swarm of bees located near the spring, creating an unsafe condition.

## 3.5 SAMPLE LOCATION 5

Sample Location 5 is a spring (S14) located to the north of the SSFL, stratigraphically above the Chatsworth Formation within the Upper Burro Flats Member. The spring flows from bedrock. A silicone-dam was constructed around the spring so water could accumulate and provide sufficient volume for the sampling. Samples from this spring were collected on June 11, 2002 and on a second occurrence during the week of June 17, 2002.

## 3.6 SAMPLE LOCATION 6

Sample Location 6 is a spring (S16) located on the north side of the SSFL, approximately 1,500 feet south of Sample Location 5. At this location, the spring emerges from colluvium at the contact between the colluvium and Upper Burro Flats Member of the Chatsworth Formation.

Samples from this spring were obtained on June 11, 2002 by installing a temporary sampling point into the colluvium, downslope of the spring.

### 3.7 SAMPLE LOCATION 7

Sample Location 7 is a spring (S6) located on the north side of the SSFL within a sandstone unit. This spring (S6) was not sampled because it was dry.

### 3.8 SAMPLE LOCATION 8

Sample Location 8 is a spring (S27) located to the northeast of the SSFL in Black Canyon. At this location, the spring occurs seasonally within Sandstone 2 at a contact with the Shear Zone, a fault that strikes southwestward through the Area I road in the SSFL. The spring at Sample Location 8 was not sampled because it was dry.

### 3.9 SAMPLE LOCATION 9

Sample Location 9 is a spring (S26) located in Dayton Canyon to the southeast of the SSFL. This spring is located near the Burro Flats Fault where the fault juxtaposes sandstone and clay shale units of the Chatsworth Formation (based on geologic mapping by Dibblee, 1992). Field staff from Ogden (2000a) reported the spring to be a "perennial seep in stream bed of canyon bottom." This was not sampled because access from the property owner could not be obtained.

### 3.10 SAMPLE LOCATION 10

Sample Location 10 is a spring (S22) located south of the SSFL in the headwaters of Bell Canyon. At this location, the spring flows from a contact between the colluvium and the Chatsworth Formation. This spring (S22) was sampled on June 11, 2002 using a temporary sampling point. An additional spring was identified during field reconnaissance further up the

Bell Canyon drainage (S22A). This spring was sampled on June 11, 2002 using a temporary sampling point.

### 3.11 SAMPLE LOCATION 11

Sample Location 11 is a seep (S5) located in the west central part of the SSFL. At this location, the seep occurs within a drainage channel at an elevation of approximately 1,750 feet above mean sea level (MSL), at the contact between the Lower Burro Flats Member with the colluvium. Water elevations in nearby near-surface groundwater monitoring wells that are screened in the Lower Burro Flats Member (RS-15, ES-23, ES-28, ES-29, ES-30, and PZ-018) have historically been within a few feet of the ground surface following the winter rainy season. Based on the presence of this nearby near-surface groundwater within Sandstone 2 and the presence of sandstone bedrock outcrops within the channel bottom, it is suspected that groundwater that emerges at this seep is derived from Sandstone 2. However, groundwater from this seep (S5) was not sampled because the seep was dry during June 2002.

### 3.12 SAMPLE LOCATION 12

An additional spring (S29 [Location 12]) was identified near Location 2 during field reconnaissance activities at the SSFL during September 2002 (Plate 1). Location 12 is a spring that emerges at the contact between the Upper Burro Flats Member and Shale 3. It was sampled on October 3, 2002, using a temporary sampling point.

## 4.0 TARGET ANALYTES, METHODS AND RESULTS

Sampling and laboratory analyses were conducted on the samples collected during this program as specified in the Spring and Seep Work Plan (MWH, 2002b). In general, these follow the quality assurance criteria specified in the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Quality Assurance Project Plan (Ogden, 2000b and 2000c). Target analytes were grouped into two primary functions. All samples were analyzed for COPCs that included the following:

- VOCs using United States Environmental Protection Agency (USEPA) Method 8260
- Perchlorate using USEPA Method 300M
- Gross alpha and gross beta using USEPA Method 900, and gamma-emitting radionuclides using USEPA Method 901.1

The second group of target analytes were selected to provide information as to the source of the water collected at the spring or seep (i.e., groundwater or surface water) and/or background water quality as it relates to general minerals. Hence the target analytes in this functional group consisted of the following:

- Stable hydrogen (deuterium) and oxygen isotopes ($^{2}H$ and $^{18}O$)
- Selected general anions and cations (chloride, sulfate, carbonate, bicarbonate, sodium, potassium, magnesium, calcium), and total dissolved solids (TDS) using USEPA Methods 300, 6010, and 160.1, respectively.

Table 2 summarizes laboratory analyses that were performed for each sample collected by MWH. Where required, samples were analyzed at a California-certified laboratory. The Ceimic Corporation (Ceimic) located in Narragansett, Rhode Island analyzed the samples for the chemical parameters, and the radioactivity analyses were performed by Eberline Services, located in Richmond, California. The University of Waterloo located in Waterloo, Ontario, Canada analyzed samples for hydrogen and oxygen isotopes (deuterium ($^{2}H$) and $^{18}0$, respectively). Additional split (or confirmation) quality control (QC) samples collected by MWH were analyzed by Severn-Trent Laboratories, located in Richland, Washington; Centrum, Weck, and Calscience Laboratories, located in Riverside, California; and by the University of Ottawa, located in Ottawa, Ontario, Canada.

The laboratory results for chemical and radiological analyses were reviewed by qualified chemists and validated following protocols established for the RFI being conducted at the SSFL under DTSC oversight. (Isotopic analyses are used only for water source evaluation and were not validated.) All laboratory data were deemed usable for the intended purpose of assessing water quality at the springs and seeps sampled during this program. Analytical results of samples collected by MWH are summarized in Tables 3 through 6, and laboratory reports and data validation information is provided in Appendix A (organized by analytical method).

DTSC collected split samples at eight of the nine spring and seep locations sampled during this program. These samples were analyzed for VOCs and perchlorate using the laboratory methods listed above. Due to the limited sample volume, the DTSC sample from S14 was only analyzed for perchlorate, not VOCs. DTSC samples were also analyzed for total metals using EPA method 6010/7000. It should be noted that the MWH primary samples were not proposed to be, nor were, analyzed for total metals. DTSC split sample results are summarized in Tables 7 and 8, and the laboratory reports are provided in Appendix B.

The following sections describe the analytical sampling results collected during this program.

## 4.1 VOC RESULTS

Table 3 summarizes VOC analytical results. Four VOCs (acetone, toluene, bromomethane, and methylene chloride) were detected at concentrations up to 21 micrograms per liter (µg/L) in samples collected from three of the nine springs sampled during this program (S14, S17, and S29). Except for acetone, which was detected twice, each of compounds were detected only once. Toluene and bromomethane were reported at concentrations below the laboratory reporting method and were estimated by the data validators. Acetone was detected in the samples collected from spring S14 at a maximum concentration of 21 µg/L. This is the location where a silicone dam was constructed and it is believed that the acetone detected in this sample is a result of contamination from the silicone caulking material (it was also detected in the field QC sample at this location, see Appendix A). Methylene chloride was detected in the sample collected from spring S29 at 6 µg/L. Both acetone and methylene chloride are common laboratory contaminants. All VOCs detected in the spring and seep samples collected during this program are very infrequently encountered in SSFL groundwater, and when detected, are at low concentrations (H&A, 2002).

DTSC split samples for VOC analysis were collected at seven spring and seep locations (Table 7). DTSC did not collect a sample from S14 due to low flow conditions or from S29 because of the timing of the October sampling event. No VOCs were detected in the seven DTSC samples (Table 7).

## 4.2 PERCHLORATE RESULTS

Perchlorate was not detected above the method reporting limit of 1 µg/L in any of the nine spring/seep samples collected by MWH, nor above the method reporting limit of 4 µg/L in the eight split samples collected by DTSC. Results are summarized in Tables 3 and 7 for the MWH and DTSC split samples, respectively.

## 4.3 RADIOACTIVITY RESULTS

Radioactivity analyses of spring and seep water samples are summarized in Table 4. There were no detectable levels of gross alpha radioactivity. Gross beta activity levels in spring and seep water samples ranged up to 4.23 ± 1.7 picoCuries per liter (pCi/L). These results are below the drinking water maximum concentration levels (MCLs) for gross alpha and gross beta activities of 15 pCi/L and 50 pCi/L, respectively. The measured gross beta activity levels are also within reported ranges of domestic water supplies in the Los Angeles Area (Table 5-8 [The Boeing Company, 2002]). It should be noted that the groundwater underlying the SSFL is not a source of drinking water, hence the MCLs are not applicable, and are used here solely for a basis of comparison.

Analytical results of man-made gamma-emitting radionuclides are also presented on Table 4. No man-made gamma-emitting radionuclides were detected in any of the spring/seep samples. Three naturally occurring gamma-emitting radionuclides were detected in two spring and seep samples. Potassium-40 was detected at 234 pCi/L at S14. Bismuth-214 was detected at 17.8 pCi/L and lead-214 was detected at 29.5 pCi/L at S29. Bismuth-214 and lead-214 are part of the radon decay chain and radon is a naturally occurring radionuclide. Lead-214 and bismuth-214 have short half-lives of 27 minutes and 20 minutes, respectively, and hence, the reported amounts would decay away in about three to four hours. There are no regulatory action levels associated with the naturally occurring radionuclides of potassium-40, bismuth-214, and lead-214.

## 4.4 STABLE HYDROGEN AND OXYGEN ISOTOPES ($^{2}H$ AND $^{18}O$ )

Hydrogen (deuterium) and oxygen isotope concentrations are summarized on Table 5. The results are also graphically depicted on Figure 4. Figure 4 also depicts deuterium and oxygen isotope results from other surface water and groundwater samples that have historically been collected at the SSFL (see Stable Isotope Hydrogeologic Evaluation at the Santa Susana Field Laboratory [Smith and Menchaca, 1995]).

These data are plotted relative to the meteoric water line[1] (MWL). As can be seen on Figure 4, the stable isotope results from all but one of the nine springs/seeps sampled fall in the same grouping as historic results of samples from wells that monitor Chatsworth Formation groundwater. These data confirm that the samples collected from the springs/seeps are derived from groundwater that emerges at these locations. The sample results from spring/seep S14 fall below the MWL as noted on Figure 4 and hence are indicative of waters that have been evaporated. These data indicate that the sample collected from spring/seep S14 was either surface water that had been present long enough to have evaporated or groundwater that emerged previously and had also evaporated.

## 4.5 GENERAL MINERALS RESULTS

A summary of the analytical results for cations, anions, alkalinity and total dissolved solids is provided on Table 6. Cations that were reported by the laboratory include: calcium, magnesium, potassium and sodium. Anions included: bicarbonate, carbonate, chloride and sulfate. Stiff diagrams depicting the cation/anion results of the nine springs sampled are presented on Plate 2. This plate also depicts the stable isotope results discussed in Section 4.4 above. TDS concentrations for all but one of the nine springs/seeps were below 1,000 milligrams per liter (mg/L). Spring/seep S22A had a TDS value of 1,241 mg/L. Chloride concentrations, which are indicators of groundwater flow system activity ranged from a low of 37.2 mg/L at S29 to a high of 78.2 mg/L at S14. The elevated chloride value from S14 indicates that the water sampled

[1] The global meteoric water line (MWL) defines the relationship between $^{18}O$ and $^{2}H$ in worldwide fresh surface waters as published by Harmon Craig (1961). The MWL is global only in application and is actually an average of many local or regional meteoric water lines that differ from the global line due to local changes in the climate and geography (Clark and Fritz, 1999).

from this location is groundwater. Surface water due to rainwater runoff would have much lower chloride values [e.g., chloride in rainfall at or near the SSFL is typically less than 1 mg/L based on measurements collected at a Atmospheric Acidity Protection Program monitoring station located in Reseda, CA (Cal EPA, 1995)].

## 4.6 METALS RESULTS

DTSC split samples were analyzed for total metals (Table 8). Five metals were detected in the eight samples collected by DTSC. Barium was detected in all eight samples at concentrations up to 0.144 mg/L. Chromium and nickel were detected once in the sample from S-14 at concentrations of 0.014 mg/L and 0.013 mg/L, respectively. Vanadium was detected in three spring/seep samples at concentrations up to 0.029 mg/L and zinc was detected in four spring/seep samples at concentrations up to 0.085 mg/L. These results are less than any established primary or secondary MCLs, or other state regulatory action levels for these metals. Also, these results are similar to or less than metal concentrations detected in SSFL groundwater monitoring wells (H&A, 2002).

# 5.0 SUMMARY AND CONCLUSIONS

A work plan was submitted to the DTSC for sampling and analyzing water emerging from within and beyond the perimeter of the SSFL at 13 spring/seep locations (MWH, 2002b). Samples were collected during June 2002 from 7 of these 13 locations. The six springs that were not sampled were either dry at the time, inaccessible due to private property owner access, safety hazards (bees), or were determined to be redundant of another sampling location. Two additional springs/seeps that had not previously been identified were also sampled, one in June 2002 and the other in October 2002. Therefore, samples were collected from a total of nine springs/seeps and submitted for chemical and radiological analyses during this program.

Samples from the springs/seeps were collected using three different methods depending on the yield and discharge characteristics of each spring/seep. Samples were analyzed to determine if COPCs were present at these locations and to assess general water quality conditions. The

occurrence and concentrations of COPCs at springs/seeps is important in evaluating the groundwater flow and transport system and in assessing potential impacts to surface receptors for the Surficial Media Operable Unit risk assessments that are being performed at the SSFL. The following COPCs were included in the list of target analytes: VOCs, perchlorate, gross alpha and gross beta radioactivity, and gamma-emitting radionuclides. Water quality parameters included stable hydrogen and oxygen isotopes ($^{2}H$ and $^{18}O$), cations, anions, alkalinity, and TDS.

An evaluation of the analytical results of the water quality parameters shows that the water sampled at each spring/seep is groundwater. This conclusion is supported by the plot of $^{2}H$ and $^{18}O$ results provided on Figure 4 and the chloride results presented on Table 6 and plotted on Plate 2. The $^{2}H$ and $^{18}O$ results for eight of the nine springs sampled falls in the same range as samples of groundwater from Chatsworth Formation wells that have also been analyzed for $^{2}H$ and $^{18}O$. The chloride data were used to evaluate the source of water for the one spring/seep sample (S14) that was enriched in $^{2}H$ and $^{18}O$ (i.e., indicative of waters that have undergone evaporation). The chloride result was the highest of any of the nine springs, indicating that the water present at this spring was groundwater that had been evaporating.

Evaluation of the analytical results of the COPCs shows that perchlorate was not detected in any of the nine spring/seep samples collected by MWH, nor in the eight split samples collected by DTSC. Low concentrations of acetone, methylene chloride, toluene, and bromomethane were detected in the samples collected by MWH at three of the nine springs/seeps (S14, S17, and S29). Toluene and bromomethane were detected below laboratory method reporting limits. The highest VOC concentration detected in the samples was 21 μg/L of acetone at S14; this result is likely associated with contamination from a silicone dam that was constructed for sample collection. Both acetone and methylene chloride are common laboratory contaminants. All detected VOCs in the three spring/seep locations are detected infrequently in SSFL groundwater, and when detected, are detected at low concentrations. DTSC split sample results did not detect VOCs at the springs and seeps sampled.

Evaluation of the radiological results shows that gross alpha and gross beta activity levels are below state or federal maximum contaminant levels for drinking water. Such a comparison is

made solely for discussion purposes as none of the groundwater underlying the SSFL is used as a drinking water source. No man-made gamma-emitting isotopes were detected in any sample. Three naturally-occurring gamma-emitting radionuclides were detected in two of the nine springs, while none was detected in the other seven springs. Potassium-40, which is a radionuclide that naturally occurs in sandstone, was detected at 234 pCi/L in the sampled from S-14. Bismuth-214 and lead-214, both of which have half-lives less than 30 minutes, were detected in the sample from S29 at concentrations of 17.8 and 29.5 pCi/L, respectively. These naturally-occurring radionuclides would decay away in about three to four hours.

## 5.1 CONCLUSIONS

Evaluation of the analytical results of springs and seeps that occur within and around the periphery of the SSFL show no chemicals of potential concern or man-made radionuclides to be present above laboratory method reporting limits at seven of the nine springs and seeps sampled. These results are consistent with the strong attenuation of the transport by groundwater of any of the target analytes due to matrix diffusion and sorption. The detected VOC concentrations of acetone and methylene chloride above laboratory method reporting limits are likely a result of sample contamination either by the silicone caulking used as a dam to sample the spring, or by laboratory procedures. Detected radionuclides are naturally occurring. Based on these sampling results, no further evaluation of spring/seep data in the Surficial Media Operable Unit risk assessments appears warranted.

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**TABLE 1**

**SPRING AND SEEP SAMPLE COLLECTION METHODS**
**SANTA SUSANA FIELD LABORATORY**

| SPRING/ SEEP SAMPLE LOCATION | SPRING/ SEEP NO. | SAMPLE DATE | Latitude and Longitude of Spring/Seep (1) | | APPROXIMATE LOCATION AT SITE | POSITION IN GEOLOGIC FRAMEWORK | SAMPLE COLLECTION METHOD |
|---|---|---|---|---|---|---|---|
| | | | X COORDINATE | Y COORDINATE | | | |
| 1 | S19 | 6/12/02 | 1783998.59396 | 268696.76457 | Northwest of Area IV, off-site | Contact between Upper Burro Flats Member and Shale 3 | Temporary sampling point |
| | S21 | 6/10/02 | 1783466.68133 | 260814.39752 | Northwest of Area IV, off-site | Contact between Upper Burro Flats Member and Shale 3 | Temporary sampling point |
| 2 | S18 | 6/10/02 | 1787609.42156 | 270294.13074 | North of Area IV, undeveloped land | Contact between Upper Burro Flats Member and Shale 3 | Collected from sheet flow |
| 3 | S17 | 6/10/02 | 1790177.83374 | 271247.73680 | North of Area II, off-site | Within the Upper Burro Flats Member | Collected from pool in a sandstone outcrop |
| | S25 | NA | NA | NA | North of Area II, off-site | Within the Upper Burro Flats Member | Not sampled, downstream of spring/seep S17 |
| 4 | S13 | NA | NA | NA | North of Area II, off-site | Within Simi Conglomerate | Not sampled, unsafe condition, bees present |
| 5 | S14 | 6/11/02 – 6/20/02 | 1791572.00634 | 273169.54422 | North of Area I, off-site | Within the Upper Burro Flats Member | Collected from pool created by silica-dam |
| 6 | S16 | 6/11/02 | 1791907.50722 | 271986.56335 | North of Area I, off-site | Contact between colluvium and Upper Burro Flats Member | Temporary sampling point |
| 7 | S6 | NA | NA | NA | North of Area I, off-site | Within sandstone | Not sampled, dry |
| 8 | S27 | NA | NA | NA | Northeast of Area I, off-site | Within sandstone adjacent to Shear Zone | Not sampled, dry |
| 9 | S26 | NA | NA | NA | Southeast of Area I, off-site | Contact between sandstone and shale units in Lower Chatsworth Formation with the Burro Flats fault | Not sampled, could not gain property access |
| 10 | S22 | 6/11/02 | 1787043.56186 | 260814.39752 | South of Area II, off-site | Contact between colluvium and Sandstone 2 | Temporary sampling point |
| | S22A | 6/11/02 | 1787044.62997 | 260836.82821 | South of Area II, on-site | Contact between colluvium and Sandstone 2 | Temporary sampling point |
| 11 | S5 | 6/11/02 | NA | NA | Northwest Area III – on-site, north of Compound A | Contact between Lower Burro Flats Member and colluvium | Not sampled, dry |
| 12 | S29 | 10/3/02 | 1786709.43405 | 270527.79044 | North of Area IV, off-site | Contact between Upper Burro Flats Member and Shale 3 | Temporary sampling point |

NA = not applicable
(1) Coordinates in State plane, NAD27, Zone V

**TABLE 2**

**SPRING AND SEEP ANALYTICAL TESTING MATRIX**
**SANTA SUSANA FIELD LABORATORY, VENTURA COUNTY, CALIFORNIA**

| | | | | | Radioactivity Testing | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Radioactivity | | Stable Isotopes | | General Minerals | | |
| Spring/ Seep Sample ID | MWH Sample ID | EPA Sample ID | VOCs (8260B) | Perchlorate (300M) | Gross Alpha/Gross Beta (900/901.1) | Gamma-Emitting Radionuclides (906) | Deuterium ($^{2}H$) | Oxygen-18 ($^{18}O$) | Cations (6010B/7000) | Anions (300) | Total Dissolved Solids (160.1) |
| S14 | SSSW05SO1 | ME058, MJ048, MW048 | X | X | X | X | X | X | X | X | X |
| S16 | SSSW04SO1 | ME050, MJ050, MW050 | X | X | X | X | X | X | X | X | X |
| S17 | SSSW03SO1 | ME049, MJ049, MW049 | X | X | X | X | X | X | X | X | X |
| S18 | SSSW02SO1 | ME048, MJ048, MW048 | X | X | X | X | X | X | X | X | X |
| S19 | SSSW08SO1 | ME054, MJ054, MW054 | X | X | X | X | X | X | X | X | X |
| S21 | SSSW01SO1 | ME047, MJ047, MO047 | X | X | X | X | X | X | X | X | X |
| S22 | SSSW07SO1 | ME053, MJ053, MW053 | X | X | X | X | X | X | X | X | X |
| S22A | SSSW06SO1 | ME052, MJ047, MW052 | X | X | X | X | X | X | X | X | X |
| S29 | SSSW09SO1 | ME093, MJ093, MW093 | X | X | X | X | X | X | X | X | X |

Notes:
VOCs - Volatile Organic Compounds

**TABLE 3**

**RESULTS OF SPRINGS AND SEEPS ANALYZED FOR VOCs AND PERCHLORATE**
**SANTA SUSANA FIELD LABORATORY**

| Spring/Seep Sample ID | MWH Sample ID | Date | Detected VOCs | | | | | Perchlorate (mg/L) |
|---|---|---|---|---|---|---|---|---|
| | | | Toluene (mg/L) | Bromomethane (mg/L) | Acetone (mg/L) | Methylene Chloride (mg/L) | MRL (mg/L) | |
| S14[a] | SSSW05S01 | 6/11/02-6/20/02 | **2 J** | ND | **21**[b] | ND | (<5 TO <15) | ND (< 1) |
| S16 | SSSW04S01 | 6/11/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S17 | SSSW03S01 | 6/10/02 | ND | ND | **2 J** | ND | (<5 TO <15) | ND (< 1) |
| S18 | SSSW02S01 | 6/10/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S19 | SSSW08S01 | 6/12/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S21 | SSSW01S01 | 6/10/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S22 | SSSW07S01 | 6/11/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S22A | SSSW06S01 | 6/11/02 | ND | ND | ND | ND | (<5 TO <15) | ND (< 1) |
| S29 | SSSW09S01 | 10/3/02 | ND | **1 J** | ND | **6** | (<2 TO <15) | ND (< 1) |

Notes:

(a) Multiple samples collected on several days from S14 location because of low flow conditions. To collect samples, silicone dam constructed.

(b) Acetone was detected at a concentration of 4 ug/L in the second VOC sample collected from S14.

ND = not detected above method reporting limit (shown as "<")
MRL = method reporting limit
µg/L - micrograms per liter
J = estimated value; compound detected below method reporting limit.

**TABLE 4**

**RESULTS OF SPRINGS AND SEEPS ANALYZED FOR RADIOACTIVITY**
**SANTA SUSANA FIELD LABORATORY**

| Spring/Seep Sample ID | MWH Sample ID | Date | Gross Alpha (pCi/L) MCL 15 | Gross Beta (pCi/L) MCL 50 | Man-Made Gamma-Emitting Radionuclides (pCi/L) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Cesium-134 | Cesium-137 | Cobalt-57 | Cobalt-60 |
| S14[(a)] | SSSW05S01 | 6/11/02-6/20/02 | ND (<3.96) | 4.23 ± 1.7 | ND (<7.21) | ND (<7.01) | ND (<4.68) | ND (<7.22) |
| S16 | SSSW04S01 | 6/11/02 | ND (<1.93) | 3.66 ± 1.4 | ND (<16.8) | ND (<15) | ND (<10.2) | ND (<17.4) |
| S17 | SSSW03S01 | 6/10/02 | ND (<3.05) | ND (<2.85) | ND (<14.7) | ND (<11) | ND (<7.98) | ND (<13.5) |
| S18 | SSSW02S01 | 6/10/02 | ND (<2.25) | 4.1 ± 1.5 | ND (<9.88) | ND (<8.1) | ND (<3.28) | ND (<10.7) |
| S19 | SSSW08S01 | 6/12/02 | ND (<2.69) | 3.3 ± 1.4 | ND (<15.1) | ND (<11.9) | ND (<8.74) | ND (<12.7) |
| S21 | SSSW01S01 | 6/10/02 | ND (<1.96) | 3.29 ± 1.4 | ND (<16.5) | ND (<13.9) | ND (<9.7) | ND (<16.7) |
| S22 | SSSW07S01 | 6/11/02 | ND (<2.51) | ND (<2.78) | ND (<14.6) | ND (<12.5) | ND (<10.8) | ND (<12.8) |
| S22A | SSSW06S01 | 6/11/02 | ND (<1.70) | ND (<2.00) | ND (<14.3) | ND (<11.3) | ND (<10.4) | ND (<11.3) |
| S29 | SSSW09S01 | 10/3/02 | ND (<4.46) | ND (<6.92) | ND (<9.26) | ND (<8.16) | ND (<5.21) | ND (<7.89) |

Notes:

(a) Multiple samples collected on several days from S14 location because of low flow conditions. To collect samples, silicone dam constructed.

(b) Results shown on this table only include those radionuclides regulated by state or federal agencies (lowest MCL provided), or man-made gamma-emmitting radionuclides (federally regulated by 40 CFR 141). All radionuclide sample data are presented in Appendix A.

(c) Three naturally occurring radionuclides were also detected in two samples: potassium-40 (234 pCi/L) at S14, and bismuth-214 (17.8 pCi/L), and lead-214 (29.5 pCi/L) at S29. Both bismuth-214 and lead-214 are short-lived naturally-occurring radon decay products. There are no federal or state established action levels for these isotopes.

ND = not detected above method reporting limit (shown as "<")

MCL = Maximum contaminant level

pCi/L - picoCuries per liter

**TABLE 5**
**RESULTS OF SPRINGS AND SEEPS ANALYZED FOR STABLE HYDROGEN AND OXYGEN ISOTOPES SANTA SUSANA FIELD LABORATORY**

| Spring/Seep Sample ID | MWH Sample ID | Date | Deuterium ($^{2}H$) (d $^{2}H$ 0/00 VSMOW) | Oxygen-18 ($^{18}O$) (d $^{18}O$ 0/00 VSMOW) |
|---|---|---|---|---|
| S14[a] | SSSW05S01 | 6/11/02-6/20/02 | -35.48 | -4.03 |
| S16 | SSSW04S01 | 6/11/02 | -47.49 | -7.07 |
| S17 | SSSW03S01 | 6/10/02 | -43.84 | -7.09 |
| S18 | SSSW02S01 | 6/10/02 | -44.38 | -7.25 |
| S19 | SSSW08S01 | 6/12/02 | -45.79 | -7.33 |
| S21 | SSSW01S01 | 6/10/02 | -44.05 | -7.03 |
| S22 | SSSW07S01 | 6/11/02 | -46.22 | -6.89 |
| S22A | SSSW06S01 | 6/11/02 | -48.21 | -6.69 |
| S29 | SSSW09S01 | 10/3/02 | -52.08 | -7.68 |

Notes:

(a) Multiple samples collected on several days from S14 location because of low flow conditions. To collect samples, silicone dam constructed.

(b) Units for the hydrogen and deuterium isotopes are given as the measured value of the sample relative to the reference standard of Vienna standard mean ocean water (VSMOW) in permils (o/oo) or parts per thousand.

# TABLE 6
# RESULTS OF SPRINGS AND SEEPS ANALYZED FOR GENERAL MINERALS
# SANTA SUSANA FIELD LABORATORY

| Spring/Seep Sample ID | MWH Sample ID | Date | Cation Concentrations (mg/L) | | | | Anion Concentrations (mg/L) | | | | | Total Dissolved Solids (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Calcium | Magnesium | Potassium | Sodium | Bicarbonate | Carbonate | Chloride | Sulfate | Alkalinity | |
| S14[(a)] | SSSW05S01 | 6/11/02-6/20/02 | **32.1** | 22.1 | 5.5 | *178* | 257 | ND (<2) | *78.2* | 233 | 257 | 768.5 |
| S16 | SSSW04S01 | 6/11/02 | 57 | 32 | ND (< 5) | **67** | 282 | ND (<2) | 47.86 | 135.43 | 282 | 561 |
| S17 | SSSW03S01 | 6/10/02 | 106 | 35 | ND (< 5) | 76 | 301 | ND (<2) | 40.27 | 189.57 | 301 | 589 |
| S18 | SSSW02S01 | 6/10/02 | 85 | 25 | ND (< 5) | 80 | 285 | ND (<2) | 38.23 | **120.79** | 285 | **481** |
| S19 | SSSW08S01 | 6/12/02 | 77 | 24 | ND (< 5) | 106 | 288 | ND (<2) | 44.72 | 153.91 | 288 | 550 |
| S21 | SSSW01S01 | 6/10/02 | 82 | 19.8 | ND (< 5) | 71 | **254** | ND (<2) | 39.5 | 121.69 | **254** | **481** |
| S22 | SSSW07S01 | 6/11/02 | *200* | *83* | *7.9* | 95 | 311 | ND (<2) | 76.44 | *556.22* | 311 | *1,241* |
| S22A | SSSW06S01 | 6/11/02 | 140 | 46 | ND (< 5) | 97 | *340* | ND (<2) | 71 | 300.54 | *340* | ND (<10) |
| S29 | SSSW09S01 | 10/3/02 | 57 | **16** | **3.4** | 130 | 283 | ND (<2) | **37.2** | 131.2 | 283.5 | 561 |

Notes:
(a) Multiple samples collected on several days from S14 location because of low flow conditions. To collect samples, silicone dam constructed.

ND = not detected above method reporting limit (shown as "<")
mg/L - milligrams per liter
**Bold indicates lowest concentration detected**
*Italics indicate highest concentration detected*

**TABLE 7**

**RESULTS OF SPRINGS AND SEEPS ANALYZED FOR VOCS AND PERCHLORATE**
**DTSC SPLIT SAMPLES**
**SANTA SUSANA FIELD LABORATORY**

| Spring/Seep Sample ID | MWH Sample ID | DTSC Sample ID | Date | VOCs (ug/L) | Perchlorate (ug/L) |
|---|---|---|---|---|---|
| S14 | SSSW05S01 | SSFL-W-012K | 6/12/02 | Not Analyzed | ND (< 4) |
| S16 | SSSW04S01 | SSFL-W-008A, K | 6/11/02 | ND (<1 TO <5) | ND (< 4) |
| S17 | SSSW03S01 | SSFL-W-007A, K | 6/10/02 | ND (<1 TO <5) | ND (< 4) |
| S18 | SSSW02S01 | SSFL-W-006A, K | 6/10/02 | ND (<1 TO <5) | ND (< 4) |
| S19 | SSSW08S01 | SSFL-W-011A, K | 6/12/02 | ND (<1 TO <5) | ND (< 4) |
| S21 | SSSW01S01 | SSFL-W-005A, K | 6/10/02 | ND (<1 TO <5) | ND (< 4) |
| S22 | SSSW07S01 | SSFL-W-010A, K | 6/11/02 | ND (<1 TO <5) | ND (< 4) |
| S22A | SSSW06S01 | SSFL-W-009A, K | 6/11/02 | ND (<1 TO <5) | ND (< 4) |

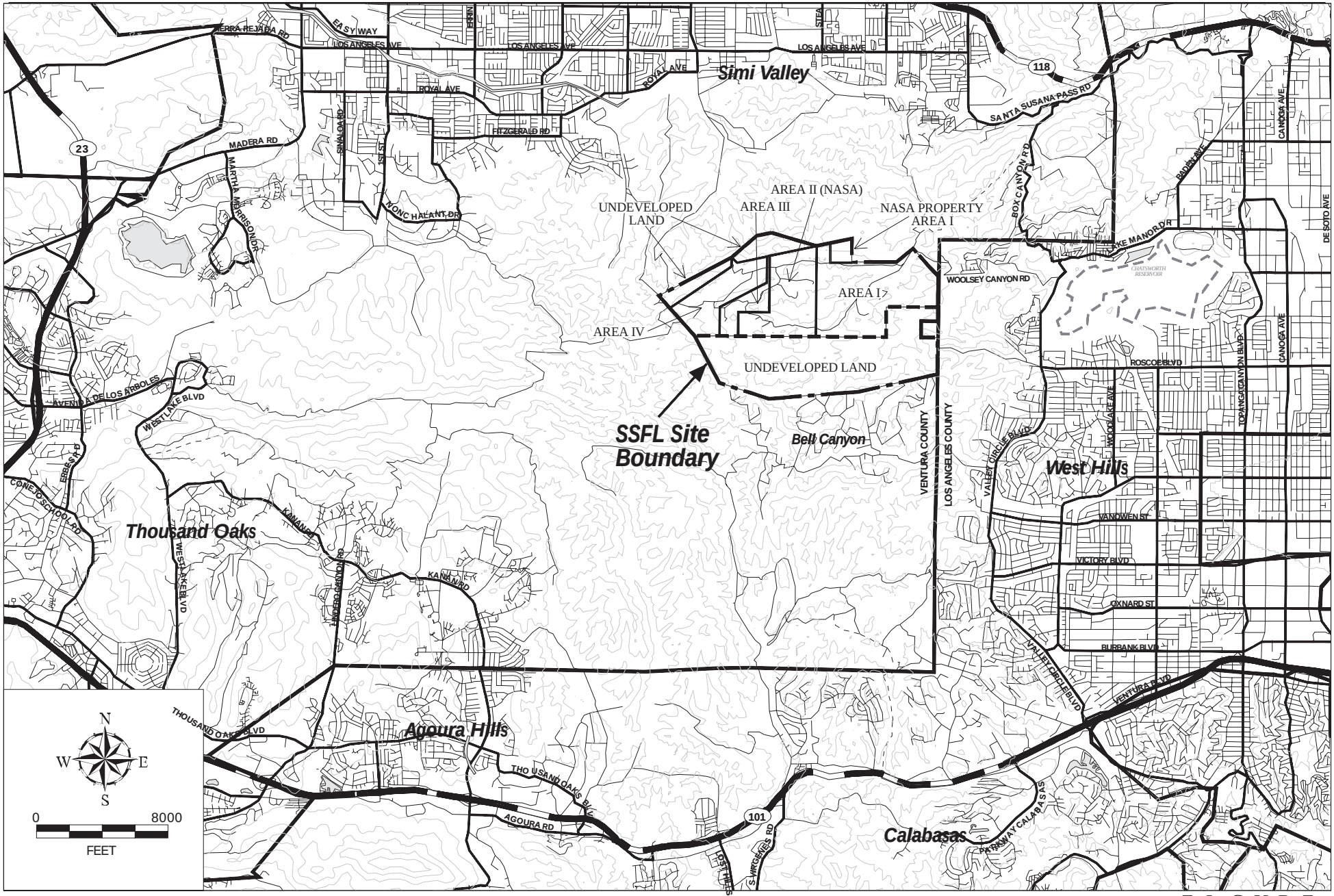
Notes:
ND = not detected above method reporting limit (shown as "<")
MRL = method reporting limit
ug/L = milligrams per liter

**TABLE 8**

**RESULTS OF SPRINGS AND SEEPS ANALYZED FOR METALS**
**DTSC SPLIT SAMPLES**
**SANTA SUSANA FIELD LABORATORY**

| Spring/Seep Sample ID | MWH Sample ID | DTSC Sample ID | Date | MRL | Metals | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Barium | Chromium | Nickel | Vanadium | Zinc |
| S14 | SSSW05S01 | SSFL-W-012J | 6/12/02 | 0.01 | 0.101 | 0.014 | 0.013 | *0.029* | *0.085* |
| S16 | SSSW04S01 | SSFL-W-008J | 6/11/02 | 0.01 | 0.053 | -- | -- | -- | **0.011** |
| S17 | SSSW03S01 | SSFL-W-007J | 6/10/02 | 0.01 | **0.029** | -- | -- | -- | -- |
| S18 | SSSW02S01 | SSFL-W-006J | 6/10/02 | 0.01 | 0.030 | -- | -- | -- | -- |
| S19 | SSSW08S01 | SSFL-W-011J | 6/12/02 | 0.01 | 0.071 | -- | -- | 0.020 | 0.031 |
| S21 | SSSW01S01 | SSFL-W-005J | 6/10/02 | 0.01 | 0.032 | -- | -- | -- | -- |
| S22 | SSSW07S01 | SSFL-W-010J | 6/11/02 | 0.01 | *0.144* | -- | -- | **0.018** | 0.026 |
| S22A | SSSW06S01 | SSFL-W-009J | 6/11/02 | 0.01 | 0.034 | -- | -- | -- | -- |

Notes:
results - mg/L - milligrams per liter, "--" indicates not detected
**Bold indicates lowest concentration detected**
*Italics indicate highest concentration detected*
MRL - method reporting limit (practical quanititation limit)



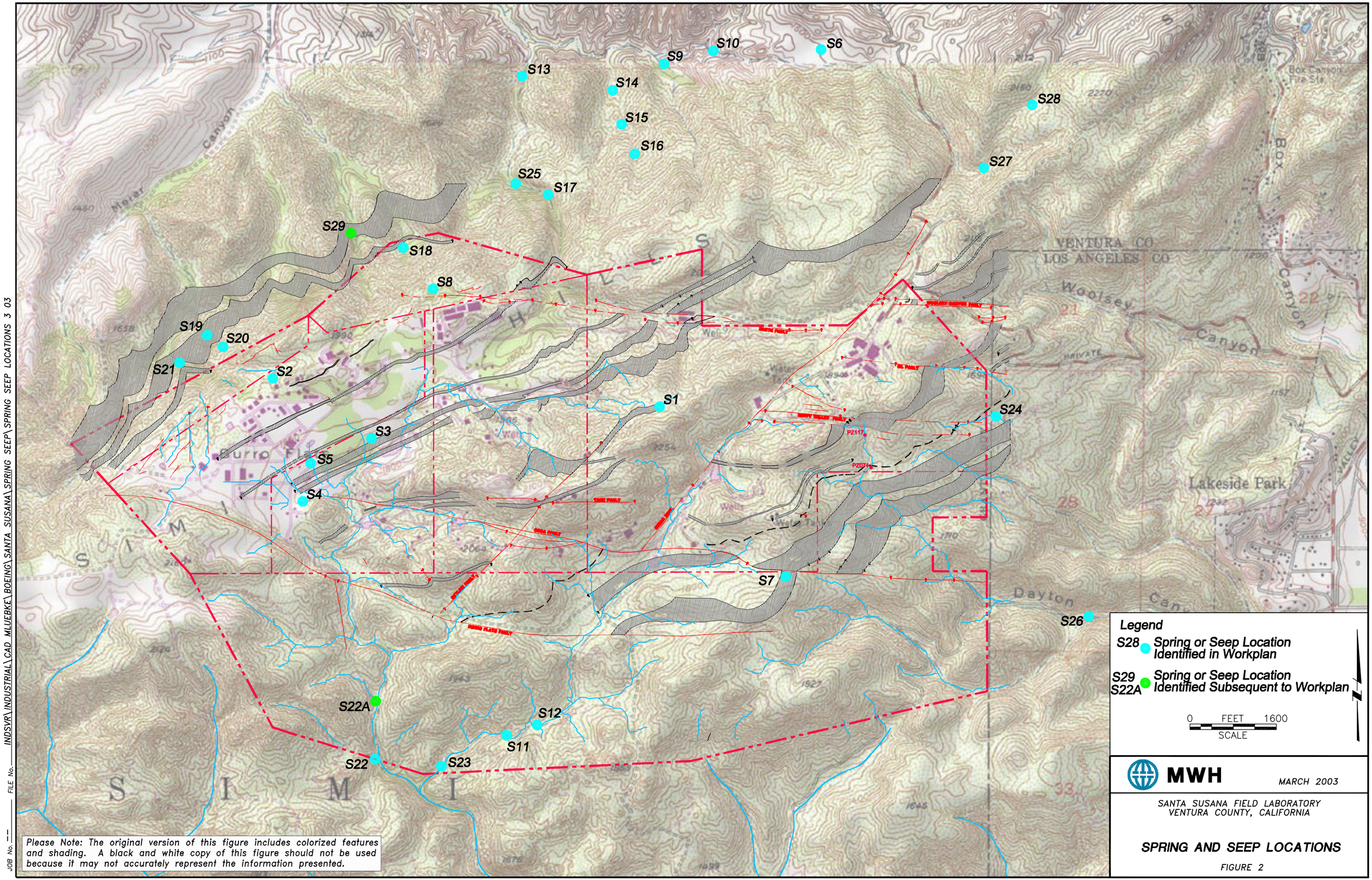

FIGURE

1

MWH
MONTGOMERY WATSON HARZA

**Regional Location Map**
**Santa Susana Field Laboratory**

/yap/rock/plots/figures/tcefigs_rfi_7.aml




Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

MWH

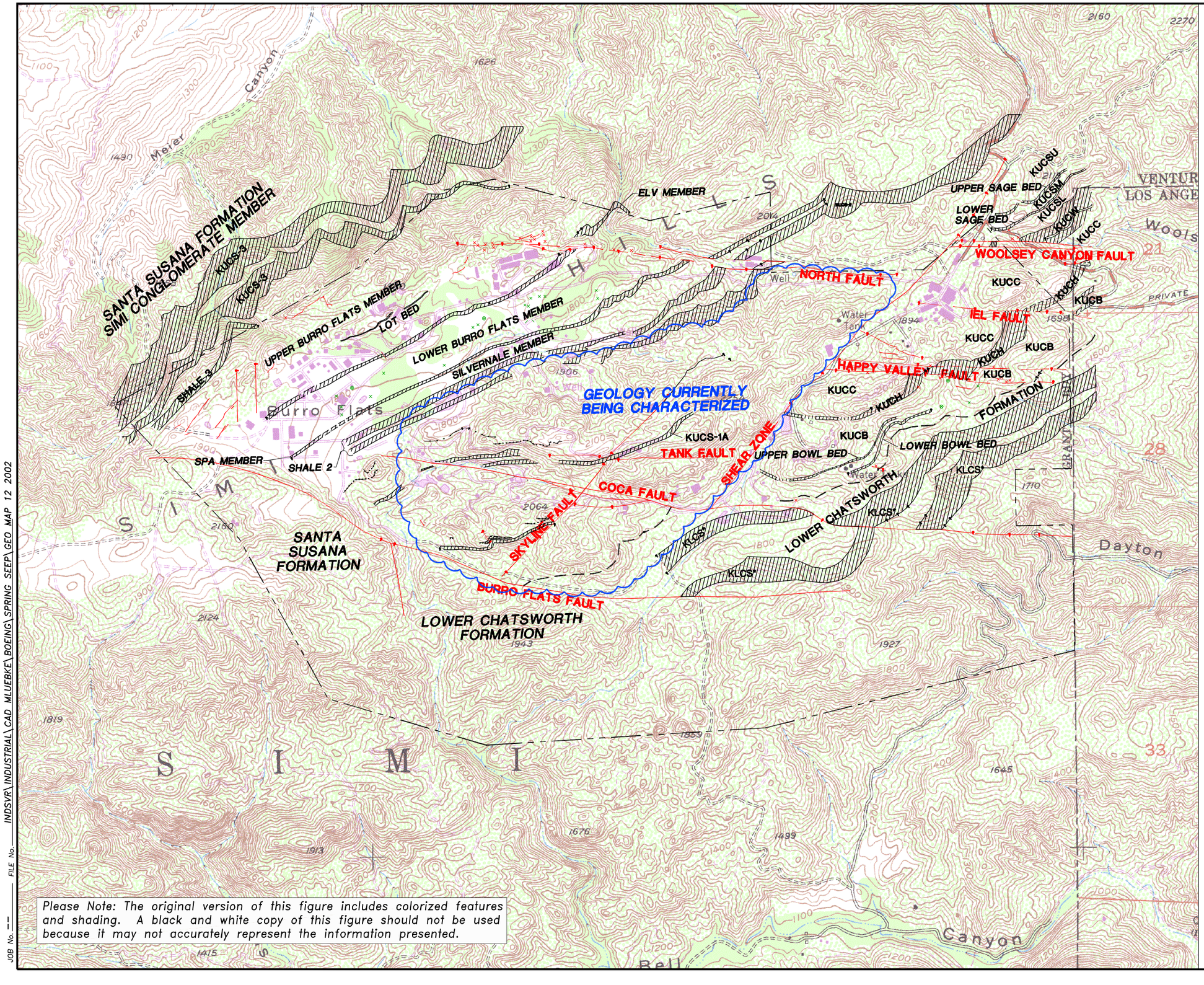
MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

**SPRING AND SEEP LOCATIONS**

FIGURE 2

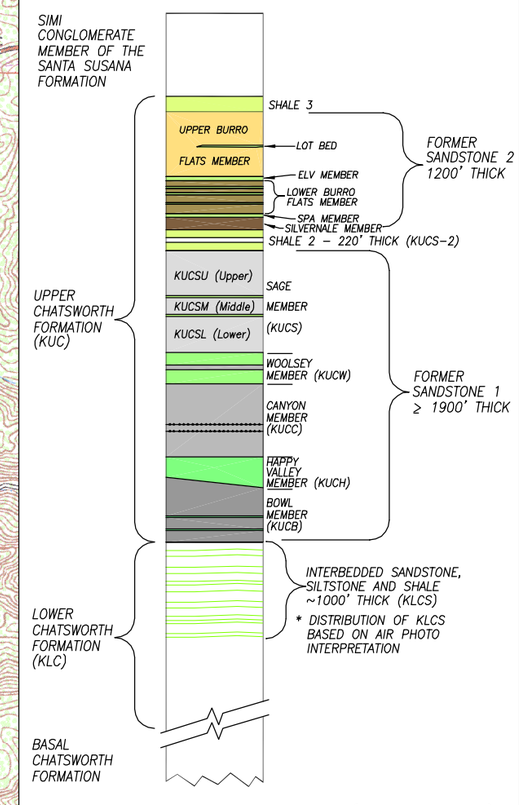
JOB No. --- FILE No. INDSVR\INDUSTRIAL\CAD_MLUEBKE\BOEING\SANTA_SUSANA\SPRING_SEEP\SPRING_SEEP_LOCATIONS_3_03




Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

## Legend

- Property Boundary
- Shale Bed
- Fault
- Contact Between Upper & Lower Chatsworth Formation




Stratigraphic Column, 2002 (not to scale)

Note: KUCS–1A & 1B are shale units in former Sandstone 1 that have not yet been characterized within the refined stratigraphy of former Sandstone 1.

MWH

MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

**CURRENT GEOLOGIC MAP OF SSFL (DEC. 2002)**

FIGURE 3

JOB No. -- FILE No. INDSVR\INDUSTRIAL\CAD MLUEBKE\BOEING\SPRING SEEP\GEO MAP 12 2002

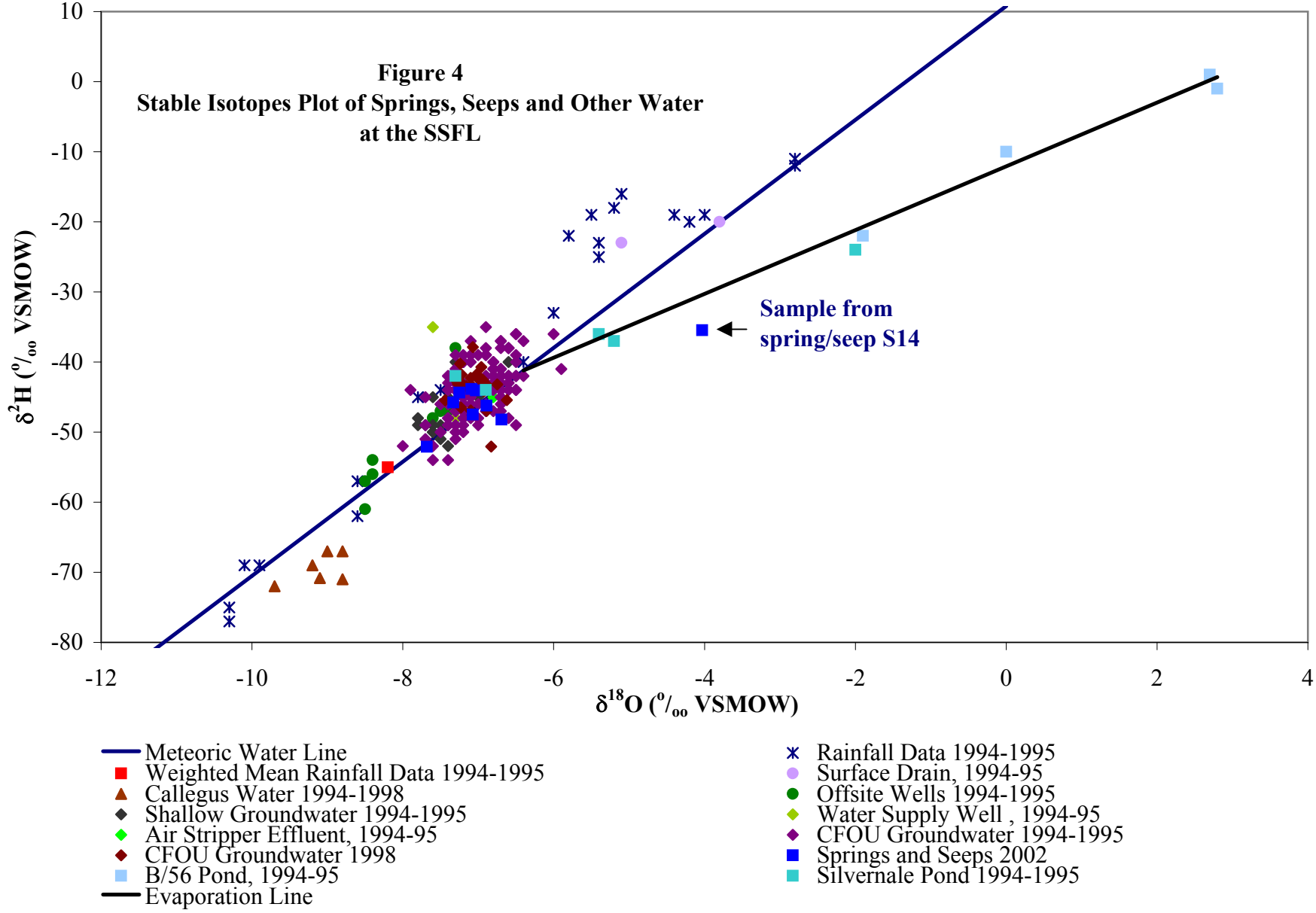


Figure 4
Stable Isotopes Plot of Springs, Seeps and Other Water at the SSFL
Sample from spring/seep S14
δ2H (o/oo VSMOW)
δ18O (o/oo VSMOW)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-12
-10
-8
-6
-4
-2
0
2
4
Meteoric Water Line
Weighted Mean Rainfall Data 1994-1995
Callegus Water 1994-1998
Shallow Groundwater 1994-1995
Air Stripper Effluent, 1994-95
CFOU Groundwater 1998
B/56 Pond, 1994-95
Evaporation Line
Rainfall Data 1994-1995
Surface Drain, 1994-95
Offsite Wells 1994-1995
Water Supply Well , 1994-95
CFOU Groundwater 1994-1995
Springs and Seeps 2002
Silvernale Pond 1994-1995

# APPENDIX A
# SPRING AND SEEP SAMPLE DATA VALIDATION SUMMARY
# SANTA SUSANA FIELD LABORATORY

## 1.0 INTRODUCTION

The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at the Santa Susana Field Laboratory (SSFL) includes soil, groundwater, surface water, and biota sampling and analysis, as well as passive and active soil gas sampling and analysis following agency-approved work plans (Ogden, 1996; 2000a, and 2000b; MWH, 2002). Samples are analyzed for a variety of compounds including metals, volatile organic compounds, semivolatile organic compounds, polynuclear aromatic hydrocarbons, total fuel hydrocarbons, pesticide/polychlorinated biphenols (PCB) compounds, dioxin/furans, explosive compounds, and general minerals (fluoride, chloride, sulfate, alkalinity, perchlorate, etc.). The resulting data is validated by qualified chemists following EPA guidelines as described in the RFI Quality Assurance Plans (QAPPs) and data validation standard operating procedures (SOPs). These data validation procedures are based on USEPA CLP National Functional Guidelines for Organic Data Review (1994a) and USEPA CLP National Functional Guidelines for Inorganic Data Review (1994b).

The Seep and Spring sampling program collected water samples from seeps and springs within and surrounding the SSFL in June and October of 2002. Samples were analyzed for volatile organic compounds (VOCs), metals (calcium, magnesium, potassium, sodium), general minerals (chloride, sulfate, perchlorate, total alkalinity, bicarbonate alkalinity, carbonate alkalinity, total dissolved solids), and limited radiological parameters (gross alpha, gross beta, and other selected radiological isotopes). Data from all samples were subsequently validated at EPA Level V by AMEC Earth and Environmental (AMEC). The associated data validation reports and annotated laboratory result forms are attached to this summary. A precision, accuracy, representativeness, completeness, and comparibility (PARCC) parameter assessment was not performed for

the Seep and Spring sampling activity, because the number of samples collected were small and, in general, individual sampling events do not constitute a statistically significant event. However, because split samples were collected by the Department of Toxic Substances Control (DTSC), the agency overseeing this project, a comparison of these data to the primary sample results was performed. The individual DTSC results were not validated by AMEC.

Data validation results in the following qualifications of analytical results: "U" (undetected), "J" (estimated), "N" (presumptive identification), and "R" (rejected). Data with "U," "J," or "N" qualifiers are still usable; data with an "R" qualifier are unusable. The following items were reviewed during the validation process: sample management (collection techniques, sample containers, preservation, handling, transport, chain-of-custody, holding times); method blank sample results; blank spike and laboratory control sample results; surrogate recoveries, if applicable; matrix spike/matrix duplicate recoveries and precision; laboratory duplicate precision, if applicable; serial dilution precision, if applicable; field quality assurance / quality control (QA/QC) sample results; and other QC indicators as applicable.

Field QC samples provide a means of evaluating the quality of field sampling procedures, the effectiveness of equipment decontamination procedures, and the potential for introduction of contaminants unrelated to the project. Field QC samples collected during the project included field split samples, field blanks, and equipment rinsates. No trip blanks were collected in association with the site samples analyzed by SW-846 Method 8260B. Unless otherwise noted, field QC samples were collected according to the SSFL RFI QAPPs.

The following section contains a brief summary of data validation results for the Seep and Spring samples collected during June and October 2002. A more detailed summary of the validation findings is presented in the individual data validation reports attached. Overall, some results were qualified with estimated concentrations; these data are still

usable, but are viewed with additional caution. No data in this sampling event were rejected.

## 2.0 VOLATILE ORGANIC COMPOUNDS

For volatiles, results for all target compounds are considered useable as no data were rejected. Ten seep/spring samples were analyzed for Method 8260B target compounds. Two field split samples, and four field QC samples were also analyzed. Acetone and methylene chloride were qualified as estimated nondetects in two field QC samples due to contamination in the method blank. Chloroform was detected in another method blank but was not detected in the associated site sample. Nondetected results for dichlorodifluoromethane, chloromethane, vinyl chloride, and methylene chloride were estimated in several samples for laboratory control sample recovery deficiencies. Detected and nondetected target compounds were estimated in several samples for surrogate recovery deficiencies and sample receipt deficiencies. The results of the two field split samples were in good agreement. The results of the seven DTSC field split samples were in good agreement.

No trip blanks were collected; therefore, no assessment could be made with respect to possible contamination during sample handling and transport to the laboratory. An equipment rinsate and a field blank were collected on 06/13/02. Chloroform was detected in both the equipment rinsate and the field blank, but was not detected in the associated site samples. Two additional equipment rinsates from silicone tubing and silicone caulking were collected on 06/19/02 and 06/20/02 in association with two site samples collected from a silicone dam at seep/spring S14 on 06/11/03 and 06/13/03. Acetone and methylene chloride were detected in both equipment rinsates; however, these detects were subsequently qualified as estimated nondetects due to method blank contamination. Additionally, chloroform was detected in the equipment rinsate from the silicone caulking, but was not detected in the associated site samples.

Four site samples had a total of six reported detects for target compounds. Of those detects, four were for common laboratory contaminants, acetone (three detects) and methylene chloride (one detect). The remaining detects were for toluene and bromomethane. These detects were estimated by the laboratory as they were below the reporting limits.

Further discussion of the acetone detects in the site samples collected from seep/spring S14 is warranted. A silicone dam was constructed on 06/10/02 to collect sample from seep/spring S14. The first site sample was collected on 06/11/03, before the silicone material used in the dam had completed hardened or 'cured'. This sample had a detect for acetone above the reporting limit at 21 µg/L. The second site sample was collected on 06/13/02 after the silicone material in the dam had cured. This sample had a detect for acetone below the reporting limit at 4 µg/L. The associated equipment rinsates were collected on 06/1902 and 06/20/02. Although these detects were subsequently qualified as estimated nondetects due to method blank contamination, it is not possible to determine if the presence of acetone in the equipment rinsates was solely due to contamination from the method blank, or resulted from contamination of the silicone material.

## 3.0 METALS

For metals, all results are considered usable as no data were rejected. Nine seep/spring samples were analyzed for calcium, magnesium, potassium, and sodium. One field split sample, eight DTSC field split samples, and four field QC samples were also analyzed. The DTSC field split samples were analyzed for different parameters (barium, chromium, nickel, vanadium, and zinc) and are, therefore, not comparable. Sodium was detected in one method blank, but not at sufficient concentration to require estimation of the associated site samples. No qualifications were required for quality control deficiencies. One equipment rinsate had detects for several target compounds, but none were of sufficient concentration to qualify the associated site sample. No target compounds were detected in the field blank or the other equipment rinsate. The results of the field split

sample were in good agreement. The target compounds were detected in most site samples.

## 4.0 GENERAL MINERALS AND PERCHLORATE

For the general minerals, all results are considered useable as no data were rejected. Eleven seep/spring samples were analyzed for chloride, sulfate, perchlorate, total alkalinity, bicarbonate alkalinity, carbonate alkalinity, and total dissolved solids. Three field split samples, eight DTSC field split samples, and four field QC samples were also analyzed. No site samples were affected by method blank contamination since no target compounds were present in the method blanks. Total alkalinity, bicarbonate alkalinity, carbonate alkalinity, total dissolved solids, and chloride were estimated in several samples for laboratory control sample recovery deficiencies. Total dissolved solids were detected in an equipment rinsate resulting in the estimation of total dissolved solids in several site samples. The results of the field split samples were in good agreement. The results of the eight DTSC field split samples were in good agreement. There were no detects for perchlorate in any of the samples. The remaining target compounds were detected in some or all of the site samples.

## 5.0 RADIOLOGICAL ISOTOPES

For the radiological parameters, all results are considered useable as no data were rejected. Thirteen seep/spring samples were analyzed for gross alpha, gross beta, potassium-40, cobalt-57, cobalt-60, cesium-134, cesium-137, thallium–208, lead-210, bismuth-212, lead-212, bismuth-214, lead-214, radium-226, actinium-228, thorium-234, and uranium-235, and one split sample was analyzed for gross alpha, gross beta, cesium-134, and cesium-137. No target compounds were present in the method blanks; however, the method blank associated with seep/spring S29 was not analyzed for lead-214 and bismuth-214. As the possibility of bismuth-214 and lead-214 blank contamination could not be evaluated in this sample, bismuth-214 and lead-214 detected in seep/spring S29 were qualified as estimated detects. No qualifications were required for quality control

deficiencies. One sample had a detect for potassium-40, a naturally-occurring compound. This sample also had beta activity greater than the minimum detectable activities (MDA). This is expected since potassium-40 decays by beta emission. The second sample had detects for lead-214 and bismuth-214 that were within the 2σ margin of error reported by the laboratory. These two isotopes are short-lived daughter products of naturally-occurring uranium-238.

## 6.0 REFERENCES CITED


Ogden Environmental and Energy Services, Company, Inc. (Ogden). 1996. RCRA Facility Investigation Work Plan Addendum, Santa Susana Field Laboratory, Ventura County, California. September 1996.

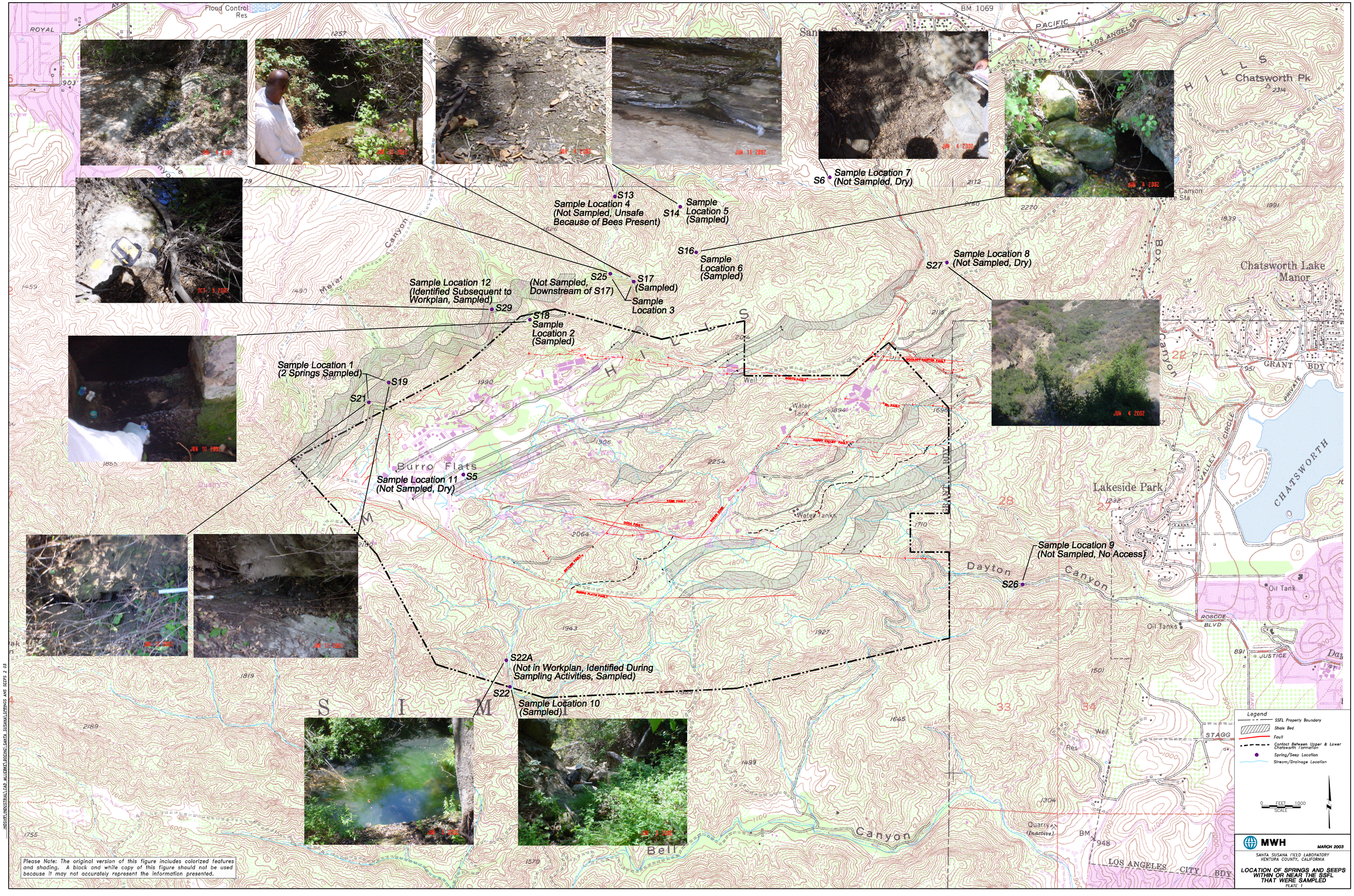
Ogden. 2000a. RCRA Facility Investigation Work Plan Addendum Amendment, Santa Susana Field Laboratory, Ventura County, California. June 2000.

Ogden. 2000b. Shallow Groundwater Investigation Work Plan, Final, Santa Susana Field Laboratory, Ventura County, California. December 2000.

MWH. 2002. Spring and Seep Sampling Work Plan. Santa Susana Field Laboratory, Ventura County, California. March 2002.

USEPA. 1994. CLP National Functional Guidelines for Organic Data Review.

USEPA. 1994. CLP National Functional Guidelines for Inorganic Data Review.


Sample Location 1
(2 Springs Sampled)
S19
S21
Sample Location 2
(Sampled)
S18
Sample Location 3
S17
(Sampled)
S25
(Not Sampled,
Downstream of S17)
Sample Location 4
(Not Sampled, Unsafe
Because of Bees Present)
S13
Sample Location 5
(Sampled)
S14
Sample Location 6
(Sampled)
S16
Sample Location 7
(Not Sampled, Dry)
S6
Sample Location 8
(Not Sampled, Dry)
S27
Sample Location 9
(Not Sampled, No Access)
S26
Sample Location 10
(Sampled)
S22
S22A
(Not in Workplan, Identified During
Sampling Activities, Sampled)
Sample Location 11
(Not Sampled, Dry)
S5
Sample Location 12
(Identified Subsequent to
Workplan, Sampled)
S29
Burro Flats
Chatsworth Pk
Chatsworth Lake
Manor
Lakeside Park
CHATSWORTH
Dayton Canyon
Meier Canyon
Bell Canyon
Oil Tank
Oil Tanks
Water Tanks
Water Tank
Quarry
(Inactive)
Legend
SSFL Property Boundary
Shale Bed
Fault
Contact Between Upper & Lower Chatsworth Formation
Spring/Seep Location
Stream/Drainage Location
0 FEET 1000
SCALE
N
MWH
MARCH 2003
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
LOCATION OF SPRINGS AND SEEPS
WITHIN OR NEAR THE SSFL
THAT WERE SAMPLED
PLATE 1
Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

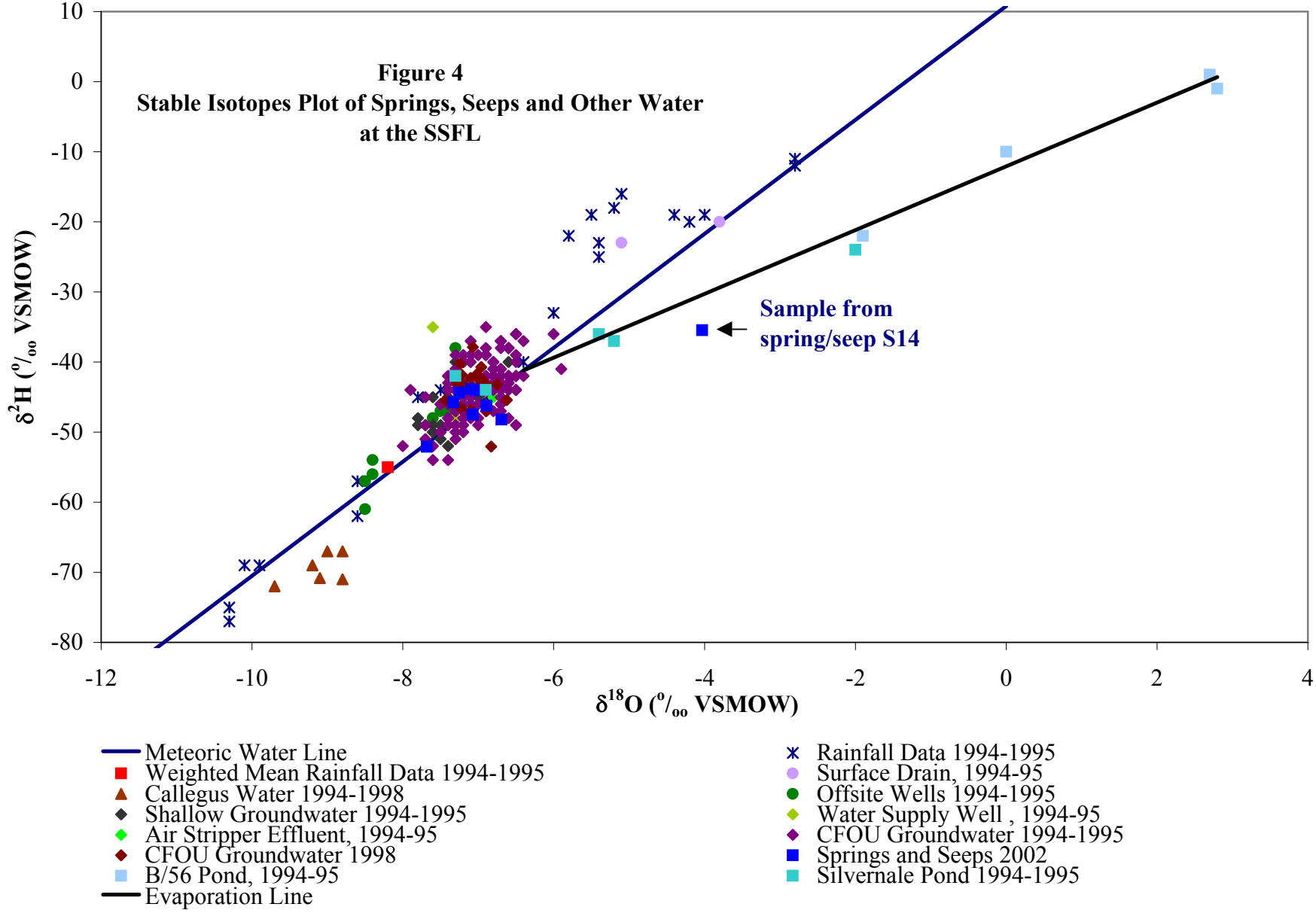
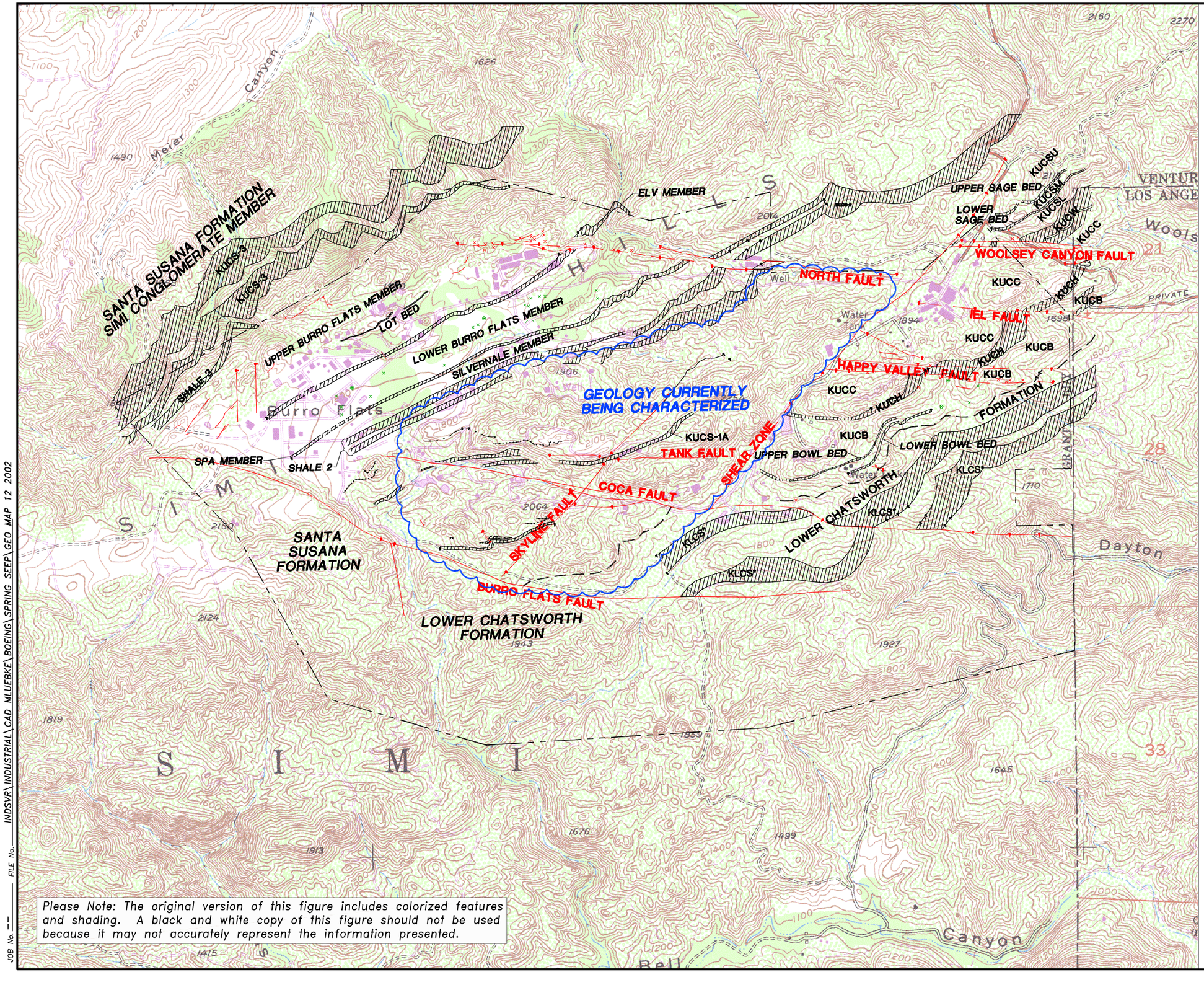


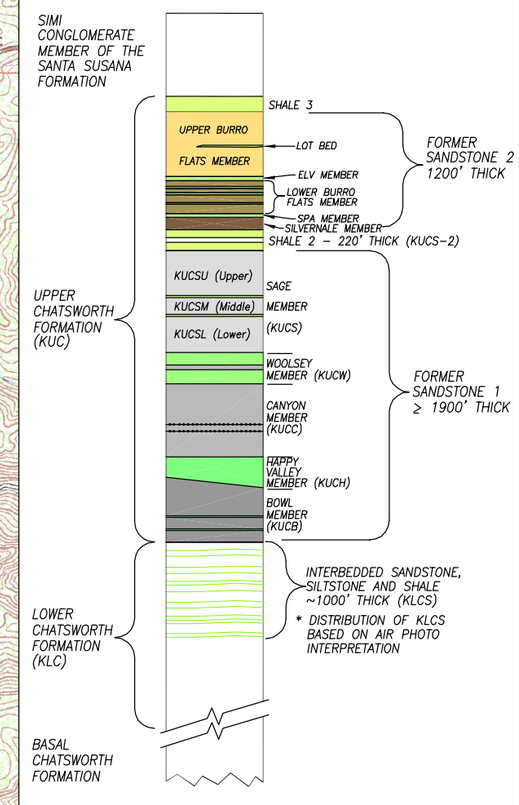
Figure 4
Stable Isotopes Plot of Springs, Seeps and Other Water at the SSFL
Sample from spring/seep S14
δ2H (o/oo VSMOW)
δ18O (o/oo VSMOW)
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-12
-10
-8
-6
-4
-2
0
2
4
Meteoric Water Line
Weighted Mean Rainfall Data 1994-1995
Callegus Water 1994-1998
Shallow Groundwater 1994-1995
Air Stripper Effluent, 1994-95
CFOU Groundwater 1998
B/56 Pond, 1994-95
Evaporation Line
Rainfall Data 1994-1995
Surface Drain, 1994-95
Offsite Wells 1994-1995
Water Supply Well , 1994-95
CFOU Groundwater 1994-1995
Springs and Seeps 2002
Silvernale Pond 1994-1995




Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

## Legend

- Property Boundary
- Shale Bed
- Fault
- Contact Between Upper & Lower Chatsworth Formation




Stratigraphic Column, 2002 (not to scale)

Note: KUCS–1A & 1B are shale units in former Sandstone 1 that have not yet been characterized within the refined stratigraphy of former Sandstone 1.

MWH

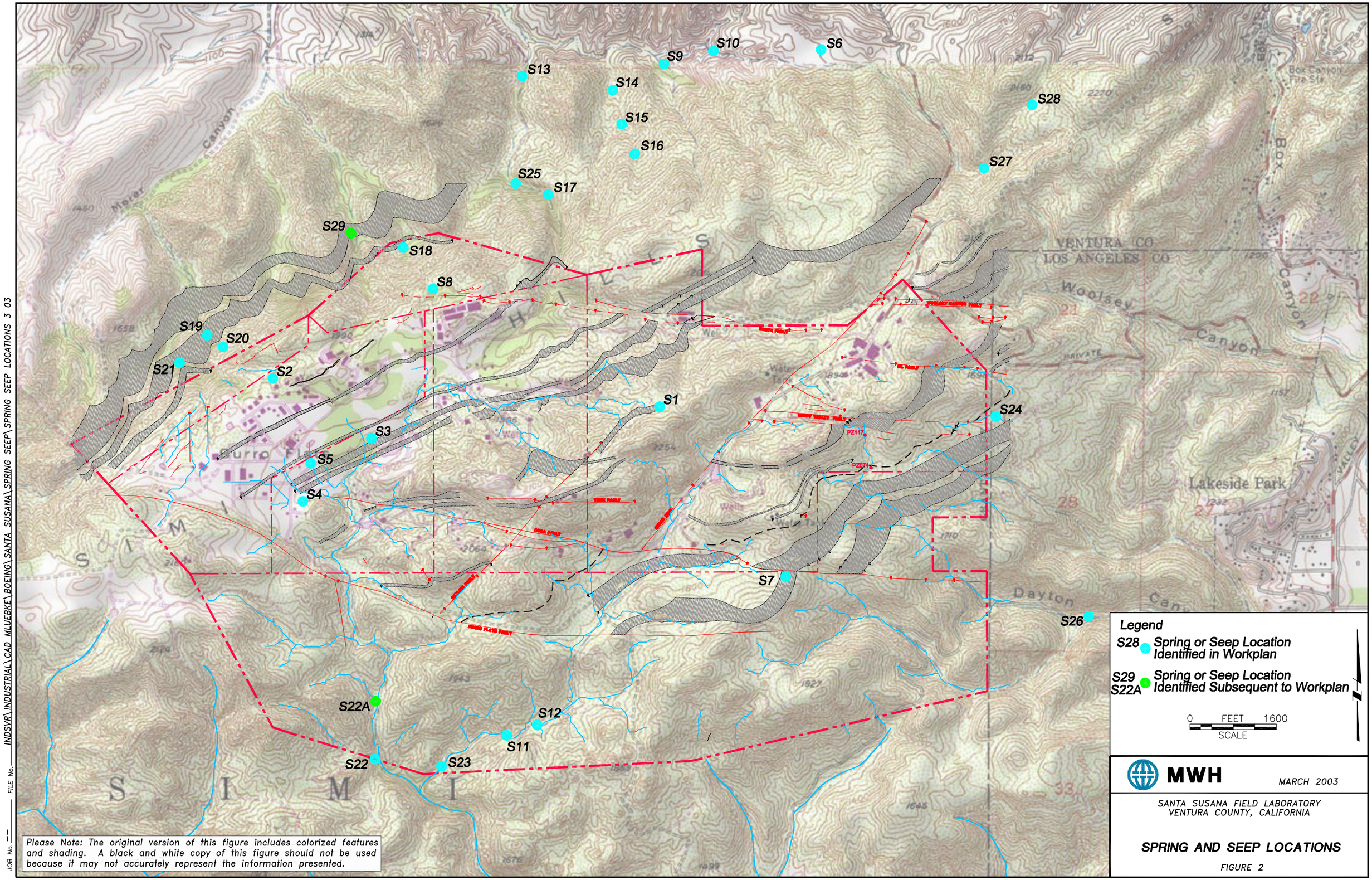
MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

**CURRENT GEOLOGIC MAP OF SSFL (DEC. 2002)**

FIGURE 3

JOB No. -- FILE No. INDSVR\INDUSTRIAL\CAD MLUEBKE\BOEING\SPRING SEEP\GEO MAP 12 2002




Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

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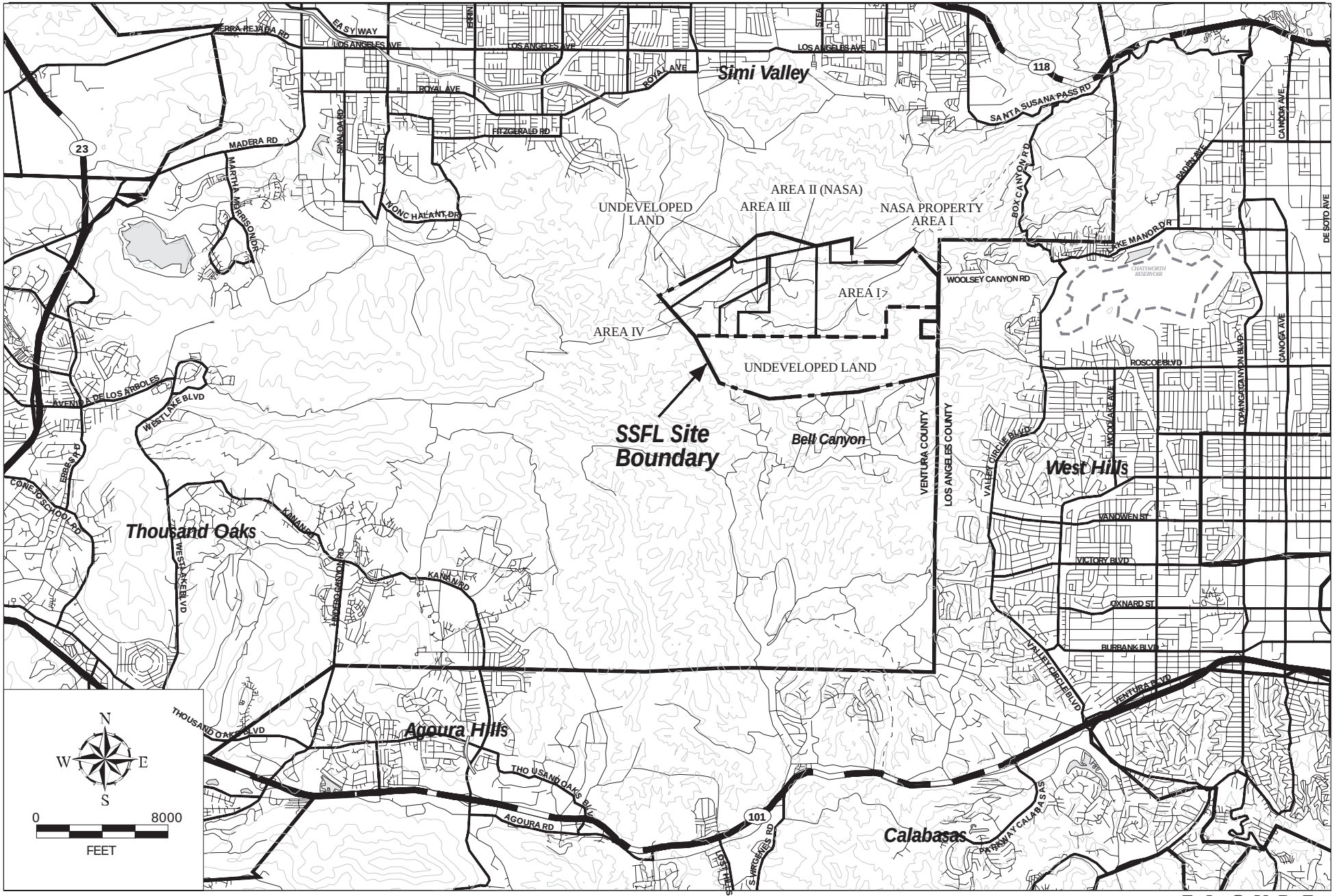
MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

**SPRING AND SEEP LOCATIONS**

FIGURE 2

JOB No. --- FILE No. INDSVR\INDUSTRIAL\CAD_MLUEBKE\BOEING\SANTA_SUSANA\SPRING_SEEP\SPRING_SEEP_LOCATIONS_3_03



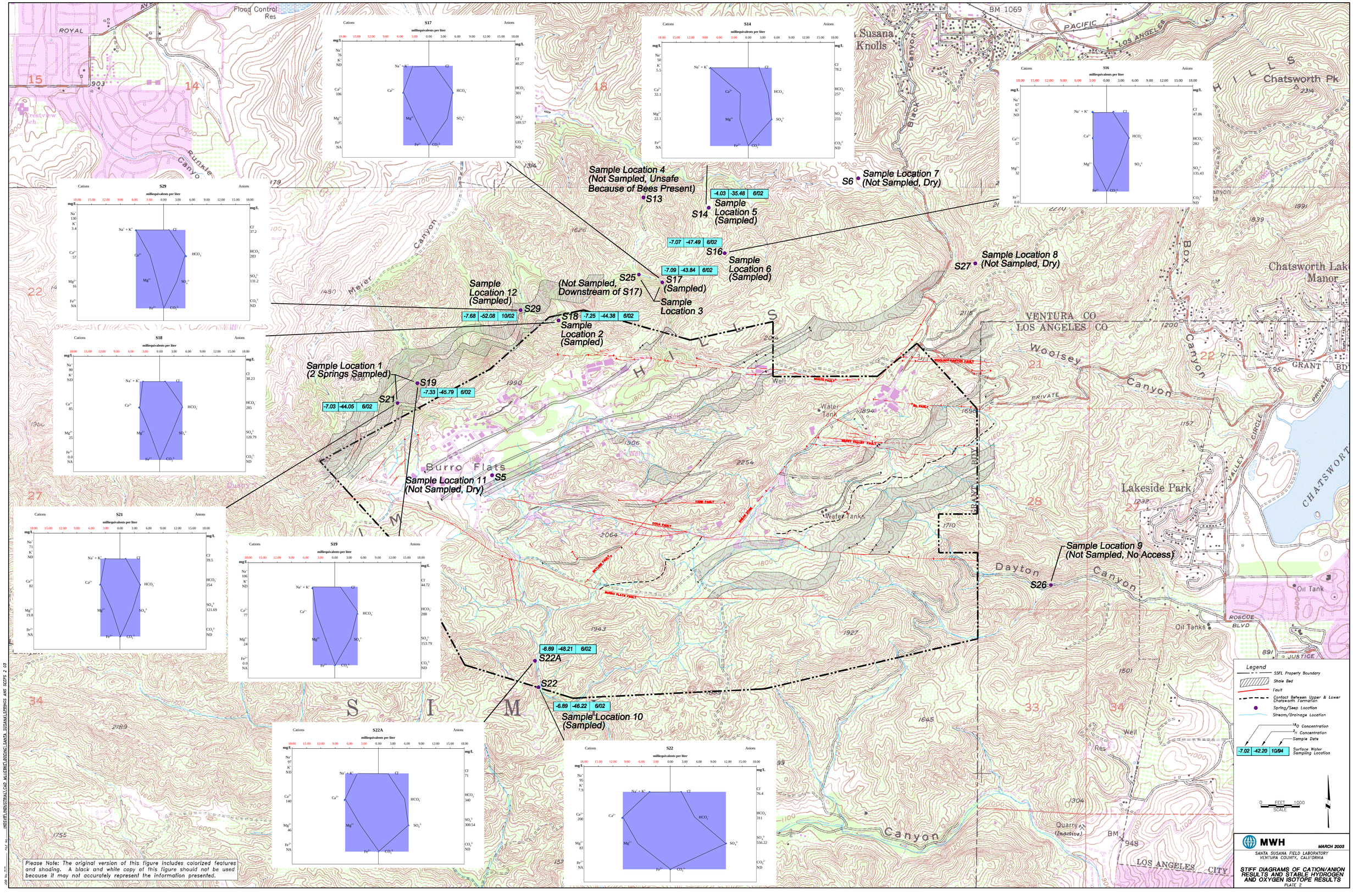

FIGURE

1

MWH
MONTGOMERY WATSON HARZA

**Regional Location Map**
**Santa Susana Field Laboratory**

/yap/rock/plots/figures/tcefigs_rfi_7.aml


Sample Location 4 (Not Sampled, Unsafe Because of Bees Present)
S13
-4.03 -35.48 6/02
S14
Sample Location 5 (Sampled)
S6
Sample Location 7 (Not Sampled, Dry)
-7.07 -47.49 6/02
S16
Sample Location 6 (Sampled)
S27
Sample Location 8 (Not Sampled, Dry)
-7.09 -43.84 6/02
S17 (Sampled)
S25 (Not Sampled, Downstream of S17)
Sample Location 3
Sample Location 12 (Sampled)
S29
-7.68 -52.08 10/02
S18
-7.25 -44.38 6/02
Sample Location 2 (Sampled)
Sample Location 1 (2 Springs Sampled)
S19
-7.33 -45.79 6/02
S21
-7.03 -44.05 6/02
Sample Location 11 (Not Sampled, Dry)
S5
Sample Location 9 (Not Sampled, No Access)
S26
-6.89 -48.21 6/02
S22A
S22
-6.89 -46.22 6/02
Sample Location 10 (Sampled)
Cations
Anions
S17
S14
S16
S29
S18
S21
S19
S22A
S22
milliequivalents per liter
mg/L
Legend
SSFL Property Boundary
Shale Bed
Fault
Contact Between Upper & Lower Chatsworth Formation
Spring/Seep Location
Stream/Drainage Location
18O Concentration
2H Concentration
Sample Date
Surface Water Sampling Location
0 FEET 1000
SCALE
MWH
MARCH 2003
SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA
STIFF DIAGRAMS OF CATION/ANION RESULTS AND STABLE HYDROGEN AND OXYGEN ISOTOPE RESULTS
PLATE 2
Please Note: The original version of this figure includes colorized features and shading. A black and white copy of this figure should not be used because it may not accurately represent the information presented.

Mar-14-03 02:36pm From-MWH AMERICAS INC T-819 P.06/08 F-485

U. of Ottawa

**MWH**
MONTGOMERY WATSON HARZA

250 N. Madison Avenue
Pasadena, CA 91101
(626) 568-6310

# Chain of Custody

Control Number: COC MO047
Date 6/13/02 Page 1 of 1

Project Manager: Dixie Hambrick
Project Name: Boeing SSFL
Project Number:
Deliver the results to the address above or as stated in contract

Bill To: Lowell Moffitt
Company: MWH
Address: 250 N. Madison Avenue, Pasadena, CA, 91101

Sample Disposal Instructions: Laboratory Disposal
Shipment Method: Fed-Ex
Comment:

Cooler No.
QC Level:
TAT:

Preservatives

| Sample ID | Description (for MWH use only) | Spring # SWMU | Depth | Date Collected | Time Collected | ULS Number | Lab ID | Soil | Water | Product | 8260B VOC | 8015BM TPH | 8270CSIM SVOC | 8270D SVOC | 8290 DIOXINS | 8315A FORMALDEHYDE | 8330 ORDNANCE | 6000/7000 METALS | 7196A HEX CHROMIUM | 8082 PCBs | 8040B/8045C pH | 340.2 FLUORIDE | 300M ANIONS | 300M HYDRAZINE | 300M PERCHLORATES | Deuterium/D18 | Sampling Method | Extra Volume MS/MSD | HOLD | Total # of Bottles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | HCL, pH<2 4°C | HCL, pH<2 4°C | 4°C | 4°C | 4°C | H2SO4, pH<2 4°C | 4°C | HNO3, pH<2 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | 4°C | | | | | |
| MO047 | SSSW01S01 | S21 | | 6/10/02 | 1048 | | | | X | | | | | | | | | | | | | | | | | X | | | | X |
| MO048 | SSSW02S01 | S18 | | ↓ | 1230 | | | | | | | | | | | | | | | | | | | | | X | | | X | X |
| MO049 | SSSW03S01 | S17 | | ↓ | 1515 | | | | | | | | | | | | | | | | | | | | | X | | | X | X |
| MO050 | SSSW04S01 | S16 | | 6/11/02 | 1000 | | | | | | | | | | | | | | | | | | | | | X | | | X | X |
| MO052 | SSSW06S01 | S22A | | 6/11/02 | 1415 | | | | | | | | | | | | | | | | | | | | | X | | | X | X |
| MO053 | SSSW07S01 | S22 | | ↓ | 1430 | | | | | | | | | | | | | | | | | | | | | X | | | X | X |
| MO054 | SSSW08S01 | S19 | | 6/12/02 | 1100 | | | | ↓ | | | | | | | | | | | | | | | | | | | | | |

| | Date | Time |
|---|---|---|
| Samplers Signature: [signature] | 6/13/02 | 1700 |
| Relinquished By: [signature] | 6/13/02 | 1700 |
| Received By: | | |
| Relinquished By: | | |
| Received By (LAB): | | |

White Copy:Original Yellow:Lab Copy Pink:Field Copy

For Lab Use

Lab Number:
Does COC match samples: Y or N
Broken container: Y or N
Received within holding time: Y or N
COC Seal Intact: Y or N
Any other problems: Y or N
If any YES, MWH contacted: Y or N
Date Contacted: __/__/__
Temperature °C

Comments:
FAX results to Dixie Hambrick
818.842.4345

Bill 127(1) wL → D

Name: Dixie Hambrick (project manager) / Edmund Sarao
Address: Montgomery Watson Harza
250 N. Madison Avenue
Pasadena, CA 91101
Project Name: Boeing SSFL
Phone: (818) 266-1378 (Ben Stewart)
Fax: (818) 842-4345 (D. Hambrick) / (619) 239-3895 (E. Sarao)
E-mail: edmund.m.sarao@us.mwhglobal.com
Other billing info: Bill to Lowell Moffitt at above address. Fax data to both #'s; e-mail data also to Edmund.
Cost: (1 x $50) = $50 Canadian (invoice to follow)

| Lab No. | Sample No. | pH | TDS | $\delta D_{VENOW}$ | Comments |
|---|---|---|---|---|---|
| B02-127-001 | MO047 | | | -43.3 | |

Submitted: June 19, 2002.
Completed: July 09, 2002.

COMPLETED

- sent by e-mail to E Sarao
09/07/02

- sent by fax to E. Sarao & D. Hambrick
09/07/02.

B02-126(1) WL-0

Name: Dixie Hambrick (project manager) / Edmund Sarao
Address: Montgomery Watson Harza
250 N. Madison Avenue
Pasadena, CA 91101
Project Name: Boeing SSFL
Phone: (818) 266-1378 (Ben Stewart)
Fax: (818) 842-4345 (D. Hambrick) / (818) 239-3895 (E. Sarao)
E-mail: edmund.m.sarao@us.mwhglobal.com
Other billing info: Bill to Lowell Moffitt at above address. Fax data to both #'s; e-mail data also to Edmund.
Cost: (1 x $40) = $40 Canadian (invoice to follow)

| Lab No. | Sample No. | pH | TDS | $\delta^{18}O_{VSMOW}$ | Comments |
|---|---|---|---|---|---|
| B02-126-001 | MO047 | | | -7.04 | |
| repeat | MO047 | | | -7.01 | |

Submitted: June 19, 2002.
Completed: July 02, 2002.

COMPLETED

— sent by e-mail to E. Sarao 02/07/02.
— faxed to E. Sarao and D. Hambrick 02/07/02.

**MWH**
MONTGOMERY WATSON HARZA

250 N. Madison Avenue
Pasadena, CA 91101
(626) 568-6310

U. of Waterloo

# Chain of Custody

Control Number: COC MW047
Date 6/13/02 Page 1 of 1

| | |
|---|---|
| Project Manager: | Dixie Hambrick |
| Project Name: | Boeing SSFL |
| Project Number: | |
| Deliver the results to the address above or as stated in contract | |

| | |
|---|---|
| Bill To: | Lowell Moffit |
| Company: | MWH |
| Address: | 250 N. Madison Avenue, Pasadena, CA, 91101 |

| | |
|---|---|
| Sample Disposal Instructions: | Laboratory Disposal |
| Shipment Method: | Fed-Ex |
| Comment: | |

Cooler No.
QC Level:
TAT: 1 Week

Preservatives: HCl, pH<2 4°C; HCl, pH<2 4°C; 4°C; 4°C; 4°C; H2SO4, pH<2 4°C; 4°C; HNO3, pH<2 4°C; 4°C; 4°C; 4°C; 4°C; 4°C; 4°C

Sample Data

| Sample ID | Description (for MWH use only) | Spring # ~~SWMU~~ | Depth | Date Collected | Time Collected | ULS Number | Lab ID | Soil | Water | Product | 8260B VOC | 8015BM TPH | 8270CSIM SVOC | 8270C SVOC | 8290 DIOXINS | 8315A FORMALDEHYDE | 8330 ORDNANCE | 6000/7000 METALS | 7196A HEX CHROMIUM | 8082 PCBs | 9040B/9045C pH | 340.2 FLUORIDE | 300M ANIONS | 300M HYDRAZINE | 300M PERCHLORATES | Dexter, Jim/DIS | Sampling Method | Extra Volume MS/MSD | HOLD | Total # of Bottles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW047 | SSSW015Ø1 | S21 | | 6/10/02 | 1048 | | | | X | | | | | | | | | | | | | | | | | X | | | | |
| MW048 | SSSW025Ø1 | S18 | | ↓ | 1230 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW049 | SSSW035Ø1 | S17 | | ↓ | 1515 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW050 | SSSW045Ø1 | S16 | | 6/11/02 | 1000 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW051 | SSSW055Ø1 | S14 | | ↓ | 1100 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW052 | SSSW065Ø1 | S22A | | ↓ | 1415 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW053 | SSSW075Ø1 | S22 | | ↓ | 1430 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW054 | SSSW085Ø1 | S19 | | 6/12/02 | 1100 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW055 | SSQW01FØ1 | — | | 6/13/02 | 1130 | | | | ↓ | | | | | | | | | | | | | | | | | X | | | | |
| MW056 | SSQW01EØ1 | — | | ↓ | 1145 | | | | ↓ | | | | | | | | | | | | | | | | | | | | | |

| | | | |
|---|---|---|---|
| Samplers Signature: | | Date 6/13/02 | Time 1700 |
| Relinquished By: | | Date 6/13/02 | Time 1700 |
| Received By: | | Date | Time |
| Relinquished By: | | Date | Time |
| Received By (LAB): | Mary Ellen Patton | Date JUN 17 2002 | Time |

For Lab Use

Lab Number:
Does COC match samples: Y or N
Broken container: Y or N
Received within holding time: Y or N
COC Seal intact: Y or N
Any other problems: Y or N
If any YES, MWH contacted: Y or N
Date Contacted: __/__/__
Temperature °C

Comments: 1-Week TAT not possible for 24
FAX results to Dixie Hambrick
818.842.4345

White Copy:Original Yellow:Lab Copy Pink:Field Copy

Client: Hambrick
Montgomery Watson Harza
Project: Boeing SSFL

ISO# 2002450
Location:Office
10 for 2H/18O

Environmental Isotope Lab
2002-07-02


| Sample | Lab# | 18O | Result | Repeat | 2H | Result | Repeat |
|---|---|---|---|---|---|---|---|
| | | SMOW | | | | | |
| MW047 | 47982 | X | -7.03 | | X | -44.05 | -44.41 |
| MW048 | 47983 | X | -7.25 | -7.39 | X | -44.38 | -43.91 |
| MW049 | 47984 | X | -7.09 | | X | -43.84 | -42.57 |
| MW050 | 47985 | X | -7.07 | | X | -47.49 | -48.97 |
| MW051 | 47986 | X | -4.03 | | X | -35.48 | -34.44 |
| MW052 | 47987 | X | -6.69 | | X | -48.21 | -48.21 |
| MW053 | 47988 | X | -6.89 | | X | -46.22 | -47.29 |
| MW054 | 47989 | X | -7.33 | | X | -45.79 | -47.36 |
| MW055 | 47990 | X | -9.34 | | X | -68.68 | -67.86 |
| MW056 | 47991 | X | -9.21 | | X | -73.58 | -73.42 |

To Contact EIL:
mepatton@uwaterloo.ca
or phone:
519 888 4732

**Robert J. Drimmie**
Laboratory Manager
rdrimmie@uwaterloo.ca
519 888 4567 ext 2580

MWH
MONTGOMERY WATSON HARZA
250 N. Madison Avenue
Pasadena, CA 91101
(626) 568-6310

Waterloo

# Chain of Custody

Control Number: COC MW093

Date 10/3/02 Page 1 of 1

Project Manager: Dixie Hardrick
Project Name: Boeing SSFL
Project Number:
Deliver the results to the address above or as stated in contract

Bill To: Lowell McGill
Company: MWH
Address: 250 N. Madison Avenue, Pasadena, CA, 91101

Sample Disposal Instructions: Laboratory Disposal
Shipment Method:
Comment:

Cooler No.
Level:
TAT: Std. TAT

Preservatives: HCL pH<2 4°C; HCL pH<2 4°C; 4°C; 4°C; 4°C; H2SO4 pH<2 4°C; 4°C; HNO3 pH<2 4°C; 4°C; 4°C; 4°C; 4°C; 4°C; 4°C

| Sample ID | Description (for MWH use only) | Sample Date: SWMU | Depth | Date Collected | Time Collected | U/S Number | Lab ID | Matrix: Soil | Water | Product | 8260B Designation | 8015BM | TPH | 8270SIM | SVOC | 8270C | SVOC | 8290 | DIOXINS | 8315A | FORMALDEHYDE | 8330 | CHROMANCE | 6000/7000 | METALS | 7196A | HEX CHROMIUM | 8082 | PCBs | 8080/8081C | pH | 340.2 | FLUORIDE | 300M | ANIONS | 300M | HYDRAZINE | 300M | PERCHLORATES | Sampling Method | Extra Volume | MS/MSD | HOLD | Total # of Bottles |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW093 | SSSW09S01 | VOP 304 | - | 10/3/02 | 1150 | - | | | X | | X | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | 3 |

Sampler's Signature: Date 10/3/02 Time 1600
Relinquished By: Date 10/4/02 Time 1200
Received By: Date Time
Relinquished By: Date Time
Received By (LAB): Date Time

For Lab Use

Lab Number:
Does COC match sampler: Y or N
Broken container: Y or N
Received within holding time: Y or N
COC Seal intact: Y or N
Any other problems: Y or N
If any YES, MWH contacted: Y or N
Date Contacted: / /
Temperature °C

Comments: Fax results to Dixie Hardrick 818.842.4345

Client: Hambrick
Montgomery Watson Harza

ISO# 2002663
Location:A - 3
1 for 2H/18O

Environmental Isotope Lab
2002-11-04
1 of 1

| Sample | Lab# | 18O | Result | Repeat | 2H | Result | Repeat |
|---|---|---|---|---|---|---|---|
| | | SMOW | | | | | |
| MW093 10/03/02 | 51840 | X | -7.68 | -7.78 | X | -52.08 | -50.68 |

To Contact EIL:
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or phone:
519 888 4732

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519 888 4567 ext 2580

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303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ093
Matrix: water
No. of Samples: 1
Date Reviewed: November 27, 2002
Reviewer: P. Meeks
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC matched the sample. Only calcium, potassium, magnesium, and sodium were requested on the COC, but the laboratory reported 21 additional metals. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Selenium was detected in the method blank at a concentration greater than the CRDL. Additionally, the reviewer noticed that boron and thallium were detected in CCB1 at 64.9020 and 5.3100 µg/L, respectively. | Boron and thallium detected in the sample were qualified "UJ." As selenium was not detected in the sample, no further qualifications were required. |
| 5. LCS/BS | One solid LCS sample was analyzed with the sample. Boron and molybdenum were not spiked into the LCS. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |
| 7. MS/MSDs | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 9. ICP Serial Dilution | None. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055 (SDG MJ047)<br>ER: MJ056 (SDG MJ047), | The field QC samples were analyzed only for calcium, potassium, magnesium, and sodium. There were no detects for these analytes in the field QC samples. No assessment was made with respect to the remaining 21 metal analytes. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# USEPA - CLP

-1-

## INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MJ093

Lab Name: Cemic Laboratories Contract: Rocketdyne

Lab Code: CEMIC Case No.: 021006 SAS No.: SDG No.: MJ093

Matrix (soil/water): WATER Lab Sample ID: 021006-01

Level (low/med): LOW Date Received: 10/4/2002

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 370 | | | P | | |
| 7440-36-0 | Antimony | 1.8 | U | | P | U | |
| 7440-38-2 | Arsenic | 6.0 | B | | P | | |
| 7440-39-3 | Barium | 51 | B | | P | | |
| 7440-41-7 | Beryllium | 0.48 | U | | P | U | |
| 7440-42-8 | Boron | 110 | B | | P | UJ | B |
| 7440-43-9 | Cadmium | 0.35 | U | | P | U | |
| 7440-70-2 | Calcium | 57000 | | | P | | |
| 7440-47-3 | Chromium | 6.4 | U | | P | U | |
| 7440-48-4 | Cobalt | 3.3 | U | | P | ↓ | |
| 7440-50-8 | Copper | 8.7 | U | | P | ↓ | |
| 7439-89-6 | Iron | 1100 | | | P | | |
| 7439-92-1 | Lead | 1.8 | U | | P | U | |
| 7439-95-4 | Magnesium | 16000 | | | P | | |
| 7439-96-5 | Manganese | 420 | | | P | | |
| 7439-97-6 | Mercury | 0.040 | U | | AV | U | |
| 7439-98-7 | Molybdenum | 8.8 | U | | P | ↓ | |
| 7440-02-0 | Nickel | 7.3 | U | | P | ↓ | |
| 7440-09-7 | Potassium | 3400 | B | | P | | |
| 7782-49-2 | Selenium | 3.7 | U | | P | U | |
| 7440-22-4 | Silver | 6.1 | U | | P | U | |
| 7440-23-5 | Sodium | 130000 | | | P | | |
| 7440-28-0 | Thallium | 3.1 | B | | P | UJ | B |
| 7440-62-2 | Vanadium | 4.5 | U | | P | U | |
| 7440-66-6 | Zinc | 36 | | | P | | |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments: AMEC VALIDATED LEVEL V

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303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ058
Matrix: water
No. of Samples: 3
Date Reviewed: November 12, 2002
Reviewer: P. Meeks
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ058, MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC accounted for the samples in this SDG. Metals analyses were not requested on the COC for the samples in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included calcium magnesium, potassium, and sodium. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Sodium was detected in the method blank at 67.800 µ.g/L. | No qualifications were required. |
| 5. LCS/BS | One aqueous LCS sample was analyzed with the sample. The recoveries were within the control limits of 80-120%. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 7. MS/MSDs | None. | No qualifications were required. |
| 9. ICP Serial Dilution | None. | No qualifications were required. |
| 10. Other | None. | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055<br>ER: MJ059, MJ060 | Calcium magnesium, potassium, and sodium were not detected in the field QC samples at sufficient concentrations to qualify MJ058. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# TOTAL METALS
-1-
## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.
MJ058

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-01

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 32100 | | | P | | |
| 7439-95-4 | Magnesium | 22100 | | | P | | |
| 7440-09-7 | Potassium | 5510 | | | P | | |
| 7440-23-5 | Sodium | 178000 | | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

# TOTAL METALS

-1-

## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.: MJ059

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-02

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 68.9 | U | | P | U | |
| 7439-95-4 | Magnesium | 117 | B | | P | | |
| 7440-09-7 | Potassium | 371 | B | | P | | |
| 7440-23-5 | Sodium | 975 | B | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

# TOTAL METALS

-1-

## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

MJ060

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-03

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 73.7 | B | | P | | |
| 7439-95-4 | Magnesium | 107 | B | | P | | |
| 7440-09-7 | Potassium | 232 | B | | P | | |
| 7440-23-5 | Sodium | 561 | B | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ047
Matrix: Water
No. of Samples: 9
Date Reviewed: July 18, 2002
Reviewer: A. Lang
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ047, MJ048, MJ049, MJ050, MJ052, MJ053, MJ054, MJ055, MJ056

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC matched the samples and accounted for the analysis. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Metals were not detected in the method blank associated with the samples in this SDG. | No qualifications were required. |
| 5. LCS/BS | One aqueous LCS sample was analyzed with the samples. The recoveries were within the laboratory defined QC limits. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |
| 7. MS/MSDs | None. | No qualifications were required. |
| 9. ICP Serial Dilution | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 10. Other | None. | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055<br>ER: MJ056 | Metals were not detected in the field QC samples. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev Qual | Final Qual |
|---|---|---|---|---|---|
| Calcium | 0618 | 82 | 5 | | |
| Magnesium | 0618 | 20 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 71 | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 85 | 5 | | |
| Magnesium | 0618 | 25 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 80 | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

188


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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-03

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev-Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 106 | 5 | | |
| Magnesium | 0618 | 35 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 76 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP 189


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Raw Data | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 57 | 5 | | |
| Magnesium | 0618 | 32 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 67 | 5 | | |

ND = Not Detected

LEVEL V AMEC VALIDATED

Reported by: KW

Approved by: BP

190


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-06

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rw Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 140 | 5 | | |
| Magnesium | 0618 | 46 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 97 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

191


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Qual Code |
|---|---|---|---|---|
| Calcium | 0618 | 200 | 5 | |
| Magnesium | 0618 | 83 | 5 | |
| Potassium | 0618 | 8 | 5 | |
| Sodium | 0618 | 95 | 5 | |

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: RP

192


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-08

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Run Qual | Lab Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 77 | 5 | | |
| Magnesium | 0618 | 24 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 106 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

193


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-09

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | ND | 5 | U | |
| Magnesium | 0618 | ND | 5 | | |
| Potassium | 0618 | ND | 5 | | |
| Sodium | 0618 | ND | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-10

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Run Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | ND | 5 | U | |
| Magnesium | 0618 | ND | 5 | ↓ | |
| Potassium | 0618 | ND | 5 | ↓ | |
| Sodium | 0618 | ND | 5 | ↓ | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

195


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303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MC093
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The sample was received with temperatures within the QC limits of 4°±2° C. The COC matched the sample and accounted for the analyses. No custody seals information was provided by the laboratory. Analyses were performed within the holding times. | No qualifications were required. |
| 3. Method Blanks | One water method blank was analyzed with this SDG. There were no detects in the method blank. | No qualifications were required. |
| 4. LCS/BS | An aqueous LCS sample was analyzed with the sample. The recoveries for all analytes were within the laboratory-established QC limits. | No qualifications were required. |
| 6. MS/MSDs | No MS/MSD analyses were performed in association with the sample in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | There were no detects in MJ055 or MJ056. | No qualifications were required |
| 8. Other | None | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

## Metals

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No: | 21172 | Date Digested: | 10/07/02 |
| Matrix: | Water | Date Analyzed: | 10/07/02 |
| Analyst: | TLR/GF | Batch Number: | 6010W2531 |

| | | Sample ID: | Blank | MC093 | Rev Qual | Qual |
|---|---|---|---|---|---|---|
| **Element** | **Method #** | **RL** | mg/L | mg/L | Qual | Code |
| Calcium | 6010B | 2.0 | ND | **60** | | |
| Magnesium | 6010B | 0.20 | ND | **15** | | |
| Sodium | 6010B | 0.20 | ND | **130** | | |
| Potassium | 6010B | 0.25 | ND | **3.2** | | |

AMEC VALIDATED
LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MC047
Matrix: water
No. of Samples: 1
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MC047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperature upon receipt at Centrum Analytical Laboratories was above the QC limits of 4°±2°C. All analyses were subcontracted to other laboratories. Temperature at receipt was not noted for the perchlorate analysis subcontracted to Weck Laboratory. Temperature upon receipt for the remaining analyses was noted to be within the QC limits.<br><br>The original COC accounted for the sample in this SDG. Chloride, sulfate, carbonate alkalinity, and bicarbonate alkalinity analyses were not requested on the COC. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. TDS analysis was requested but was not performed as insufficient volume was received.<br><br>No transfer COC was included for the perchlorate analysis. A transfer COC was included for the remaining analyses, but was not legible. No custody seal information was provided by the laboratory. Holding times were met. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 3. Method Blanks | Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity method blanks were analyzed. | No qualifications were required. |
| 5. LCS/BS | Recoveries for perchlorate and sulfate were within the laboratory-established control limits. No LCS was provided for chloride or alkalinity. | Chloride, total alkalinity, bicarbonate alkalinity, and carbonate alkalinity were qualified as estimated, "J," for detects and "UJ," for nondetects. |
| 6. Duplicates<br>MC047 – chloride only | Duplicate analyses were performed for chloride only. The RPD was less than 20%. | No qualifications were required. |
| 7. MS/MSDs<br>MC047 –sulfate only | MS/MSD analyses were performed for sulfate only. The recoveries were within the laboratory-established control limits of 70-130% and the RPD was less than the laboratory-established control limit of 25%. | No qualifications were required. |
| 10. Other | No raw data was provided for any of the analyses in this SDG. | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056<br>FB: MJ055<br>Field duplicates: none | There were no applicable detects in either of the field QC samples. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Weck Laboratories, Inc.
Environmental and Analytical Services - Since 1964

**Report Date:** *Friday, June 28, 2002*
**Received Date:** *Monday, June 17, 2002*
**Log By:** mq
**Log Time:** 11:03

**Client:** Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Riverside, CA 92507
**Attn.:** Marilu Escher

**Phone:** (909) 779-0310
**FAX:** (909) 779-0344

**Project:** Boeing SSFL/20674

**P.O. #:**
**Turnaround Time:** Normal

## CERTIFICATE OF ANALYSIS

**Lab#:** A204182-001 **Sample ID:** MCO47 **Matrix:** Water
**Sampled By:** Client **Date:** 6/10/2002 **Time:** 10:48 **Source:** 20674-1

| Parameter | Rev Qual | Qual Code | Result | Flag | Units | Dilution Factor | RL | Method | Analyzed | Worksheet # |
|---|---|---|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | | ug/L | 1 | 3.0 | EPA 314 | 6/24/2002 dc | WS35335 |

**Authorized Signature**

ELAP # 1132
LACSD # 10143

Flags for Data Qualifiers:

B = Compound detected in the blank. Sample result equal or less than 10 times the concentration in the blank.
J = Analyte was detected. However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Pratical Quantitation Limit (PQL).
H = Estimated value, result over the calibration range
R = Result is suspect, LCS recovery greater than the upper control limit.
L = Result is suspect, LCS recovery lower than the control limit.
Q = QC result out of acceptance limits.
T = Trace detection, detected but below the reporting limit.

Notes:

The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless specified.
RL = Reporting Limit.
ND = Not detected, below the reporting limit.
Sub = Subcontracted analysis, original report enclosed.

AMEC VALIDATED
LEVEL V



14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
*www.wecklabs.com*

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 2320B

Project 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity, Total as CaCO3 | 250 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED
LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Centrum Analytical Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

| | |
|---|---|
| Date Received: | 06/14/02 |
| Work Order No: | 02-06-0556 |
| Preparation: | N/A |
| Method: | SM 2320B |

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Bicarbonate (as CaCO3) | 250 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED

LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 2320B

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Carbonate | ND | 1.0 | 1 | | mg/L | UJ | L |

AMEC VALIDATED
LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 4500-Cl C

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/17/02** | **0617CICMB1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | 47 | 2 | 1 | | mg/L | J | L |

| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **Method Blank** | **099-05-057-1,078** | **Aqueous** | **N/A** | **N/A** | **06/17/02** | **0617CICMB1** |

| Parameter | Result | RL | DF | Qual | Units | |
|---|---|---|---|---|---|---|
| Chloride | ND | 2.0 | 1 | | mg/L | X |

AMEC VALIDATED

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

| | |
|---|---|
| Date Received: | 06/14/02 |
| Work Order No: | 02-06-0556 |
| Preparation: | N/A |
| Method: | EPA 375.4 |

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/16/02** | **0616SO4MB1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Sulfate | 150 | 10 | 5 | D | mg/L | | |

| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **Method Blank** | **099-05-091-1,086** | **Aqueous** | **N/A** | **N/A** | **06/16/02** | **0616SO4MB1** |

| Parameter | Result | RL | DF | Qual | Units | |
|---|---|---|---|---|---|---|
| Sulfate | ND | 2.0 | 1 | | mg/L | X |

AMEC VALIDATED

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ093
Matrix: water
No. of Samples: 1
Date Reviewed: November 27, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. The COC accounted for the sample in this SDG. Chloride, sulfate, carbonate, bicarbonate, and alkalinity analyses were not requested on the COC for the sample in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. Custody seals were not present on the cooler.<br><br>Holding times were met, except for the seven day holding time for TDS. | The TDS result for MJ093 was qualified "J." |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | The LCS recoveries were within the laboratory-established control limits, except for TDS, which was recovered at 123%. | The TDS result for MJ093 was qualified "J." |
| 6. Duplicates | None performed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 7. MS/MSDs | None performed. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | TDS was reported in MJ056 at 914 mg/L. | TDS was qualified as estimated, "J," in MJ093. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Qual | Qual Code | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | U | | ug/L | 1 | 10/07/02 | 10/07/02 |

ND = Not Detected

Reported by: BS

Approved by: TS

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Rev Qual | Qual Code | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Sulfate | 131.2 | | | mg/L | 7.5 | 10/14/02 | 10/14/02 |

Reported by: BS

Approved by: TS

AMEC VALIDATED

LEVEL V

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Units | Per Qual | Qual Code | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | 283.5 | mg/L | | | 2 | 10/11/02 | 10/11/02 |
| Chloride | 37.2 | mg/L | | | 1 | 10/17/02 | 10/17/02 |
| Total Dissolved Solids | 561 | mg/L | J | H, L, F | 10 | 10/17/02 | 10/17/02 |

Reported by: SB

Approved by: [illegible]

AREO VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Units | Raw Qual | Qual Code | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | 283 | mg/L | * | | 2 | 10/11/02 | 10/11/02 |
| Bicarbonate | 283 | mg/L | | | 2 | 10/11/02 | 10/11/02 |
| Carbonate | ND | mg/L | U | | 2 | 10/11/02 | 10/11/02 |

ND = Not Detected

*Analysis Not Validated

Reported by: HL

Approved by: HL

AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ058
Matrix: water
No. of Samples: 3
Date Reviewed: November 12, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ058, MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. The COC accounted for the samples in this SDG. Chloride, sulfate, alkalinity, bicarbonate, and carbonate analyses were not requested on the COC for the samples in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. Custody seals were not present on the cooler. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for the remaining analyses. | No qualifications were required. |
| 6. Duplicates | None performed. | No qualifications were required. |
| 7. MS/MSDs<br>MJ047 – perchlorate only | None performed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ059, MJ060<br>FB: MJ055<br>Field duplicates: none | Alkalinity, carbonate, and TDS were reported in the equipment rinsates. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ058

Date Sampled: 06/20/02

Laboratory ID: 020619-01

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Codes |
|---|---|---|---|---|---|---|---|
| Alkalinity | 257 | mg/L | 2.0 | 06/29/02 | 06/29/02 | - | |
| Bicarbonate | 257 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 768.5 | mg/L | 10 | 06/25/02 | 06/26/02 | | |

ND = Not Detected

Reported by: B. Pantelli

Approved by: KW

AMEC VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ058

Date Sampled: 06/20/02

Laboratory ID: 020619-01

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | 78.2 | mg/L | 1 | 07/02/02 | 07/02/02 | | |
| Sulfate | 233 | mg/L | 5 | 07/06/02 | 07/06/02 | | |

Reported by: KW

Approved by: BP

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Bicarbonate | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 21 | mg/L | 10 | 06/25/02 | 06/26/02 | | |

ND = Not Detected

Reported by: B. Parnell

Approved by: KW

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | ND | mg/L | 1 | 07/02/02 | 07/02/02 | U- | |
| Sulfate | ND | mg/L | 5 | 07/06/02 | 07/06/02 | U | |

ND = Not Detected

Reported by: KW

Approved by: BP

AMEC VALIDATED
LEVEL V

**CEIMIC**
**Corporation**
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | ug/L | 1 | 06/27/02 | 06/27/02 | U | |

ND = Not Detected

Reported by: PL

Approved by: TS

AMEC VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Raw Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | - | |
| Bicarbonate | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 14 | mg/L | 10 | 06/25/02 | 06/25/02 | | |

ND = Not Detected

Reported by: B. Pomuk

Approved by: KW

AMEC VALIDATED LEVEL V

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rw Qual | Qua Cods |
|---|---|---|---|---|---|---|---|
| Chloride | ND | mg/L | 1 | 07/02/02 | 07/02/02 | U- | |
| Sulfate | ND | mg/L | 5 | 07/06/02 | 07/06/02 | U | |

ND = Not Detected

Reported by: KW

Approved by: BP

AMEC VALIDATED LEVEL V

# CEIMIC Corporation

*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | ug/L | 1 | 06/27/02 | 06/27/02 | U | |

ND = Not Detected

Reported by: PL

Approved by: TS

AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ047
Matrix: Soil
No. of Samples: 10
Date Reviewed: July 18, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ047, MJ048, MJ049, MJ050, MJ052, MJ053, MJ054, MJ055, MJ056, MJ057

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. COC matches samples and accounts for analyses. Custody seals were not present on the cooler. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for chloride, sulfate, and alkalinity. Not applicable to total dissolved solids. | No qualifications were required. |
| 6. Duplicates | Not performed. | No qualifications were required. |
| 7. MS/MSDs<br>MJ047 – perchlorate only | The RPD was less then 20% and the recoveries were within 75-125%. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056<br>FB: MJ055<br>Field duplicates: none | Total dissolved solids were reported in the equipment rinsate at 914 mg/L. | Total dissolved solids detected in the site samples were qualified as estimated, "J." |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 39.50 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 121.69 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED
LEVEL V

Reported by: TS

Approved by: [illegible]

211

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Per Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 38.23 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 120.79 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: [illegible]

212

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 40.27 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 189.57 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 47.86 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 135.43 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: MR

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 71.00 | mg/L | 10.00 | 06/19/99 | 06/19/99 |
| Sulfate | | | 300.54 | mg/L | 10.00 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: M

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 76.44 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 556.22 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: R

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 44.72 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 153.91 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: NL

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | U | | ND | mg/L | 0.200 | 06/19/99 | 06/19/99 |
| Sulfate | ↓ | | ND | mg/L | 0.200 | 06/19/99 | 06/19/99 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: DL

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | U | | ND | mg/L | 0.100 | 06/19/99 | 06/19/99 |
| Sulfate | ↓ | | ND | mg/L | 0.100 | 06/19/99 | 06/19/99 |

ND = Not Detected.

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: R

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ057

Date Sampled: 06/13/02

Laboratory ID: 020581-11

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 76.82 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 221.20 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED
LEVEL V

Reported by: TS

Approved by: M

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 254 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 254 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pawluk

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 285 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 285 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pawlak

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 301 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 301 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pamuk

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 282 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 282 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Ramirez

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 340 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 340 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: B. Pu Mink

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 311 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 311 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: B. Ronnek

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 288 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 288 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pomeroy

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Rewick

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Re Wilk

Approved by: [signature]

292

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 481 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: B P

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 481 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 589 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 561 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | U | | ND | mg/L | 10 | 06/18/02 | 06/19/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 1241 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 550 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | U | | ND | mg/L | 10 | 06/18/02 | 06/19/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | | 914 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: R

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PC

Approved by: TS

309



4

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PR

Approved by: TS

311



8

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: R

Approved by: TS

312



7

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: RL

Approved by: TG

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____

Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ057

Date Sampled: 06/13/02

Laboratory ID: 020581-11

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PR

Approved by: TS

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MC093
Matrix: water
No. of Samples: 1
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperature upon receipt at Centrum Analytical Laboratories was within the QC limits of 4°±2°C. All analyses were subcontracted to Calscience Environmental Laboratories.<br><br>The original COC accounted for the sample in this SDG. Chloride, sulfate, carbonate alkalinity, and bicarbonate alkalinity analyses were not requested on the COC. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses.<br><br>No transfer COC was included. The Calscience case narrative did not mention any sample receipt problems. No custody seal information was provided by either laboratory. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity or TDS method blanks were analyzed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 5. LCS/BS | Recoveries for perchlorate, chloride and sulfate were within the laboratory-established control limits. No LCS was provided for TDS or alkalinity. | TDS, total alkalinity, bicarbonate alkalinity, and carbonate alkalinity were qualified as estimated, "J," for detects and "UJ," for nondetects. |
| 6. Duplicates<br>MC047 – TDS only | Duplicate analyses were performed for TDS only. The RPD was less than 20%. | No qualifications were required. |
| 7. MS/MSDs<br>None | None. | No qualifications were required. |
| 10. Other | Raw data was provided only for TDS. | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | TDS was reported in MJ056 at 914 mg/L. | TDS was estimated , "J," in MC093. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | |
|---|---|---|
| Centrum Analytical Laboratories, Inc. | Date Sampled: | 10/03/02 |
| 1401 Research Park Drive | Date Received: | 10/04/02 |
| Suite 100 | Date Analyzed: | 10/08/02 |
| Riverside, CA 92507-2111 | | |
| | Work Order No.: | 02-10-0288 |
| Attn: Marilu Escher | Method: | EPA 314.0 |
| RE: Boeing SSFL/21172 | Page 1 of 1 | |

All concentrations are reported in ug/L (ppb).

| Sample Number | Perchlorate Concentration | Reporting Limit | Rev Qual | Qual Code |
|---|---|---|---|---|
| MC093 | ND | 2.0 | U | |
| Method Blank | ND | 2.0 | * | |

Analysis Not Validated

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ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

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Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as CaCO3) | 290 | 5.0 | 1 | | mg/L | J | L |

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LEVEL V

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Bicarbonate (as CaCO3) | 290 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Carbonate | ND | 1.0 | 1 | | mg/L | UJ | L |

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LEVEL V

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

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Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | EPA 300.0 |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **021004L01** |

| Parameter | Rev Qual | Qual Code | Result | RL | DF | Qual | Units | Parameter | Rev Qual | Qual Code | Result | RL | DF | Qual | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | | | 35 | 20 | 20 | | mg/L | Sulfate | | | 130 | 20 | 20 | | mg/L |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Method Blank** | | | | | **099-05-118-1,453** | | | **N/A** | | **Aqueous** | **N/A** | | **10/04/02** | | **021004L01** |

| Parameter | | Result | RL | DF | Qual | Units | Parameter | | Result | RL | DF | Qual | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | ~~X~~ | ND | 1.0 | 1 | | mg/L | Sulfate | ~~X~~ | ND | 1.0 | 1 | | mg/L |

Analysis Not Validated

AMEC VALIDATED

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Centrum Analytical Laboratories, Inc.

## General Chemistry

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | | |
| Matrix: | Water | | |
| Analyst: | GF | | |

| Analysis: | Total Dissolved Solids | | |
|---|---|---|---|
| Method Number: | 160.1 | | |
| Sample ID | mg/L | Qual | Qual Code |
| MC093 | 610 | J | L, F |
| Reporting Limit: | 10 | | |
| Date Analyzed: | 10/09/02 | | |
| QC Batch # : | 1601W0305 | | |

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 8462
Matrix: Water
No. of Samples: 3
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME058, ME059, ME060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No sample receipt information was provided by the laboratory. Analyses were performed within the holding time of 180 days. | As the case narrative did not note that the samples were received damaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (2024-003) was analyzed with the samples in this SDG. There were no detects in the method blank. The method blank was not analyzed for cobalt-57, thallium-208, lead-210, lead-212, lead-214, bismuth-212, bismuth-214, thorium-234, or actinium-228. | As cobalt-57, thallium-208, lead-210, lead-212, lead-214, bismuth-212, bismuth-214, thorium-234, or actinium-228 were not reported in any of the site samples, no qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | An aqueous LCS sample (2024-004) was analyzed with the samples in this SDG. The LCS was only fortified with gross alpha, gross beta, cesium-137, and radium-226. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 85-110% and were deemed reasonable by the reviewer. | No qualifications were required. |
| 6. Duplicates | No duplicate analyses were performed in association with the samples in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME059, ME060<br>FB: ME055 (SDG 8458)<br>Field duplicates: none | There were no detects in any of the field QC samples. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | Potassium-40 was reported in site sample ME058. Potassium-40 occurs naturally in soil and water. This sample also had beta activity greater than the MDA, which is expected since potassium-40 decays by beta emission. Additionally, the beta activity reported in ME058 was approximately five times less than the California Primary Drinking Water Standard. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8462
Work Order R206078-01
Received Date 06/21/02

Client MWH PASADENA
Contract JOB #1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME058 | 8462-001 | 06/18/02 | 07/24/02 | GrossAlpha | 0.435 ± 2.3 | pCi/L | 3.96 | U | |
| | | | 07/24/02 | Gross Beta | 4.23 ± 1.7 | pCi/L | 2.46 | | |
| | | | 07/19/02 | K40 (G) | 234 ± 110 | pCi/L | 71.3 | | |
| | | | 07/19/02 | Co57 (G) | U | pCi/L | 4.68 | U | |
| | | | 07/19/02 | Co60 (G) | U | pCi/L | 7.22 | | |
| | | | 07/19/02 | Cs134 (G) | U | pCi/L | 7.21 | | |
| | | | 07/19/02 | Cs137 (G) | U | pCi/L | 7.01 | | |
| | | | 07/19/02 | Tl208 (G) | U | pCi/L | 11.0 | | |
| | | | 07/19/02 | Pb210 (G) | U | pCi/L | 1330 | | |
| | | | 07/19/02 | Bi212 (G) | U | pCi/L | 52.3 | | |
| | | | 07/19/02 | Pb212 (G) | U | pCi/L | 12.6 | | |
| | | | 07/19/02 | Bi214 (G) | U | pCi/L | 13.7 | | |
| | | | 07/19/02 | Pb214 (G) | U | pCi/L | 12.6 | | |
| | | | 07/19/02 | Ra226 (G) | U | pCi/L | 98.7 | | |
| | | | 07/19/02 | Ac228 (G) | U | pCi/L | 31.5 | | |
| | | | 07/19/02 | Th234 (G) | U | pCi/L | 192 | | |
| | | | 07/19/02 | U235 (G) | U | pCi/L | 37.5 | | |
| ME059 | 8462-002 | 06/19/02 | 07/24/02 | GrossAlpha | -0.288 ± 0.30 | pCi/L | 0.797 | U | |
| | | | 07/24/02 | Gross Beta | -0.028 ± 1.1 | pCi/L | 1.87 | | |
| | | | 07/24/02 | K40 (G) | U | pCi/L | 148 | | |
| | | | 07/24/02 | Co57 (G) | U | pCi/L | 5.34 | | |
| | | | 07/24/02 | Co60 (G) | U | pCi/L | 7.96 | | |
| | | | 07/24/02 | Cs134 (G) | U | pCi/L | 8.42 | | |
| | | | 07/24/02 | Cs137 (G) | U | pCi/L | 7.19 | | |
| | | | 07/24/02 | Tl208 (G) | U | pCi/L | 7.57 | | |
| | | | 07/24/02 | Pb210 (G) | U | pCi/L | 1420 | | |
| | | | 07/24/02 | Bi212 (G) | U | pCi/L | 53.9 | | |
| | | | 07/24/02 | Pb212 (G) | U | pCi/L | 10.3 | | |
| | | | 07/24/02 | Bi214 (G) | U | pCi/L | 14.3 | | |
| | | | 07/24/02 | Pb214 (G) | U | pCi/L | 13.3 | | |
| | | | 07/24/02 | Ra226 (G) | U | pCi/L | 118 | | |
| | | | 07/24/02 | Ac228 (G) | U | pCi/L | 33.0 | | |
| | | | 07/24/02 | Th234 (G) | U | pCi/L | 235 | | |
| | | | 07/24/02 | U235 (G) | U | pCi/L | 45.7 | | |
| ME060 | 8462-003 | 06/20/02 | 07/24/02 | GrossAlpha | 0.208 ± 0.52 | pCi/L | 0.851 | U | |
| | | | 07/24/02 | Gross Beta | -0.722 ± 1.3 | pCi/L | 2.24 | | |

AMEC VALIDATED
LEVEL V

Certified by
Report Date 01/06/03
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# Eberline Services

## ANALYSIS RESULTS

SDG 8462
Work Order R206078-01
Received Date 06/21/02

Client MWH PASADENA
Contract JOB #1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME060 | | | 07/19/02 | K40 (G) | U | pCi/L | 146 | U | |
| | | | 07/19/02 | Co57 (G) | U | pCi/L | 5.50 | | |
| | | | 07/19/02 | Co60 (G) | U | pCi/L | 8.87 | | |
| | | | 07/19/02 | Cs134 (G) | U | pCi/L | 9.71 | | |
| | | | 07/19/02 | Cs137 (G) | U | pCi/L | 8.39 | | |
| | | | 07/19/02 | Tl208 (G) | U | pCi/L | 15.3 | | |
| | | | 07/19/02 | Pb210 (G) | U | pCi/L | 570 | | |
| | | | 07/19/02 | Bi212 (G) | U | pCi/L | 69.9 | | |
| | | | 07/19/02 | Pb212 (G) | U | pCi/L | 11.6 | | |
| | | | 07/19/02 | Bi214 (G) | U | pCi/L | 16.1 | | |
| | | | 07/19/02 | Pb214 (G) | U | pCi/L | 15.4 | | |
| | | | 07/19/02 | Ra226 (G) | U | pCi/L | 115 | | |
| | | | 07/19/02 | Ac228 (G) | U | pCi/L | 37.4 | | |
| | | | 07/19/02 | Th234 (G) | U | pCi/L | 181 | | |
| | | | 07/19/02 | U235 (G) | U | pCi/L | 44.8 | | |

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LEVEL V

Certified by [signature]
Report Date 01/06/03
Page 2

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 20380
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: MS047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. The laboratory provided no temperature information. No custody seals were present on the coolers. Analyses were performed within the holding time of 180 days. | Due to the nonvolatile nature of the analytes and as the sample was noted to be received undamaged, no qualifications were required. |
| 3. Method Blanks | Three water method blanks, one for gross alpha (E299D1AC), one for gross beta (E299K1AA), and one for cesium-134 and cesium-137 (E299Q1AA) were analyzed with the sample in this SDG. There were no detects in the method blanks above the applicable MDAs. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | Three aqueous LCS samples, one for gross alpha (E299D1AC), one for gross beta (E299K1AC), and one for cesium-134 and cesium-137 (E299Q1AC) were analyzed with the sample in this SDG. The recoveries were within the laboratory-established control limits of 70-130%. | No qualifications were required. |
| 6. Duplicates<br>MS047 | The duplicate analyses were performed on sample MS047 for gross alpha only. Gross alpha was nondetected in the original result and detected above the MDA in the duplicate result.; however, the results were within ±2σ. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME056 (SDG 8458)<br>FB: ME055 (SDG 8458)<br>Field duplicates: none | There were no detects in ME055 or ME056. | No qualifications were required |
| 8. Other | None. | No qualifications were required. |
| Comments | None. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# FORM I

## SAMPLE RESULTS

**Date:** 26-Jun-02

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | STL Richland | **SDG:** | 20380 | **Collection Date:** | 6/10/2002 10:48:00 AM |
| **Lot-Sample No.:** | J2F180183-1 | **Report No. :** | 19857 | **Received Date:** | 6/14/2002 11:00:00 AM |
| **Client Sample ID:** | MS047 | **COC No. :** | | **Matrix:** | WATER |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Rev Qual | Qual Code | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Analy Method, Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 2170274 | **Work Order:** | E273C1AA | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| ALPHA | 1.76 | U | 1.2 | U | | 1.2 | 1.87 | pCi/L | 100.00% | *0.94* | 6/21/02 01:52 p | | 0.098 | RICHRC5014 |
| | | | | | | | | 0.786 | 1.0 | *(2.8)* | | | L | GPC10A |
| **Batch:** 2170276 | **Work Order:** | E273C1AC | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| BETA | 6.82 | | 2.0 | | | 2.2 | 3.29 | pCi/L | 100.00% | *(2.1)* | 6/21/02 01:42 p | | 0.1983 | RICHRC5014 |
| | | | | | | | | 1.56 | 4.0 | *(6.3)* | | | L | GPC26A |
| **Batch:** 2170282 | **Work Order:** | E273C1AD | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| CS-134 | 3.93 | U | 9.1 | U | | 9.1 | 17.5 | pCi/L | | *0.22* | 6/22/02 05:39 a | | 0.6 | RICHRC5017 |
| | | | | | | | | | | *0.87* | | | L | GER1$1 |
| CS-137 | 2.12 | U | 7.8 | U | | 7.8 | 14.6 | pCi/L | | *0.14* | 6/22/02 05:39 a | | 0.6 | RICHRC5017 |
| | | | | | | | | | 20.0 | *0.54* | | | L | GER1$1 |

**Number of Results:** 4

**Comments:**

AMEC VALIDATED

LEVEL V



MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 900.0M and 901.1
QC Level: V[1]
SDG: 8458
Matrix: Water
No. of Samples: 9
REs/DLs: 0
Date Reviewed: February 11, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME047, ME048, ME049, ME050, ME052, ME053, ME054, ME055, ME056

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No sample receipt information was provided by the laboratory. Analyses were performed within the holding time of 180 days. | As the case narrative did not note that the samples were received damaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (8458-011) was analyzed with the samples in this SDG. There were no detects in the method blank. The method blank was not analyzed for lead-210. | As lead-210 was not reported in any of the site samples, no qualifications were required. |
| 4. LCS/BS | An aqueous LCS sample (8458-010) was analyzed with the samples in this SDG. The LCS was only fortified with gross alpha, gross beta, cobalt-60, and cesium-137. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 90-110%. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 6. Duplicates<br>ME049 | The duplicate analyses were performed on sample ME049 in association with the samples in this SDG. All RPDs were within the laboratory-established control limit of $\pm 3\sigma$. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME056<br>FB: ME055<br>Field duplicates: none | There were no detects in ME055 or ME056. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | None. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME047 | 8458-001 | 06/10/02 | 07/23/02 | GrossAlpha | 0.209 ± 1.1 | pCi/L | 1.96 | U | |
| | | | 07/23/02 | Gross Beta | 3.29 ± 1.4 | pCi/L | 1.94 | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 220 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 9.70 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 16.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 16.5 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 13.9 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 15.7 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 969 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 106 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 20.3 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 26.7 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 27.7 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 200 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 67.6 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 315 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 74.4 | | |
| ME048 | 8458-002 | 06/10/02 | 07/23/02 | GrossAlpha | 1.17 ± 1.6 | pCi/L | 2.25 | U | |
| | | | 07/23/02 | Gross Beta | 4.10 ± 1.5 | pCi/L | 2.06 | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 92.7 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 3.28 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 10.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 9.88 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 8.10 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 8.16 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 142 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 63.8 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 9.10 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 15.4 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 13.1 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 89.8 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 34.7 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 112 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 26.1 | | |
| ME049 | 8458-003 | 06/10/02 | 07/23/02 | GrossAlpha | 0.023 ± 1.7 | pCi/L | 3.05 | U | |
| | | | 07/23/02 | Gross Beta | 1.66 ± 1.8 | pCi/L | 2.85 | U | |

**AMEC VALIDATED**

LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME049 | | | | | | | | | |
| | | | 07/18/02 | K 40 (G) | U | pCi/L | 195 | U | |
| | | | 07/18/02 | Co 57 (G) | U | pCi/L | 7.98 | | |
| | | | 07/18/02 | Co 60 (G) | U | pCi/L | 13.5 | | |
| | | | 07/18/02 | Cs 134 (G) | U | pCi/L | 14.7 | | |
| | | | 07/18/02 | Cs 137 (G) | U | pCi/L | 11.0 | | |
| | | | 07/18/02 | Tl 208 (G) | U | pCi/L | 12.2 | | |
| | | | 07/18/02 | Pb 210 (G) | U | pCi/L | 807 | | |
| | | | 07/18/02 | Bi 212 (G) | U | pCi/L | 93.5 | | |
| | | | 07/18/02 | Pb 212 (G) | U | pCi/L | 16.8 | | |
| | | | 07/18/02 | Bi 214 (G) | U | pCi/L | 22.9 | | |
| | | | 07/18/02 | Pb 214 (G) | U | pCi/L | 22.5 | | |
| | | | 07/18/02 | Ra 226 (G) | U | pCi/L | 168 | | |
| | | | 07/18/02 | Ac 228 (G) | U | pCi/L | 54.8 | | |
| | | | 07/18/02 | Th 234 (G) | U | pCi/L | 257 | | |
| | | | 07/18/02 | U 235 (G) | U | pCi/L | 61.5 | | |
| ME050 | 8458-004 | 06/11/02 | 07/23/02 | GrossAlpha | 1.47 ± 1.5 | pCi/L | 1.93 | U | |
| | | | 07/23/02 | Gross Beta | 3.66 ± 1.4 | pCi/L | 1.93 | | |
| | | | 07/18/02 | K 40 (G) | U | pCi/L | 261 | U | |
| | | | 07/18/02 | Co 57 (G) | U | pCi/L | 10.2 | | |
| | | | 07/18/02 | Co 60 (G) | U | pCi/L | 17.4 | | |
| | | | 07/18/02 | Cs 134 (G) | U | pCi/L | 16.8 | | |
| | | | 07/18/02 | Cs 137 (G) | U | pCi/L | 15.0 | | |
| | | | 07/18/02 | Tl 208 (G) | U | pCi/L | 16.9 | | |
| | | | 07/18/02 | Pb 210 (G) | U | pCi/L | 1020 | | |
| | | | 07/18/02 | Bi 212 (G) | U | pCi/L | 114 | | |
| | | | 07/18/02 | Pb 212 (G) | U | pCi/L | 20.6 | | |
| | | | 07/18/02 | Bi 214 (G) | U | pCi/L | 30.2 | | |
| | | | 07/18/02 | Pb 214 (G) | U | pCi/L | 30.0 | | |
| | | | 07/18/02 | Ra 226 (G) | U | pCi/L | 209 | | |
| | | | 07/18/02 | Ac 228 (G) | U | pCi/L | 73.1 | | |
| | | | 07/18/02 | Th 234 (G) | U | pCi/L | 324 | | |
| | | | 07/18/02 | U 235 (G) | U | pCi/L | 81.6 | | |
| ME052 | 8458-005 | 06/11/02 | 07/23/02 | GrossAlpha | 0.788 ± 1.2 | pCi/L | 1.70 | U | |
| | | | 07/23/02 | Gross Beta | 0.915 ± 1.2 | pCi/L | 2.00 | U | |

AMEC VALIDATED

LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME052 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 140 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 10.4 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 11.3 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 14.3 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 11.3 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 14.0 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 4150 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 92.6 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 23.9 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 27.4 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 28.0 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 309 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 52.1 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 509 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 84.5 | | |
| ME053 | 8458-006 | 06/11/02 | 07/23/02 | GrossAlpha | -0.555 ± 1.2 | pCi/L | 2.51 | U | |
| | | | 07/23/02 | Gross Beta | -0.143 ± 1.6 | pCi/L | 2.78 | U | |
| | | | 07/30/02 | K 40 (G) | U | pCi/L | 148 | U | |
| | | | 07/30/02 | Co 57 (G) | U | pCi/L | 10.8 | | |
| | | | 07/30/02 | Co 60 (G) | U | pCi/L | 12.8 | | |
| | | | 07/30/02 | Cs 134 (G) | U | pCi/L | 14.6 | | |
| | | | 07/30/02 | Cs 137 (G) | U | pCi/L | 12.5 | | |
| | | | 07/30/02 | Tl 208 (G) | U | pCi/L | 14.0 | | |
| | | | 07/30/02 | Pb 210 (G) | U | pCi/L | 6480 | | |
| | | | 07/30/02 | Bi 212 (G) | U | pCi/L | 87.7 | | |
| | | | 07/30/02 | Pb 212 (G) | U | pCi/L | 23.5 | | |
| | | | 07/30/02 | Bi 214 (G) | U | pCi/L | 36.0 | | |
| | | | 07/30/02 | Pb 214 (G) | U | pCi/L | 27.6 | | |
| | | | 07/30/02 | Ra 226 (G) | U | pCi/L | 219 | | |
| | | | 07/30/02 | Ac 228 (G) | U | pCi/L | 50.4 | | |
| | | | 07/30/02 | Th 234 (G) | U | pCi/L | 522 | | |
| | | | 07/30/02 | U 235 (G) | U | pCi/L | 79.6 | | |
| ME054 | 8458-007 | 06/12/02 | 07/23/02 | GrossAlpha | 1.78 ± 2.0 | pCi/L | 2.69 | U | |
| | | | 07/23/02 | Gross Beta | 3.30 ± 1.4 | pCi/L | 2.09 | | |

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LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Codes |
|---|---|---|---|---|---|---|---|---|---|
| ME054 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 295 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 8.74 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 12.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 15.1 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 11.9 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 11.8 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 2130 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 95.2 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 15.8 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 23.2 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 22.8 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 178 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 55.5 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 363 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 68.2 | | |
| ME055 | 8458-008 | 06/13/02 | 07/23/02 | GrossAlpha | -0.119 ± 0.42 | pCi/L | 0.866 | U | |
| | | | 07/23/02 | Gross Beta | -0.261 ± 1.3 | pCi/L | 2.27 | U | |
| | | | 07/30/02 | K 40 (G) | U | pCi/L | 95.8 | U | |
| | | | 07/30/02 | Co 57 (G) | U | pCi/L | 7.06 | | |
| | | | 07/30/02 | Co 60 (G) | U | pCi/L | 7.80 | | |
| | | | 07/30/02 | Cs 134 (G) | U | pCi/L | 9.38 | | |
| | | | 07/30/02 | Cs 137 (G) | U | pCi/L | 8.48 | | |
| | | | 07/30/02 | Tl 208 (G) | U | pCi/L | 9.27 | | |
| | | | 07/30/02 | Pb 210 (G) | U | pCi/L | 3390 | | |
| | | | 07/30/02 | Bi 212 (G) | U | pCi/L | 101 | | |
| | | | 07/30/02 | Pb 212 (G) | U | pCi/L | 16.3 | | |
| | | | 07/30/02 | Bi 214 (G) | U | pCi/L | 17.9 | | |
| | | | 07/30/02 | Pb 214 (G) | U | pCi/L | 19.0 | | |
| | | | 07/30/02 | Ra 226 (G) | U | pCi/L | 148 | | |
| | | | 07/30/02 | Ac 228 (G) | U | pCi/L | 33.9 | | |
| | | | 07/30/02 | Th 234 (G) | U | pCi/L | 347 | | |
| | | | 07/30/02 | U 235 (G) | U | pCi/L | 55.2 | | |
| ME056 | 8458-009 | 06/13/02 | 07/23/02 | GrossAlpha | -0.028 ± 0.38 | pCi/L | 0.772 | U | |
| | | | 07/23/02 | Gross Beta | -0.162 ± 1.1 | pCi/L | 1.92 | U | |

AMEC VALIDATED

LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME056 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 318 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 6.81 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 14.6 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 15.4 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 12.7 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 11.5 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 504 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 86.8 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 15.0 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 24.8 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 22.6 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 154 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 54.0 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 175 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 51.8 | | |

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LEVEL V

Certified by
Report Date 08/08/02

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 8494
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No temperature information was provided by the laboratory. The sample was received intact. No custody seals were present on the cooler. Analyses were performed within the holding time of 180 days. | Due to the nonvolatile nature of the analytes and as the sample was received undamaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (7720-003) was analyzed with the sample in this SDG. There were no detects in the method blank. The method blank was only analyzed for gross alpha and gross beta (see comment section). | All remaining analytes except bismuth-214 and lead-214 were nondetected in ME093. As the possibility of bismuth-214 and lead-214 blank contamination could not be evaluated, bismuth-214 and lead-214 detected in ME093 were qualified as estimated, "J.". |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | An aqueous LCS sample (7720-003) was analyzed with the sample in this SDG. The LCS was only fortified with gross alpha, gross beta, cobalt-60, cesium-137, and uranium-235. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 85-110% and were deemed acceptable. | No qualifications were required. |
| 6. Duplicates | No duplicate analyses were performed in association with the sample in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: none<br>FB: none<br>Field duplicates: none | There were no field QC samples associated with ME093. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | Sample ME093 had detects for lead-214 and bismuth-214. These two isotopes are short-lived daughter products of naturally-occurring uranium-238. Other precursors in this decay chain are radon-222 and radium-226. Uranium-238 and radium-226 were analyzed for but were not detected at large MDAs. These MDAs were probably large enough to support the detection of lead-214 and bismuth-214. Of these detects, only beta activity is regulated by the National Primary Drinking Water Standards and the California Primary Drinking Water Standards. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8494
Work Order R210047-01
Received Date 10/09/02

Client MWH PASADENA
Contract 1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME093 | 8494-001 | 10/03/02 | 10/23/02 | GrossAlpha | 0.390 ± 2.5 | pCi/L | 4.46 | U | |
| | | | 10/23/02 | Gross Beta | 5.51 ± 4.3 | pCi/L | 6.92 | | |
| | | | 10/15/02 | K40 | U | pCi/L | 253 | | |
| | | | 10/15/02 | Co57 | U | pCi/L | 5.21 | | |
| | | | 10/15/02 | Co60 | U | pCi/L | 7.89 | | |
| | | | 10/15/02 | Cs134 | U | pCi/L | 9.26 | | |
| | | | 10/15/02 | Cs137 | U | pCi/L | 8.16 | | |
| | | | 10/15/02 | Tl208 | U | pCi/L | 14.2 | | |
| | | | 10/15/02 | Pb210 | U | pCi/L | 1790 | | |
| | | | 10/15/02 | Bi212 | U | pCi/L | 61.0 | | |
| | | | 10/15/02 | Pb212 | U | pCi/L | 11.2 | | |
| | | | 10/15/02 | Bi214 | 17.8 ± 16 | pCi/L | 16.6 | J | *3 |
| | | | 10/15/02 | Pb214 | 29.5 ± 16 | pCi/L | 18.4 | J | *3 |
| | | | 10/15/02 | Ra226 | U | pCi/L | 122 | U | |
| | | | 10/15/02 | Ac228 | U | pCi/L | 36.4 | | |
| | | | 10/15/02 | Th234 | U | pCi/L | 246 | | |
| | | | 10/15/02 | U235 | U | pCi/L | 48.4 | | |

AMEC VALIDATED

LEVEL V

Certified by [signature]
Report Date 10/31/02
Page 1

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MC047
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 01/08/03
Reviewer: S. Boehnke
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. Sample receipt information was recorded on the COC. The VOC sample vials were received intact. Custody seals were present and intact on the cooler. The cooler temperature was recorded as 12°C, outside the temperature limits of 4 ± 2°C.<br><br>The analysis of the sample was performed within 14 days of sample collection. | All nondetect sample results were qualified as estimated, "UJ." |
| 4. Method Blanks | One method blank was analyzed with this SDG. No target compounds were detected in the method blank. | No qualifications were required. |
| 5. LCS/BS | One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in the site sample in this SDG. | No qualifications were required. |
| 9. Other | TICs were not provided with the sample in this SDG. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 06/10-12/02 |
| Project: | Boeing SSFL | Date Received: | 06/14/02 |
| Job No.: | 20674 | Date Analyzed: | 06/17/02 |
| Matrix: | Water | Batch Number: | M48260W749 |
| Analyst: | JTS/CP | | |

| | Sample ID: | Blank | MC047 | rev qual | qual Code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| cis-1,3-Dichloropropene | 0.5 | ND | ND | UJ | *1 |
| trans-1,3-Dichloropropene | 0.5 | ND | ND | | |
| Diisopropyl Ether (DIPE) | 5.0 | ND | ND | | |
| Ethylbenzene | 0.5 | ND | ND | | |
| Ethyl tert-Butyl Ether (EtBE) | 5.0 | ND | ND | | |
| Hexachlorobutadiene | 0.5 | ND | ND | | |
| 2-Hexanone | 10 | ND | ND | | |
| Isopropylbenzene | 0.5 | ND | ND | | |
| p-Isopropyltoluene | 0.5 | ND | ND | | |
| Methylene chloride | 50 | ND | ND | | |
| 4-Methyl-2-pentanone | 5.0 | ND | ND | | |
| Methyl-tert-butyl ether (MtBE) | 1.0 | ND | ND | | |
| Naphthalene | 0.5 | ND | ND | | |
| n-Propylbenzene | 0.5 | ND | ND | | |
| Styrene | 0.5 | ND | ND | | |
| 1,1,1,2-Tetrachloroethane | 0.5 | ND | ND | | |
| 1,1,2,2-Tetrachloroethane | 1.0 | ND | ND | | |
| Tetrachloroethene | 0.5 | ND | ND | | |
| Toluene | 0.5 | ND | ND | | |
| 1,2,3-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,2,4-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,1,1-Trichloroethane | 0.5 | ND | ND | | |
| 1,1,2-Trichloroethane | 0.5 | ND | ND | | |
| Trichloroethene | 0.5 | ND | ND | | |
| 1,2,3-Trichloropropane | 0.5 | ND | ND | | |
| Trichlorofluoromethane | 0.5 | ND | ND | | |
| Trichlorotrifluoroethane | 5.0 | ND | ND | | |
| 1,2,4-Trimethylbenzene | 0.5 | ND | ND | | |
| 1,3,5-Trimethylbenzene | 0.5 | ND | ND | | |
| Vinyl chloride | 0.5 | ND | ND | | |
| Xylenes, m-,p- | 1.0 | ND | ND | | |
| Xylene, o- | 0.5 | ND | ND | | |

**Surrogates (% recovery)** Limits: 70 - 130

| Sample ID: | Blank | MC047 |
|---|---|---|
| Dibromofluoromethane | 101 | 99 |
| Toluene-d8 | 98 | 99 |
| Bromofluorobenzene | 101 | 102 |

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LEVEL V

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 06/10-12/02 |
| Project: | Boeing SSFL | Date Received: | 06/14/02 |
| Job No.: | 20674 | Date Analyzed: | 06/17/02 |
| Matrix: | Water | Batch Number: | M48260W749 |
| Analyst: | JTS/CP | | |

| | Sample ID: | Blank | MC047 | rev qual | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| Acetone | 50 | ND | ND | UJ | *1 |
| tert-Amyl Methyl Ether (TAME) | 5.0 | ND | ND | | |
| Benzene | 0.5 | ND | ND | | |
| Bromobenzene | 1.0 | ND | ND | | |
| Bromochloromethane | 1.0 | ND | ND | | |
| Bromodichloromethane | 0.5 | ND | ND | | |
| Bromoform | 0.5 | ND | ND | | |
| Bromomethane | 0.5 | ND | ND | | |
| tert-Butanol (TBA) | 10 | ND | ND | | |
| 2-Butanone (MEK) | 10 | ND | ND | | |
| n-Butylbenzene | 0.5 | ND | ND | | |
| sec-Butylbenzene | 0.5 | ND | ND | | |
| tert-Butylbenzene | 0.5 | ND | ND | | |
| Carbon disulfide | 10 | ND | ND | | |
| Carbon tetrachloride | 0.5 | ND | ND | | |
| Chlorobenzene | 0.5 | ND | ND | | |
| Chloroethane | 0.5 | ND | ND | | |
| Chloroform | 0.5 | ND | ND | | |
| Chloromethane | 0.5 | ND | ND | | |
| 2-Chlorotoluene | 0.5 | ND | ND | | |
| 4-Chlorotoluene | 0.5 | ND | ND | | |
| Dibromochloromethane | 0.5 | ND | ND | | |
| 1,2-Dibromoethane | 0.5 | ND | ND | | |
| 1,2-Dibromo-3-chloropropane | 10 | ND | ND | | |
| Dibromomethane | 0.5 | ND | ND | | |
| 1,2-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,3-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,4-Dichlorobenzene | 0.5 | ND | ND | | |
| Dichlorodifluoromethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethane | 0.5 | ND | ND | | |
| 1,2-Dichloroethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethene | 0.5 | ND | ND | | |
| cis-1,2-Dichloroethene | 0.5 | ND | ND | | |
| trans-1,2-Dichloroethene | 0.5 | ND | ND | | |
| 1,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,3-Dichloropropane | 0.5 | ND | ND | | |
| 2,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,1-Dichloropropene | 0.5 | ND | ND | | |

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LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MJ093
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 11/26/02
Reviewer: M. Pokorny
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.<br><br>A laboratory sample receipt checklist noted that the VOC sample vials were received intact. There were no custody seals on the coolers. The cooler temperatures were recorded as 2°C, within the temperature limits of 4 ± 2°C.<br><br>The analysis of the sample was performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | One method blank (VBLKLG) was analyzed with this SDG. Acetone was reported in VBLKLG, at 2µg/L. | Acetone was not reported in the sample of this SDG; therefore, no qualifications were required. |
| 5. LCS/BS | One LCS (VLCSLG) was analyzed with this SDG. All spiked compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in any of the site samples in this SDG. | No qualifications were required. |
| 9. Other | Sample MJ093 was analyzed for a list of 41 target compounds.<br><br>TICs were not provided with the sample in this SDG.<br><br>Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ093

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: ROCKET SAS No.: SDG No.: MJ093

Matrix: (soil/water) WATER Lab Sample ID: 021006-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: LL302

Level: (low/med) LOW Date Received: 10/04/02

% Moisture: not dec. _____ Date Analyzed: 10/10/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 75-71-8 | Dichlorodifluoromethane | 5 | U | U | |
| 74-87-3 | Chloromethane | 5 | U | ↓ | |
| 75-01-4 | Vinyl Chloride | 2 | U | | |
| 74-83-9 | Bromomethane | 1 | J | J | |
| 75-00-3 | Chloroethane | 5 | U | U | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | ↓ | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 6 | | | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | U | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 108-38-3 | m,p-Xylenes | 10 | U | | |
| 95-47-6 | o-Xylene | 5 | U | | |



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ093

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: ROCKET SAS No.: SDG No.: MJ093

Matrix: (soil/water) WATER Lab Sample ID: 021006-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: LL302

Level: (low/med) LOW Date Received: 10/04/02

% Moisture: not dec. _____ Date Analyzed: 10/10/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 75-25-2 | Bromoform | 5 | U | U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | | |
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



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LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MJ058
Matrix: Water
No. of Samples: 2
No. of Reanalyses/Dilutions: 0
Date Reviewed: 11/26/02
Reviewer: M. Pokorny
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.<br><br>A laboratory sample receipt checklist noted that the VOC sample vials were received intact. There were no custody seals on the coolers. The cooler temperatures were recorded as 5°C, within the temperature limits of 4 ± 2°C.<br><br>The analyses of the samples were performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | Two method blanks (VBLKP2 and VBLKQE) were analyzed with this SDG. Acetone and methylene chloride were reported in VBLKP2, at 31µg/L and 16µg/L, respectively. No target compounds were reported in VBLKQE. | The reporting limits for acetone and methylene chloride were raised to the levels of contamination and the results qualified as estimated nondetects, "UJ," in samples MJ059 and MJ060. |
| 5. LCS/BS | Two LCSs (VLCSP2 and VLCSQE) were analyzed with this SDG. All spiked compounds were recovered within the QC limits. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |
| 8. Field QC Samples<br>ER: None<br>TB: None<br>FB: None<br>FD: None | Sample MJ059 was identified as a silicone blank on the COC.<br>Sample MJ060 was identified as a tubing blank on the COC. | No qualifications were required. |
| 9. Other | Samples MJ059 and MJ060 were initially analyzed for a list of 37 target compounds and was reanalyzed for the added compound 1,4-dioxane.<br><br>TICs were not provided with the sample in this SDG.<br><br>Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

FORM I
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3034

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U | U | |
| 75-01-4 | Vinyl Chloride | 5 | U | ↓ | |
| 74-83-9 | Bromomethane | 5 | U | ↓ | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 67-64-1 | Acetone | 41 | B | UJ | B |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | U | |
| 75-09-2 | Methylene Chloride | 20 | B | UJ | B |
| 75-15-0 | Carbon Disulfide | 5 | U | U | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | ↓ | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | ↓ | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | ↓ | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | ↓ | |
| 67-66-3 | Chloroform | 1 | J | J | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | U | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | ↓ | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | ↓ | |
| 71-43-2 | Benzene | 5 | U | ↓ | |
| 79-01-6 | Trichloroethene | 5 | U | ↓ | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | ↓ | |
| 75-27-4 | Bromodichloromethane | 5 | U | ↓ | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | ↓ | |
| 108-88-3 | Toluene | 5 | U | ↓ | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | ↓ | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | ↓ | |
| 127-18-4 | Tetrachloroethene | 5 | U | ↓ | |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U | ↓ | |
| 591-78-6 | 2-Hexanone | 10 | U | ↓ | |
| 124-48-1 | Dibromochloromethane | 5 | U | ↓ | |
| 108-90-7 | Chlorobenzene | 5 | U | ↓ | |
| 100-41-4 | Ethylbenzene | 5 | U | ↓ | |
| 1330-20-7 | Xylenes (total) | 15 | U | ↓ | |
| 108-38-3 | m,p-Xylenes | 10 | U | ↓ | |

FORM I VOA

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FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3034

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5 | U | U | |
| 100-42-5 | Styrene | 5 | U | ↓ | |
| 75-25-2 | Bromoform | 5 | U | ↓ | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

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LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q2646

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 08/09/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 123-91-1 | 1,4-Dioxane | 0.100 | U | U | |

FORM I VOA



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3035

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U | U | |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 67-64-1 | Acetone | 29 | B | UJ | B |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | U | |
| 75-09-2 | Methylene Chloride | 20 | B | UJ | B |
| 75-15-0 | Carbon Disulfide | 5 | U | U | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U | | |
| 591-78-6 | 2-Hexanone | 10 | U | | |
| 124-48-1 | Dibromochloromethane | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 108-38-3 | m,p-Xylenes | 10 | U | | |



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LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3035

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5 | U | U | |
| 100-42-5 | Styrene | 5 | U | ↓ | |
| 75-25-2 | Bromoform | 5 | U | ↓ | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q2647

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 08/09/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 123-91-1 | 1,4-Dioxane | 0.100 | U | U | |

FORM I VOA



AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MJ047
Matrix: Water
No. of Samples: 11
No. of Reanalyses/Dilutions: 0
Date Reviewed: 07/18/02
Reviewer: D. A. Buckheister
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MJ047, MJ048, MJ049, MJ050, MJ051, MJ052, MJ053, MJ054, MJ055, MJ056, MJ057

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC. A laboratory sample receipt checklist noted that the VOC sample vials were not all received intact; however, no additional information regarding the broken containers was recorded. There were no custody seals on the cooler. The cooler temperature was recorded as 4°C, within the temperature limits of 4 ± 2°C. Air bubbles were present in samples MJ047, MJ048, and MJ049.<br><br>The samples were analyzed within 14 days of sample collection. | All target compounds were qualified as estimated, "J" for detects and "UJ," for nondetects," in samples MJ047, MJ048, and MJ049. |
| 4. Method Blanks | Two method blanks (VBLKQW and VBLKQX) were analyzed with this SDG. No target compounds were reported in the method blanks. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 5. LCS/BS | Two LCSs (VLCSQW and VLCSQX) were analyzed with this SDG. Dichlorodifluoromethane, chloromethane, vinyl chloride, and methylene chloride were recovered below the QC limits but above than 10% in both of the LCSs. Added target compounds chlorotrifluoroethane, 1,1,2-trichlorotrifluoroethane, and 2-chloroethyl vinyl ether were not spiked into either LCS. | The nondetect results for the compounds recovered below the QC limits were qualified as estimated, "UJ," in all of the samples in this SDG, except MJ055 and MJ056, which were identified as field QC samples. |
| 6. Surrogates | Dibromofluoromethane was recovered above the QC laboratory-established QC limits in samples MJ048, MJ049, MJ050, MJ052, MJ054, MJ055, MJ056, and MJ057. Dibromofluoromethane was recovered below the QC limits but above 10% in sample MJ053. All remaining surrogate recoveries were within the QC limits. | Detected compounds in samples MJ049 and MJ057 were qualified as estimated, "J." Samples MJ055 and MJ056 were identified as field QC samples and required no qualifications. The nondetect results for all target compounds were qualified as estimated, "UJ," in sample MJ053. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |
| 8. Field QC Samples<br>ER: MJ056<br>ER:MJ059, MJ060 (MJ051 only)<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in both the equipment rinsate MJ056 and the field blank at 2µg/L, and in equipment rinsate MJ059 at 1 µg/L. Chloroform was not reported in any of the site samples in this SDG. | No qualifications were required. |
| 9. Other | All of the samples in this SDG were analyzed for added compounds chlorotrifluoroethene, 1,1,2–trichlorotrifluoroethane, and 2–chloroethyl vinyl ether.<br><br>TICs were not provided with the samples in this SDG.<br><br>Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

T702 V01

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ047

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1905

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | UJ | *1 |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | | L |
| 74-87-3 | Chloromethane | 5 | U | | |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | UJ | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | UJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | | |

FORM I VOA

AMEC VALIDATED

LEVEL V11

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ047

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1905

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | UJ | *1 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |

AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ048

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1906

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | UJ | *1 |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | UJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | ↓ | ↓ |
| 74-83-9 | Bromomethane | 5 | U | UJ | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | ↓ | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | ↓ | |
| 67-64-1 | Acetone | 10 | U | ↓ | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | ↓ | |
| 75-09-2 | Methylene Chloride | 5 | U | UJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | UJ | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | ↓ | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | ↓ | |
| 67-66-3 | Chloroform | 5 | U | ↓ | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | ↓ | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | ↓ | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | ↓ | |
| 71-43-2 | Benzene | 5 | U | ↓ | |
| 79-01-6 | Trichloroethene | 5 | U | ↓ | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | ↓ | |
| 75-27-4 | Bromodichloromethane | 5 | U | ↓ | |
| 108-88-3 | Toluene | 5 | U | ↓ | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | ↓ | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | ↓ | |
| 127-18-4 | Tetrachloroethene | 5 | U | ↓ | |
| 108-90-7 | Chlorobenzene | 5 | U | ↓ | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | ↓ | |
| 100-41-4 | Ethylbenzene | 5 | U | ↓ | |
| 1330-20-7 | Xylenes (total) | 15 | U | ↓ | |
| 75-25-2 | Bromoform | 5 | U | ↓ | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ048

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1906

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | US | *1 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED
LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ049

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1907

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | UJ | *1 |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | UJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | ↓ | ↓ |
| 74-83-9 | Bromomethane | 5 | U | UJ | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | ↓ | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | ↓ | |
| 67-64-1 | Acetone | 2 | J | J | S |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | UJ | |
| 75-09-2 | Methylene Chloride | 5 | U | ↓ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | UJ | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | ↓ |
| 78-93-3 | 2-Butanone | 10 | U | ↓ | ↓ |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | ↓ | ↓ |
| 67-66-3 | Chloroform | 5 | U | ↓ | ↓ |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | ↓ | ↓ |
| 56-23-5 | Carbon Tetrachloride | 5 | U | ↓ | ↓ |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | ↓ | ↓ |
| 71-43-2 | Benzene | 5 | U | ↓ | ↓ |
| 79-01-6 | Trichloroethene | 5 | U | ↓ | ↓ |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | ↓ | ↓ |
| 75-27-4 | Bromodichloromethane | 5 | U | ↓ | ↓ |
| 108-88-3 | Toluene | 5 | U | ↓ | ↓ |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | ↓ | ↓ |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | ↓ | ↓ |
| 127-18-4 | Tetrachloroethene | 5 | U | ↓ | ↓ |
| 108-90-7 | Chlorobenzene | 5 | U | ↓ | ↓ |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | ↓ | ↓ |
| 100-41-4 | Ethylbenzene | 5 | U | ↓ | ↓ |
| 1330-20-7 | Xylenes (total) | 15 | U | ↓ | ↓ |
| 75-25-2 | Bromoform | 5 | U | ↓ | ↓ |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | ↓ |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ049

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1907

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/24/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | UJ | *1 |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED
LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ050

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-04

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1920

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | UJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | u | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | UJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | u | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | | |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ050

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-04

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1920

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ051

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-05

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1921

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | UJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | u | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 21 | | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | u | |
| 75-09-2 | Methylene Chloride | 5 | U | UJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | u | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | ↓ | |
| 108-88-3 | Toluene | 2 | J | J | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | u | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | ↓ | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ051

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-05

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1921

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | ↓ | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | ↓ | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | ↓ | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | ↓ | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | ↓ | |



AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ052

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-06

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1922

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | uJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | u | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | uJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | u | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ052

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-06

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1922

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |

FORM I VOA

AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ053

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-07

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1923

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | UJ | S |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | UJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | UJ | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | ↓ | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | UJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | UJ | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | ↓ |

FORM I VOA



AMEC VALIDATED
LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ053

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-07

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1923

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | UJ | S |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | ↓ | ↓ |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ054

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-08

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1924

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | uJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | u | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | uJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | u | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ054

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-08

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1924

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL QUAL CODE |
|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | ↓ |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | ↓ |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | ↓ |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | ↓ |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | ↓ |



AMEC VALIDATED
LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW 6/14/2 SAMPLE NO.

MJ055 PB

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-09

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1925

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | U | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | | |
| 74-87-3 | Chloromethane | 5 | U | | |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 5 | U | | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 2 | J | J | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | U | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | | |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW 6/14/2 SAMPLE NO.

MJ055

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-09

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1925

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | RFV Qual | Qual Code |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | u | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | ↓ | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED
LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ056 ER

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-10

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1926

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL QUAL CODE |
|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | |
| 74-87-3 | Chloromethane | 5 | U | |
| 75-01-4 | Vinyl Chloride | 5 | U | |
| 74-83-9 | Bromomethane | 5 | U | |
| 75-00-3 | Chloroethane | 5 | U | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | |
| 67-64-1 | Acetone | 10 | U | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | |
| 75-09-2 | Methylene Chloride | 5 | U | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | |
| 78-93-3 | 2-Butanone | 10 | U | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | |
| 67-66-3 | Chloroform | 2 | J | J |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | u |
| 56-23-5 | Carbon Tetrachloride | 5 | U | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | |
| 71-43-2 | Benzene | 5 | U | |
| 79-01-6 | Trichloroethene | 5 | U | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | |
| 75-27-4 | Bromodichloromethane | 5 | U | |
| 108-88-3 | Toluene | 5 | U | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | |
| 127-18-4 | Tetrachloroethene | 5 | U | |
| 108-90-7 | Chlorobenzene | 5 | U | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | |
| 100-41-4 | Ethylbenzene | 5 | U | |
| 1330-20-7 | Xylenes (total) | 15 | U | |
| 75-25-2 | Bromoform | 5 | U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | |

AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ056

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-10

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1926

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ057

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-11

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1927

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 79-38-9 | Chlorotrifluoroethene | 5 | U | u | |
| 75-71-8 | Dichlorodifluoromethane | 5 | U | uJ | L |
| 74-87-3 | Chloromethane | 5 | U | ↓ | ↓ |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | u | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | | |
| 76-13-1 | 1,1,2-Trichlorotrifluoroetha | 5 | U | | |
| 67-64-1 | Acetone | 4 | J | ~~J~~ J | S |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | u | |
| 75-09-2 | Methylene Chloride | 5 | U | uJ | L |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | u | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 110-75-8 | 2-Chloroethylvinyl ether | 10 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 75-25-2 | Bromoform | 5 | U | | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED



LEVEL V

DAB 7/18/02

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ057

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ047

Matrix: (soil/water) WATER Lab Sample ID: 020581-11

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q1927

Level: (low/med) LOW Date Received: 06/14/02

% Moisture: not dec. _____ Date Analyzed: 06/25/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume:_____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | U | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



AMEC VALIDATED LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MJ093
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 11/26/02
Reviewer: M. Pokorny
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.<br><br>A laboratory sample receipt checklist noted that the VOC sample vials were received intact. There were no custody seals on the coolers. The cooler temperatures were recorded as 2°C, within the temperature limits of 4 ± 2°C.<br><br>The analysis of the sample was performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | One method blank (VBLKLG) was analyzed with this SDG. Acetone was reported in VBLKLG, at 2µg/L. | Acetone was not reported in the sample of this SDG; therefore, no qualifications were required. |
| 5. LCS/BS | One LCS (VLCSLG) was analyzed with this SDG. All spiked compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in any of the site samples in this SDG. | No qualifications were required. |
| 9. Other | Sample MJ093 was analyzed for a list of 41 target compounds.<br><br>TICs were not provided with the sample in this SDG.<br><br>Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ093

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: ROCKET SAS No.: SDG No.: MJ093

Matrix: (soil/water) WATER Lab Sample ID: 021006-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: LL302

Level: (low/med) LOW Date Received: 10/04/02

% Moisture: not dec. _____ Date Analyzed: 10/10/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 75-71-8 | Dichlorodifluoromethane | 5 | U | U | |
| 74-87-3 | Chloromethane | 5 | U | ↓ | |
| 75-01-4 | Vinyl Chloride | 2 | U | | |
| 74-83-9 | Bromomethane | 1 | J | J | |
| 75-00-3 | Chloroethane | 5 | U | U | |
| 75-69-4 | Trichlorofluoromethane | 5 | U | ↓ | |
| 67-64-1 | Acetone | 10 | U | | |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | | |
| 75-09-2 | Methylene Chloride | 6 | | | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | U | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 630-20-6 | 1,1,1,2-Tetrachloroethane | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 108-38-3 | m,p-Xylenes | 10 | U | | |
| 95-47-6 | o-Xylene | 5 | U | | |



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ093

Lab Name: CEIMIC CORP Contract: MW

Lab Code: CEIMIC Case No.: ROCKET SAS No.: SDG No.: MJ093

Matrix: (soil/water) WATER Lab Sample ID: 021006-01

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: LL302

Level: (low/med) LOW Date Received: 10/04/02

% Moisture: not dec. _____ Date Analyzed: 10/10/02

GC Column: DB-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____(uL) Soil Aliquot Volume: _____(uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 75-25-2 | Bromoform | 5 | U | U | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | | |
| 108-67-8 | 1,3,5-Trimethylbenzene | 5 | U | | |
| 95-63-6 | 1,2,4-Trimethylbenzene | 5 | U | | |
| 541-73-1 | 1,3-Dichlorobenzene | 5 | U | | |
| 106-46-7 | 1,4-Dichlorobenzene | 5 | U | | |
| 95-50-1 | 1,2-Dichlorobenzene | 5 | U | | |
| 96-12-8 | 1,2-Dibromo-3-Chloropropane | 5 | U | | |



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LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MJ058
Matrix: Water
No. of Samples: 2
No. of Reanalyses/Dilutions: 0
Date Reviewed: 11/26/02
Reviewer: M. Pokorny
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.<br><br>A laboratory sample receipt checklist noted that the VOC sample vials were received intact. There were no custody seals on the coolers. The cooler temperatures were recorded as 5°C, within the temperature limits of 4 ± 2°C.<br><br>The analyses of the samples were performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | Two method blanks (VBLKP2 and VBLKQE) were analyzed with this SDG. Acetone and methylene chloride were reported in VBLKP2, at 31µg/L and 16µg/L, respectively. No target compounds were reported in VBLKQE. | The reporting limits for acetone and methylene chloride were raised to the levels of contamination and the results qualified as estimated nondetects, "UJ," in samples MJ059 and MJ060. |
| 5. LCS/BS | Two LCSs (VLCSP2 and VLCSQE) were analyzed with this SDG. All spiked compounds were recovered within the QC limits. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |
| 8. Field QC Samples<br>ER: None<br>TB: None<br>FB: None<br>FD: None | Sample MJ059 was identified as a silicone blank on the COC.<br>Sample MJ060 was identified as a tubing blank on the COC. | No qualifications were required. |
| 9. Other | Samples MJ059 and MJ060 were initially analyzed for a list of 37 target compounds and was reanalyzed for the added compound 1,4-dioxane.<br><br>TICs were not provided with the sample in this SDG.<br><br>Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

FORM I
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3034

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U | U | |
| 75-01-4 | Vinyl Chloride | 5 | U | ↓ | |
| 74-83-9 | Bromomethane | 5 | U | ↓ | |
| 75-00-3 | Chloroethane | 5 | U | ↓ | |
| 67-64-1 | Acetone | 41 | B | UJ | B |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | U | |
| 75-09-2 | Methylene Chloride | 20 | B | UJ | B |
| 75-15-0 | Carbon Disulfide | 5 | U | U | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | ↓ | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | ↓ | |
| 78-93-3 | 2-Butanone | 10 | U | ↓ | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | ↓ | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | ↓ | |
| 67-66-3 | Chloroform | 1 | J | J | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | U | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | ↓ | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | ↓ | |
| 71-43-2 | Benzene | 5 | U | ↓ | |
| 79-01-6 | Trichloroethene | 5 | U | ↓ | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | ↓ | |
| 75-27-4 | Bromodichloromethane | 5 | U | ↓ | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | ↓ | |
| 108-88-3 | Toluene | 5 | U | ↓ | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | ↓ | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | ↓ | |
| 127-18-4 | Tetrachloroethene | 5 | U | ↓ | |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U | ↓ | |
| 591-78-6 | 2-Hexanone | 10 | U | ↓ | |
| 124-48-1 | Dibromochloromethane | 5 | U | ↓ | |
| 108-90-7 | Chlorobenzene | 5 | U | ↓ | |
| 100-41-4 | Ethylbenzene | 5 | U | ↓ | |
| 1330-20-7 | Xylenes (total) | 15 | U | ↓ | |
| 108-38-3 | m,p-Xylenes | 10 | U | ↓ | |

FORM I VOA

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FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3034

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5 | U | U | |
| 100-42-5 | Styrene | 5 | U | ↓ | |
| 75-25-2 | Bromoform | 5 | U | ↓ | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA

AMEC VALIDATED



LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ059

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-02

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q2646

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 08/09/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 123-91-1 | 1,4-Dioxane | 0.100 | U | U | |

FORM I VOA



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3035

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 95-47-6 | o-Xylene | 5 | U | U | |
| 100-42-5 | Styrene | 5 | U | ↓ | |
| 75-25-2 | Bromoform | 5 | U | ↓ | |
| 79-34-5 | 1,1,2,2-Tetrachloroethane | 5 | U | ↓ | |

FORM I VOA



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: Q2647

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 08/09/02

GC Column: RTX-624 ID: 0.25 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 123-91-1 | 1,4-Dioxane | 0.100 | U | U | |

FORM I VOA



AMEC VALIDATED

LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJ060

Lab Name: CEIMIC CORP Contract: MONTGOMERY

Lab Code: CEIMIC Case No.: BOEING SAS No.: SDG No.: MJ058

Matrix: (soil/water) WATER Lab Sample ID: 020619-03

Sample wt/vol: 5.000 (g/mL) ML Lab File ID: P3035

Level: (low/med) LOW Date Received: 06/21/02

% Moisture: not dec. _____ Date Analyzed: 07/03/02

GC Column: DB624 ID: 0.20 (mm) Dilution Factor: 1.0

Soil Extract Volume: _____ (uL) Soil Aliquot Volume: _____ (uL)

| CAS NO. | COMPOUND | CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L | Q | REV QUAL | QUAL CODE |
|---|---|---|---|---|---|
| 74-87-3 | Chloromethane | 5 | U | U | |
| 75-01-4 | Vinyl Chloride | 5 | U | | |
| 74-83-9 | Bromomethane | 5 | U | | |
| 75-00-3 | Chloroethane | 5 | U | | |
| 67-64-1 | Acetone | 29 | B | UJ | B |
| 75-35-4 | 1,1-Dichloroethene | 5 | U | U | |
| 75-09-2 | Methylene Chloride | 20 | B | UJ | B |
| 75-15-0 | Carbon Disulfide | 5 | U | U | |
| 156-60-5 | trans-1,2-Dichloroethene | 5 | U | | |
| 75-34-3 | 1,1-Dichloroethane | 5 | U | | |
| 78-93-3 | 2-Butanone | 10 | U | | |
| 156-59-2 | cis-1,2-Dichloroethene | 5 | U | | |
| 540-59-0 | 1,2-Dichloroethene (total) | 10 | U | | |
| 67-66-3 | Chloroform | 5 | U | | |
| 71-55-6 | 1,1,1-Trichloroethane | 5 | U | | |
| 56-23-5 | Carbon Tetrachloride | 5 | U | | |
| 107-06-2 | 1,2-Dichloroethane | 5 | U | | |
| 71-43-2 | Benzene | 5 | U | | |
| 79-01-6 | Trichloroethene | 5 | U | | |
| 78-87-5 | 1,2-Dichloropropane | 5 | U | | |
| 75-27-4 | Bromodichloromethane | 5 | U | | |
| 10061-01-5 | cis-1,3-Dichloropropene | 5 | U | | |
| 108-88-3 | Toluene | 5 | U | | |
| 10061-02-6 | trans-1,3-Dichloropropene | 5 | U | | |
| 79-00-5 | 1,1,2-Trichloroethane | 5 | U | | |
| 127-18-4 | Tetrachloroethene | 5 | U | | |
| 108-10-1 | 4-Methyl-2-Pentanone | 10 | U | | |
| 591-78-6 | 2-Hexanone | 10 | U | | |
| 124-48-1 | Dibromochloromethane | 5 | U | | |
| 108-90-7 | Chlorobenzene | 5 | U | | |
| 100-41-4 | Ethylbenzene | 5 | U | | |
| 1330-20-7 | Xylenes (total) | 15 | U | | |
| 108-38-3 | m,p-Xylenes | 10 | U | | |



AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MC047
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 01/08/03
Reviewer: S. Boehnke
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. Sample receipt information was recorded on the COC. The VOC sample vials were received intact. Custody seals were present and intact on the cooler. The cooler temperature was recorded as 12°C, outside the temperature limits of 4 ± 2°C.<br><br>The analysis of the sample was performed within 14 days of sample collection. | All nondetect sample results were qualified as estimated, "UJ." |
| 4. Method Blanks | One method blank was analyzed with this SDG. No target compounds were detected in the method blank. | No qualifications were required. |
| 5. LCS/BS | One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in the site sample in this SDG. | No qualifications were required. |
| 9. Other | TICs were not provided with the sample in this SDG. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 06/10-12/02 |
| Project: | Boeing SSFL | Date Received: | 06/14/02 |
| Job No.: | 20674 | Date Analyzed: | 06/17/02 |
| Matrix: | Water | Batch Number: | M48260W749 |
| Analyst: | JTS/CP | | |

| | Sample ID: | Blank | MC047 | rev qual | qual Code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| cis-1,3-Dichloropropene | 0.5 | ND | ND | UJ | *1 |
| trans-1,3-Dichloropropene | 0.5 | ND | ND | | |
| Diisopropyl Ether (DIPE) | 5.0 | ND | ND | | |
| Ethylbenzene | 0.5 | ND | ND | | |
| Ethyl tert-Butyl Ether (EtBE) | 5.0 | ND | ND | | |
| Hexachlorobutadiene | 0.5 | ND | ND | | |
| 2-Hexanone | 10 | ND | ND | | |
| Isopropylbenzene | 0.5 | ND | ND | | |
| p-Isopropyltoluene | 0.5 | ND | ND | | |
| Methylene chloride | 50 | ND | ND | | |
| 4-Methyl-2-pentanone | 5.0 | ND | ND | | |
| Methyl-tert-butyl ether (MtBE) | 1.0 | ND | ND | | |
| Naphthalene | 0.5 | ND | ND | | |
| n-Propylbenzene | 0.5 | ND | ND | | |
| Styrene | 0.5 | ND | ND | | |
| 1,1,1,2-Tetrachloroethane | 0.5 | ND | ND | | |
| 1,1,2,2-Tetrachloroethane | 1.0 | ND | ND | | |
| Tetrachloroethene | 0.5 | ND | ND | | |
| Toluene | 0.5 | ND | ND | | |
| 1,2,3-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,2,4-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,1,1-Trichloroethane | 0.5 | ND | ND | | |
| 1,1,2-Trichloroethane | 0.5 | ND | ND | | |
| Trichloroethene | 0.5 | ND | ND | | |
| 1,2,3-Trichloropropane | 0.5 | ND | ND | | |
| Trichlorofluoromethane | 0.5 | ND | ND | | |
| Trichlorotrifluoroethane | 5.0 | ND | ND | | |
| 1,2,4-Trimethylbenzene | 0.5 | ND | ND | | |
| 1,3,5-Trimethylbenzene | 0.5 | ND | ND | | |
| Vinyl chloride | 0.5 | ND | ND | | |
| Xylenes, m-,p- | 1.0 | ND | ND | | |
| Xylene, o- | 0.5 | ND | ND | | |

**Surrogates (% recovery)** Limits: 70 - 130

| Sample ID: | Blank | MC047 |
|---|---|---|
| Dibromofluoromethane | 101 | 99 |
| Toluene-d8 | 98 | 99 |
| Bromofluorobenzene | 101 | 102 |

AMEC VALIDATED



LEVEL V

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 06/10-12/02 |
| Project: | Boeing SSFL | Date Received: | 06/14/02 |
| Job No.: | 20674 | Date Analyzed: | 06/17/02 |
| Matrix: | Water | Batch Number: | M48260W749 |
| Analyst: | JTS/CP | | |

| | Sample ID: | Blank | MC047 | rev qual | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| Acetone | 50 | ND | ND | UJ | *1 |
| tert-Amyl Methyl Ether (TAME) | 5.0 | ND | ND | | |
| Benzene | 0.5 | ND | ND | | |
| Bromobenzene | 1.0 | ND | ND | | |
| Bromochloromethane | 1.0 | ND | ND | | |
| Bromodichloromethane | 0.5 | ND | ND | | |
| Bromoform | 0.5 | ND | ND | | |
| Bromomethane | 0.5 | ND | ND | | |
| tert-Butanol (TBA) | 10 | ND | ND | | |
| 2-Butanone (MEK) | 10 | ND | ND | | |
| n-Butylbenzene | 0.5 | ND | ND | | |
| sec-Butylbenzene | 0.5 | ND | ND | | |
| tert-Butylbenzene | 0.5 | ND | ND | | |
| Carbon disulfide | 10 | ND | ND | | |
| Carbon tetrachloride | 0.5 | ND | ND | | |
| Chlorobenzene | 0.5 | ND | ND | | |
| Chloroethane | 0.5 | ND | ND | | |
| Chloroform | 0.5 | ND | ND | | |
| Chloromethane | 0.5 | ND | ND | | |
| 2-Chlorotoluene | 0.5 | ND | ND | | |
| 4-Chlorotoluene | 0.5 | ND | ND | | |
| Dibromochloromethane | 0.5 | ND | ND | | |
| 1,2-Dibromoethane | 0.5 | ND | ND | | |
| 1,2-Dibromo-3-chloropropane | 10 | ND | ND | | |
| Dibromomethane | 0.5 | ND | ND | | |
| 1,2-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,3-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,4-Dichlorobenzene | 0.5 | ND | ND | | |
| Dichlorodifluoromethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethane | 0.5 | ND | ND | | |
| 1,2-Dichloroethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethene | 0.5 | ND | ND | | |
| cis-1,2-Dichloroethene | 0.5 | ND | ND | | |
| trans-1,2-Dichloroethene | 0.5 | ND | ND | | |
| 1,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,3-Dichloropropane | 0.5 | ND | ND | | |
| 2,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,1-Dichloropropene | 0.5 | ND | ND | | |

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LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MC093
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 01/08/03
Reviewer: S. Boehnke
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. Sample receipt information was recorded on the COC. The VOC sample vials were received intact. The cooler temperature was recorded as 4°C, within the temperature limits of 4 ± 2°C. No custody seal information was provided by the laboratory.<br><br>The analysis of the sample was performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | One method blank was analyzed with this SDG. No target compounds were detected in the method blank. | No qualifications were required. |
| 5. LCS/BS | One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in the site sample in this SDG. | No qualifications were required. |
| 9. Other | TICs were not provided with the sample in this SDG. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | Date Analyzed: | 10/04-07/02 |
| Matrix: | Water | Batch Number: | MS48260W2893 |
| Analyst: | ZL | | |

| | Sample ID: | Blank | MC093 rev | qual | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| Acetone | 50 | ND | ND | U | |
| tert-Amyl Methyl Ether (TAME) | 5.0 | ND | ND | | |
| Benzene | 0.5 | ND | ND | | |
| Bromobenzene | 1.0 | ND | ND | | |
| Bromochloromethane | 1.0 | ND | ND | | |
| Bromodichloromethane | 0.5 | ND | ND | | |
| Bromoform | 0.5 | ND | ND | | |
| Bromomethane | 0.5 | ND | ND | | |
| tert-Butanol (TBA) | 10 | ND | ND | | |
| 2-Butanone (MEK) | 10 | ND | ND | | |
| n-Butylbenzene | 0.5 | ND | ND | | |
| sec-Butylbenzene | 0.5 | ND | ND | | |
| tert-Butylbenzene | 0.5 | ND | ND | | |
| Carbon disulfide | 10 | ND | ND | | |
| Carbon tetrachloride | 0.5 | ND | ND | | |
| Chlorobenzene | 0.5 | ND | ND | | |
| Chloroethane | 0.5 | ND | ND | | |
| Chloroform | 0.5 | ND | ND | | |
| Chloromethane | 0.5 | ND | ND | | |
| 2-Chlorotoluene | 0.5 | ND | ND | | |
| 4-Chlorotoluene | 0.5 | ND | ND | | |
| Dibromochloromethane | 0.5 | ND | ND | | |
| 1,2-Dibromoethane | 0.5 | ND | ND | | |
| 1,2-Dibromo-3-chloropropane | 10 | ND | ND | | |
| Dibromomethane | 0.5 | ND | ND | | |
| 1,2-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,3-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,4-Dichlorobenzene | 0.5 | ND | ND | | |
| Dichlorodifluoromethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethane | 0.5 | ND | ND | | |
| 1,2-Dichloroethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethene | 0.5 | ND | ND | | |
| cis-1,2-Dichloroethene | 0.5 | ND | ND | | |
| trans-1,2-Dichloroethene | 0.5 | ND | ND | | |
| 1,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,3-Dichloropropane | 0.5 | ND | ND | | |
| 2,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,1-Dichloropropene | 0.5 | ND | ND | | |

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LEVEL V

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | Date Analyzed: | 10/04-07/02 |
| Matrix: | Water | Batch Number: | MS48260W2893 |
| Analyst: | ZL | | |

| | Sample ID: | Blank | MC093 | RL | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | qual | |
| cis-1,3-Dichloropropene | 0.5 | ND | ND | U | |
| trans-1,3-Dichloropropene | 0.5 | ND | ND | | |
| Diisopropyl Ether (DIPE) | 5.0 | ND | ND | | |
| Ethylbenzene | 0.5 | ND | ND | | |
| Ethyl tert-Butyl Ether (EtBE) | 5.0 | ND | ND | | |
| Hexachlorobutadiene | 0.5 | ND | ND | | |
| 2-Hexanone | 10 | ND | ND | | |
| Isopropylbenzene | 0.5 | ND | ND | | |
| p-Isopropyltoluene | 0.5 | ND | ND | | |
| Methylene chloride | 50 | ND | ND | | |
| 4-Methyl-2-pentanone | 5.0 | ND | ND | | |
| Methyl-tert-butyl ether (MtBE) | 1.0 | ND | ND | | |
| Naphthalene | 0.5 | ND | ND | | |
| n-Propylbenzene | 0.5 | ND | ND | | |
| Styrene | 0.5 | ND | ND | | |
| 1,1,1,2-Tetrachloroethane | 0.5 | ND | ND | | |
| 1,1,2,2-Tetrachloroethane | 1.0 | ND | ND | | |
| Tetrachloroethene | 0.5 | ND | ND | | |
| Toluene | 0.5 | ND | ND | | |
| 1,2,3-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,2,4-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,1,1-Trichloroethane | 0.5 | ND | ND | | |
| 1,1,2-Trichloroethane | 0.5 | ND | ND | | |
| Trichloroethene | 0.5 | ND | ND | | |
| 1,2,3-Trichloropropane | 0.5 | ND | ND | | |
| Trichlorofluoromethane | 0.5 | ND | ND | | |
| Trichlorotrifluoroethane | 5.0 | ND | ND | | |
| 1,2,4-Trimethylbenzene | 0.5 | ND | ND | | |
| 1,3,5-Trimethylbenzene | 0.5 | ND | ND | | |
| Vinyl chloride | 0.5 | ND | ND | | |
| Xylenes, m-,p- | 1.0 | ND | ND | | |
| Xylene, o- | 0.5 | ND | ND | | |

**Surrogates (% recovery)** Limits: 70 - 130

| Sample ID: | Blank | MC093 |
|---|---|---|
| Dibromofluoromethane | 98 | 101 |
| Toluene-d8 | 98 | 97 |
| Bromofluorobenzene | 97 | 95 |

AMEC VALIDATED



LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ047
Matrix: Water
No. of Samples: 9
Date Reviewed: July 18, 2002
Reviewer: A. Lang
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ047, MJ048, MJ049, MJ050, MJ052, MJ053, MJ054, MJ055, MJ056

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC matched the samples and accounted for the analysis. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Metals were not detected in the method blank associated with the samples in this SDG. | No qualifications were required. |
| 5. LCS/BS | One aqueous LCS sample was analyzed with the samples. The recoveries were within the laboratory defined QC limits. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |
| 7. MS/MSDs | None. | No qualifications were required. |
| 9. ICP Serial Dilution | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 10. Other | None. | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055<br>ER: MJ056 | Metals were not detected in the field QC samples. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev Qual | Final Qual |
|---|---|---|---|---|---|
| Calcium | 0618 | 82 | 5 | | |
| Magnesium | 0618 | 20 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 71 | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

187


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 85 | 5 | | |
| Magnesium | 0618 | 25 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 80 | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

188


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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-03

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rev-Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 106 | 5 | | |
| Magnesium | 0618 | 35 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 76 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP 189


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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Raw Data | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 57 | 5 | | |
| Magnesium | 0618 | 32 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 67 | 5 | | |

ND = Not Detected

LEVEL V AMEC VALIDATED

Reported by: KW

Approved by: BP

190


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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-06

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Rw Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 140 | 5 | | |
| Magnesium | 0618 | 46 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 97 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

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# CEIMIC
# Corporation
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TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Date Analysis Completed: 06/18/02

Matrix: Aqueous

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Qual Code |
|---|---|---|---|---|
| Calcium | 0618 | 200 | 5 | |
| Magnesium | 0618 | 83 | 5 | |
| Potassium | 0618 | 8 | 5 | |
| Sodium | 0618 | 95 | 5 | |

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: RP

192


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-08

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Run Qual | Lab Code |
|---|---|---|---|---|---|
| Calcium | 0618 | 77 | 5 | | |
| Magnesium | 0618 | 24 | 5 | | |
| Potassium | 0618 | ND | 5 | U | |
| Sodium | 0618 | 106 | 5 | | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

193


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-09

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | ND | 5 | U | |
| Magnesium | 0618 | ND | 5 | | |
| Potassium | 0618 | ND | 5 | | |
| Sodium | 0618 | ND | 5 | | |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: KW

Approved by: BP

194


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# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-10

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

| Target Analyte | Preparation Batch | Sample Concentration | Quantitation Limit | Run Qual | Qual Code |
|---|---|---|---|---|---|
| Calcium | 0618 | ND | 5 | U | |
| Magnesium | 0618 | ND | 5 | ↓ | |
| Potassium | 0618 | ND | 5 | ↓ | |
| Sodium | 0618 | ND | 5 | ↓ | |

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP

195


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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ058
Matrix: water
No. of Samples: 3
Date Reviewed: November 12, 2002
Reviewer: P. Meeks
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ058, MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC accounted for the samples in this SDG. Metals analyses were not requested on the COC for the samples in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included calcium magnesium, potassium, and sodium. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Sodium was detected in the method blank at 67.800 µ.g/L. | No qualifications were required. |
| 5. LCS/BS | One aqueous LCS sample was analyzed with the sample. The recoveries were within the control limits of 80-120%. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 7. MS/MSDs | None. | No qualifications were required. |
| 9. ICP Serial Dilution | None. | No qualifications were required. |
| 10. Other | None. | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055<br>ER: MJ059, MJ060 | Calcium magnesium, potassium, and sodium were not detected in the field QC samples at sufficient concentrations to qualify MJ058. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# TOTAL METALS
-1-
## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.
MJ058

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-01

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 32100 | | | P | | |
| 7439-95-4 | Magnesium | 22100 | | | P | | |
| 7440-09-7 | Potassium | 5510 | | | P | | |
| 7440-23-5 | Sodium | 178000 | | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

# TOTAL METALS

-1-

## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.: MJ059

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-02

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 68.9 | U | | P | U | |
| 7439-95-4 | Magnesium | 117 | B | | P | | |
| 7440-09-7 | Potassium | 371 | B | | P | | |
| 7440-23-5 | Sodium | 975 | B | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

# TOTAL METALS

-1-

## INORGANIC ANALYSIS DATA SHEET

SAMPLE NO.

MJ060

Contract: Boeing SSFL

Lab Code: CEIMIC Case No.: 020619 SAS No.: SDG NO.: MJ058

Matrix (soil/water): WATER Lab Sample ID: 020619-03

Level (low/med): LOW Date Received: 06/21/02

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): µG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7440-70-2 | Calcium | 73.7 | B | | P | | |
| 7439-95-4 | Magnesium | 107 | B | | P | | |
| 7440-09-7 | Potassium | 232 | B | | P | | |
| 7440-23-5 | Sodium | 561 | B | | P | | |

AMEC VALIDATED

LEVEL V

Color Before: COLORLESS Clarity Before: CLEAR Texture:

Color After: COLORLESS Clarity After: CLEAR Artifacts:

Comments:

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MJ093
Matrix: water
No. of Samples: 1
Date Reviewed: November 27, 2002
Reviewer: P. Meeks
Reference: *USEPA SW-846 Methods 3050B, 6010B*
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The coolers were received within the temperature QC limits of 4°±2° C. The COC matched the sample. Only calcium, potassium, magnesium, and sodium were requested on the COC, but the laboratory reported 21 additional metals. No custody seals were present on the coolers.<br><br>The analysis was performed within the 6 month holding time for metals. | No qualifications were required. |
| 3. Method Blanks | Selenium was detected in the method blank at a concentration greater than the CRDL. Additionally, the reviewer noticed that boron and thallium were detected in CCB1 at 64.9020 and 5.3100 µg/L, respectively. | Boron and thallium detected in the sample were qualified "UJ." As selenium was not detected in the sample, no further qualifications were required. |
| 5. LCS/BS | One solid LCS sample was analyzed with the sample. Boron and molybdenum were not spiked into the LCS. | No qualifications were required. |
| 6. Duplicates | None. | No qualifications were required. |
| 7. MS/MSDs | None. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 9. ICP Serial Dilution | None. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>FB: MJ055 (SDG MJ047)<br>ER: MJ056 (SDG MJ047), | The field QC samples were analyzed only for calcium, potassium, magnesium, and sodium. There were no detects for these analytes in the field QC samples. No assessment was made with respect to the remaining 21 metal analytes. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# USEPA - CLP

-1-

## INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MJ093

Lab Name: Cemic Laboratories Contract: Rocketdyne

Lab Code: CEMIC Case No.: 021006 SAS No.: SDG No.: MJ093

Matrix (soil/water): WATER Lab Sample ID: 021006-01

Level (low/med): LOW Date Received: 10/4/2002

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

| CAS No. | Analyte | Concentration | C | Q | M | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| 7429-90-5 | Aluminum | 370 | | | P | | |
| 7440-36-0 | Antimony | 1.8 | U | | P | U | |
| 7440-38-2 | Arsenic | 6.0 | B | | P | | |
| 7440-39-3 | Barium | 51 | B | | P | | |
| 7440-41-7 | Beryllium | 0.48 | U | | P | U | |
| 7440-42-8 | Boron | 110 | B | | P | UJ | B |
| 7440-43-9 | Cadmium | 0.35 | U | | P | U | |
| 7440-70-2 | Calcium | 57000 | | | P | | |
| 7440-47-3 | Chromium | 6.4 | U | | P | U | |
| 7440-48-4 | Cobalt | 3.3 | U | | P | ↓ | |
| 7440-50-8 | Copper | 8.7 | U | | P | ↓ | |
| 7439-89-6 | Iron | 1100 | | | P | | |
| 7439-92-1 | Lead | 1.8 | U | | P | U | |
| 7439-95-4 | Magnesium | 16000 | | | P | | |
| 7439-96-5 | Manganese | 420 | | | P | | |
| 7439-97-6 | Mercury | 0.040 | U | | AV | U | |
| 7439-98-7 | Molybdenum | 8.8 | U | | P | ↓ | |
| 7440-02-0 | Nickel | 7.3 | U | | P | ↓ | |
| 7440-09-7 | Potassium | 3400 | B | | P | | |
| 7782-49-2 | Selenium | 3.7 | U | | P | U | |
| 7440-22-4 | Silver | 6.1 | U | | P | U | |
| 7440-23-5 | Sodium | 130000 | | | P | | |
| 7440-28-0 | Thallium | 3.1 | B | | P | UJ | B |
| 7440-62-2 | Vanadium | 4.5 | U | | P | U | |
| 7440-66-6 | Zinc | 36 | | | P | | |

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments: AMEC VALIDATED LEVEL V

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303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V[1]
SDG: MC093
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The sample was received with temperatures within the QC limits of 4°±2° C. The COC matched the sample and accounted for the analyses. No custody seals information was provided by the laboratory. Analyses were performed within the holding times. | No qualifications were required. |
| 3. Method Blanks | One water method blank was analyzed with this SDG. There were no detects in the method blank. | No qualifications were required. |
| 4. LCS/BS | An aqueous LCS sample was analyzed with the sample. The recoveries for all analytes were within the laboratory-established QC limits. | No qualifications were required. |
| 6. MS/MSDs | No MS/MSD analyses were performed in association with the sample in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | There were no detects in MJ055 or MJ056. | No qualifications were required |
| 8. Other | None | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

## Metals

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No: | 21172 | Date Digested: | 10/07/02 |
| Matrix: | Water | Date Analyzed: | 10/07/02 |
| Analyst: | TLR/GF | Batch Number: | 6010W2531 |

| | | Sample ID: | Blank | MC093 | Rev Qual | Qual |
|---|---|---|---|---|---|---|
| **Element** | **Method #** | **RL** | mg/L | mg/L | Qual | Code |
| Calcium | 6010B | 2.0 | ND | **60** | | |
| Magnesium | 6010B | 0.20 | ND | **15** | | |
| Sodium | 6010B | 0.20 | ND | **130** | | |
| Potassium | 6010B | 0.25 | ND | **3.2** | | |

AMEC VALIDATED
LEVEL V

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ047
Matrix: Soil
No. of Samples: 10
Date Reviewed: July 18, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ047, MJ048, MJ049, MJ050, MJ052, MJ053, MJ054, MJ055, MJ056, MJ057

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. COC matches samples and accounts for analyses. Custody seals were not present on the cooler. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for chloride, sulfate, and alkalinity. Not applicable to total dissolved solids. | No qualifications were required. |
| 6. Duplicates | Not performed. | No qualifications were required. |
| 7. MS/MSDs<br>MJ047 – perchlorate only | The RPD was less then 20% and the recoveries were within 75-125%. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056<br>FB: MJ055<br>Field duplicates: none | Total dissolved solids were reported in the equipment rinsate at 914 mg/L. | Total dissolved solids detected in the site samples were qualified as estimated, "J." |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 39.50 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 121.69 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED
LEVEL V

Reported by: TS

Approved by: [illegible]

211

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Per Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 38.23 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 120.79 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: [illegible]

212

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 40.27 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 189.57 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 47.86 | mg/L | 5.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 135.43 | mg/L | 5.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: MR

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 71.00 | mg/L | 10.00 | 06/19/99 | 06/19/99 |
| Sulfate | | | 300.54 | mg/L | 10.00 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: M

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 76.44 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 556.22 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: R

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 44.72 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 153.91 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: NL

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | U | | ND | mg/L | 0.200 | 06/19/99 | 06/19/99 |
| Sulfate | ↓ | | ND | mg/L | 0.200 | 06/19/99 | 06/19/99 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: DL

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | U | | ND | mg/L | 0.100 | 06/19/99 | 06/19/99 |
| Sulfate | ↓ | | ND | mg/L | 0.100 | 06/19/99 | 06/19/99 |

ND = Not Detected.

AMEC VALIDATED

LEVEL V

Reported by: TS

Approved by: R

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES
EPA 300.0 A

Client: Montgomery Watson

Client Sample ID: MJ057

Date Sampled: 06/13/02

Laboratory ID: 020581-11

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Chloride | | | 76.82 | mg/L | 10.0 | 06/19/99 | 06/19/99 |
| Sulfate | | | 221.20 | mg/L | 10.0 | 06/19/99 | 06/19/99 |

AMEC VALIDATED
LEVEL V

Reported by: TS

Approved by: M

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 254 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 254 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pawluk

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 285 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 285 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pawlak

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 301 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 301 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pamuk

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 282 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 282 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Ramirez

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 340 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 340 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: B. Pu Mk

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Raw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 311 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 311 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: B. Ronnek

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | | | 288 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | | | 288 | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Pomeroy

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Rewick

Approved by: [signature]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | U | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Bicarbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |
| Carbonate | ↓ | | ND | mg/L | 2.0 | 06/22/02 | 06/22/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: B. Re Wilk

Approved by: [signature]

292

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 481 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: B P

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rw Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 481 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 589 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 561 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | U | | ND | mg/L | 10 | 06/18/02 | 06/19/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 1241 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | J | F | 550 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | U | | ND | mg/L | 10 | 06/18/02 | 06/19/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: BP

Approved by: [illegible]

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | | | 914 | mg/L | 10 | 06/18/02 | 06/19/02 |

AMEC VALIDATED

LEVEL V

Reported by: BP

Approved by: R

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ047

Date Sampled: 06/10/02

Laboratory ID: 020581-01

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PC

Approved by: TS

309



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# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ048

Date Sampled: 06/10/02

Laboratory ID: 020581-02

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PR

Approved by: TS

311



8

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ049

Date Sampled: 06/10/02

Laboratory ID: 020581-03

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: R

Approved by: TS

312



7

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ050

Date Sampled: 06/11/02

Laboratory ID: 020581-04

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED
LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Laboratory ID: 020581-07

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ054

Date Sampled: 06/12/02

Laboratory ID: 020581-08

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: RL

Approved by: TG

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ055

Date Sampled: 06/13/02

Laboratory ID: 020581-09

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____

Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ056

Date Sampled: 06/13/02

Laboratory ID: 020581-10

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: _____ Approved by: _____

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ057

Date Sampled: 06/13/02

Laboratory ID: 020581-11

Date Sample Received: 06/14/02

Matrix: Water

| Target Analyte | Rev Qual | Qual Code | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | ug/L | 1 | 06/27/02 | 06/27/02 |

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: PR

Approved by: TS

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ058
Matrix: water
No. of Samples: 3
Date Reviewed: November 12, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ058, MJ059, MJ060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. The COC accounted for the samples in this SDG. Chloride, sulfate, alkalinity, bicarbonate, and carbonate analyses were not requested on the COC for the samples in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. Custody seals were not present on the cooler. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for the remaining analyses. | No qualifications were required. |
| 6. Duplicates | None performed. | No qualifications were required. |
| 7. MS/MSDs<br>MJ047 – perchlorate only | None performed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ059, MJ060<br>FB: MJ055<br>Field duplicates: none | Alkalinity, carbonate, and TDS were reported in the equipment rinsates. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ058

Date Sampled: 06/20/02

Laboratory ID: 020619-01

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Codes |
|---|---|---|---|---|---|---|---|
| Alkalinity | 257 | mg/L | 2.0 | 06/29/02 | 06/29/02 | - | |
| Bicarbonate | 257 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 768.5 | mg/L | 10 | 06/25/02 | 06/26/02 | | |

ND = Not Detected

Reported by: B. Pantelli

Approved by: KW

AMEC VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ058

Date Sampled: 06/20/02

Laboratory ID: 020619-01

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | 78.2 | mg/L | 1 | 07/02/02 | 07/02/02 | | |
| Sulfate | 233 | mg/L | 5 | 07/06/02 | 07/06/02 | | |

Reported by: KW

Approved by: BP

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Bicarbonate | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 21 | mg/L | 10 | 06/25/02 | 06/26/02 | | |

ND = Not Detected

Reported by: B. Parnell

Approved by: KW

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | ND | mg/L | 1 | 07/02/02 | 07/02/02 | U- | |
| Sulfate | ND | mg/L | 5 | 07/06/02 | 07/06/02 | U | |

ND = Not Detected

Reported by: KW

Approved by: BP

AMEC VALIDATED
LEVEL V

**CEIMIC**
**Corporation**
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ059

Date Sampled: 06/19/02

Laboratory ID: 020619-02

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | ug/L | 1 | 06/27/02 | 06/27/02 | U | |

ND = Not Detected

Reported by: PL

Approved by: TS

AMEC VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Raw Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | - | |
| Bicarbonate | 20 | mg/L | 2.0 | 06/29/02 | 06/29/02 | | |
| Carbonate | ND | mg/L | 2.0 | 06/29/02 | 06/29/02 | U | |
| Total Dissolved Solids | 14 | mg/L | 10 | 06/25/02 | 06/25/02 | | |

ND = Not Detected

Reported by: B. Pomuk

Approved by: KW

AMEC VALIDATED LEVEL V

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rw Qual | Qua Cods |
|---|---|---|---|---|---|---|---|
| Chloride | ND | mg/L | 1 | 07/02/02 | 07/02/02 | U- | |
| Sulfate | ND | mg/L | 5 | 07/06/02 | 07/06/02 | U | |

ND = Not Detected

Reported by: KW

Approved by: BP

AMEC VALIDATED LEVEL V

# CEIMIC Corporation

*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ060

Date Sampled: 06/20/02

Laboratory ID: 020619-03

Date Sample Received: 06/21/02

Matrix: Water

| Target Analyte | Result | Units | Method Reporting Limit | Date Prep'd | Date Analyzed | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | ug/L | 1 | 06/27/02 | 06/27/02 | U | |

ND = Not Detected

Reported by: PL

Approved by: TS

AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MJ093
Matrix: water
No. of Samples: 1
Date Reviewed: November 27, 2002
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MJ093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperatures were within the QC limits of 4°±2°C. The COC accounted for the sample in this SDG. Chloride, sulfate, carbonate, bicarbonate, and alkalinity analyses were not requested on the COC for the sample in this SDG. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. Custody seals were not present on the cooler.<br><br>Holding times were met, except for the seven day holding time for TDS. | The TDS result for MJ093 was qualified "J." |
| 3. Method Blanks | There were no detects in any of the method blanks. | No qualifications were required. |
| 5. LCS/BS | The LCS recoveries were within the laboratory-established control limits, except for TDS, which was recovered at 123%. | The TDS result for MJ093 was qualified "J." |
| 6. Duplicates | None performed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 7. MS/MSDs | None performed. | No qualifications were required. |
| 10. Other | None | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | TDS was reported in MJ056 at 914 mg/L. | TDS was qualified as estimated, "J," in MJ093. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Qual | Qual Code | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Perchlorate | ND | U | | ug/L | 1 | 10/07/02 | 10/07/02 |

ND = Not Detected

Reported by: BS

Approved by: TS

AMEC VALIDATED

LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Rev Qual | Qual Code | Units | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Sulfate | 131.2 | | | mg/L | 7.5 | 10/14/02 | 10/14/02 |

Reported by: BS

Approved by: TS

AMEC VALIDATED

LEVEL V

# CEIMIC
## Corporation
*"Analytical Chemistry for Environmental Management"*

INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Units | Per Qual | Qual Code | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | 283.5 | mg/L | | | 2 | 10/11/02 | 10/11/02 |
| Chloride | 37.2 | mg/L | | | 1 | 10/17/02 | 10/17/02 |
| Total Dissolved Solids | 561 | mg/L | J | H, L, F | 10 | 10/17/02 | 10/17/02 |

Reported by: SB

Approved by: [illegible]

AREO VALIDATED
LEVEL V

# CEIMIC
# Corporation
*"Analytical Chemistry for Environmental Management"*

## INORGANIC ANALYTES

Client: Montgomery Watson

Client Sample ID: MJ093

Date Sampled: 10/03/02

Laboratory ID: 021006-01

Date Sample Received: 10/04/02

Matrix: Water

| Target Analyte | Result | Units | Raw Qual | Qual Code | Method Reporting Limit | Date Prep'd | Date Analyzed |
|---|---|---|---|---|---|---|---|
| Alkalinity | 283 | mg/L | * | | 2 | 10/11/02 | 10/11/02 |
| Bicarbonate | 283 | mg/L | | | 2 | 10/11/02 | 10/11/02 |
| Carbonate | ND | mg/L | U | | 2 | 10/11/02 | 10/11/02 |

ND = Not Detected

*Analysis Not Validated

Reported by: HL

Approved by: HL

AMEC VALIDATED

LEVEL V

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MC047
Matrix: water
No. of Samples: 1
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MC047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperature upon receipt at Centrum Analytical Laboratories was above the QC limits of 4°±2°C. All analyses were subcontracted to other laboratories. Temperature at receipt was not noted for the perchlorate analysis subcontracted to Weck Laboratory. Temperature upon receipt for the remaining analyses was noted to be within the QC limits.<br><br>The original COC accounted for the sample in this SDG. Chloride, sulfate, carbonate alkalinity, and bicarbonate alkalinity analyses were not requested on the COC. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses. TDS analysis was requested but was not performed as insufficient volume was received.<br><br>No transfer COC was included for the perchlorate analysis. A transfer COC was included for the remaining analyses, but was not legible. No custody seal information was provided by the laboratory. Holding times were met. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 3. Method Blanks | Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity method blanks were analyzed. | No qualifications were required. |
| 5. LCS/BS | Recoveries for perchlorate and sulfate were within the laboratory-established control limits. No LCS was provided for chloride or alkalinity. | Chloride, total alkalinity, bicarbonate alkalinity, and carbonate alkalinity were qualified as estimated, "J," for detects and "UJ," for nondetects. |
| 6. Duplicates<br>MC047 – chloride only | Duplicate analyses were performed for chloride only. The RPD was less than 20%. | No qualifications were required. |
| 7. MS/MSDs<br>MC047 –sulfate only | MS/MSD analyses were performed for sulfate only. The recoveries were within the laboratory-established control limits of 70-130% and the RPD was less than the laboratory-established control limit of 25%. | No qualifications were required. |
| 10. Other | No raw data was provided for any of the analyses in this SDG. | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056<br>FB: MJ055<br>Field duplicates: none | There were no applicable detects in either of the field QC samples. | No qualifications were required. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Weck Laboratories, Inc.
Environmental and Analytical Services - Since 1964

**Report Date:** *Friday, June 28, 2002*
**Received Date:** *Monday, June 17, 2002*
**Log By:** mq
**Log Time:** 11:03

**Client:** Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Riverside, CA 92507
**Attn.:** Marilu Escher

**Phone:** (909) 779-0310
**FAX:** (909) 779-0344

**Project:** Boeing SSFL/20674

**P.O. #:**
**Turnaround Time:** Normal

## CERTIFICATE OF ANALYSIS

**Lab#:** A204182-001 **Sample ID:** MCO47 **Matrix:** Water
**Sampled By:** Client **Date:** 6/10/2002 **Time:** 10:48 **Source:** 20674-1

| Parameter | Rev Qual | Qual Code | Result | Flag | Units | Dilution Factor | RL | Method | Analyzed | Worksheet # |
|---|---|---|---|---|---|---|---|---|---|---|
| Perchlorate | U | | ND | | ug/L | 1 | 3.0 | EPA 314 | 6/24/2002 dc | WS35335 |

**Authorized Signature**

ELAP # 1132
LACSD # 10143

Flags for Data Qualifiers:

B = Compound detected in the blank. Sample result equal or less than 10 times the concentration in the blank.
J = Analyte was detected. However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Pratical Quantitation Limit (PQL).
H = Estimated value, result over the calibration range
R = Result is suspect, LCS recovery greater than the upper control limit.
L = Result is suspect, LCS recovery lower than the control limit.
Q = QC result out of acceptance limits.
T = Trace detection, detected but below the reporting limit.

Notes:

The Chain of Custody document is part of the analytical report.
Any remaining sample(s) for testing will be disposed of one month from the final report date unless other arrangements are made in advance.
All results are expressed on wet weight basis unless specified.
RL = Reporting Limit.
ND = Not detected, below the reporting limit.
Sub = Subcontracted analysis, original report enclosed.

AMEC VALIDATED
LEVEL V



14859 East Clark Avenue, City of Industry, California 91745-1396 (626) 336-2139 FAX (626) 336-2634
*www.wecklabs.com*

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 2320B

Project 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity, Total as CaCO3 | 250 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED
LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Centrum Analytical Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

| | |
|---|---|
| Date Received: | 06/14/02 |
| Work Order No: | 02-06-0556 |
| Preparation: | N/A |
| Method: | SM 2320B |

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Bicarbonate (as CaCO3) | 250 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED

LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 2320B

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/14/02** | **0614AlkDP1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Carbonate | ND | 1.0 | 1 | | mg/L | UJ | L |

AMEC VALIDATED
LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

Date Received: 06/14/02
Work Order No: 02-06-0556
Preparation: N/A
Method: SM 4500-Cl C

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/17/02** | **0617CICMB1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Chloride | 47 | 2 | 1 | | mg/L | J | L |

| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **Method Blank** | **099-05-057-1,078** | **Aqueous** | **N/A** | **N/A** | **06/17/02** | **0617CICMB1** |

| Parameter | Result | RL | DF | Qual | Units | |
|---|---|---|---|---|---|---|
| Chloride | ND | 2.0 | 1 | | mg/L | X |

AMEC VALIDATED

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

Centrum Analytical Laboratories, Inc.
1401 Research Park Drive
Suite 100
Riverside, CA 92507-2111

| | |
|---|---|
| Date Received: | 06/14/02 |
| Work Order No: | 02-06-0556 |
| Preparation: | N/A |
| Method: | EPA 375.4 |

Project: 20674 / Boeing SSFL



| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC047** | **02-06-0556-1** | **Aqueous** | **06/10/02** | **N/A** | **06/16/02** | **0616SO4MB1** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Sulfate | 150 | 10 | 5 | D | mg/L | | |

| Client Sample Number | Lab Sample Number | Matrix | Date Collected | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **Method Blank** | **099-05-091-1,086** | **Aqueous** | **N/A** | **N/A** | **06/16/02** | **0616SO4MB1** |

| Parameter | Result | RL | DF | Qual | Units | |
|---|---|---|---|---|---|---|
| Sulfate | ND | 2.0 | 1 | | mg/L | X |

AMEC VALIDATED

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: General Minerals by 300.0M, 310.0, and 2540C
QC Level: V[1]
SDG: MC093
Matrix: water
No. of Samples: 1
Date Reviewed: January 08, 2003
Reviewer: P. Meeks
Reference: *USEPA Contract Laboratory Program National Functional Guidelines For Inorganic Data Review* (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | Temperature upon receipt at Centrum Analytical Laboratories was within the QC limits of 4°±2°C. All analyses were subcontracted to Calscience Environmental Laboratories.<br><br>The original COC accounted for the sample in this SDG. Chloride, sulfate, carbonate alkalinity, and bicarbonate alkalinity analyses were not requested on the COC. A memo from Montgomery Watson personnel dated 06/21/02 alerted the laboratory that the general mineral analyses requested on the COC included these analyses.<br><br>No transfer COC was included. The Calscience case narrative did not mention any sample receipt problems. No custody seal information was provided by either laboratory. Holding times were met. | No qualifications were required. |
| 3. Method Blanks | Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity or TDS method blanks were analyzed. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 5. LCS/BS | Recoveries for perchlorate, chloride and sulfate were within the laboratory-established control limits. No LCS was provided for TDS or alkalinity. | TDS, total alkalinity, bicarbonate alkalinity, and carbonate alkalinity were qualified as estimated, "J," for detects and "UJ," for nondetects. |
| 6. Duplicates<br>MC047 – TDS only | Duplicate analyses were performed for TDS only. The RPD was less than 20%. | No qualifications were required. |
| 7. MS/MSDs<br>None | None. | No qualifications were required. |
| 10. Other | Raw data was provided only for TDS. | No qualifications were required. |
| 11. Field QC Samples<br>ER: MJ056 (SDG MJ047)<br>FB: MJ055 (SDG MJ047)<br>Field duplicates: none | TDS was reported in MJ056 at 914 mg/L. | TDS was estimated , "J," in MC093. |
| Comments | None | None |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | |
|---|---|---|
| Centrum Analytical Laboratories, Inc. | Date Sampled: | 10/03/02 |
| 1401 Research Park Drive | Date Received: | 10/04/02 |
| Suite 100 | Date Analyzed: | 10/08/02 |
| Riverside, CA 92507-2111 | | |
| | Work Order No.: | 02-10-0288 |
| Attn: Marilu Escher | Method: | EPA 314.0 |
| RE: Boeing SSFL/21172 | Page 1 of 1 | |

All concentrations are reported in ug/L (ppb).

| Sample Number | Perchlorate Concentration | Reporting Limit | Rev Qual | Qual Code |
|---|---|---|---|---|
| MC093 | ND | 2.0 | U | |
| Method Blank | ND | 2.0 | * | |

Analysis Not Validated

AMEC VALIDATED

ND denotes not detected at indicated reportable limit.

Each sample was received by CEL chilled, intact, and with chain-of-custody attached.

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Alkalinity, Total (as CaCO3) | 290 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED

LEVEL V

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Bicarbonate (as CaCO3) | 290 | 5.0 | 1 | | mg/L | J | L |

AMEC VALIDATED

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | SM 2320B |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **21004ALKD3** |

| Parameter | Result | RL | DF | Qual | Units | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|
| Carbonate | ND | 1.0 | 1 | | mg/L | UJ | L |

AMEC VALIDATED
LEVEL V

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

7440 Lincoln Way, Garden Grove, CA 92841-1432 • TEL: (714) 895-5494 • FAX: (714) 894-7501

Calscience Environmental Laboratories, Inc.

# ANALYTICAL REPORT

| | | | |
|---|---|---|---|
| Centrum Analytical Laboratories, Inc. | | Date Received: | 10/04/02 |
| 1401 Research Park Drive | | Work Order No: | 02-10-0288 |
| Suite 100 | | Preparation: | N/A |
| Riverside, CA 92507-2111 | | Method: | EPA 300.0 |

Project: Boeing SSFL/21172



| Client Sample Number | Lab Sample Number | Date Collected | Matrix | Date Prepared | Date Analyzed | QC Batch ID |
|---|---|---|---|---|---|---|
| **MC093** | **02-10-0288-1** | **10/03/02** | **Aqueous** | **N/A** | **10/04/02** | **021004L01** |

| Parameter | Rev Qual | Qual Code | Result | RL | DF | Qual | Units | Parameter | Rev Qual | Qual Code | Result | RL | DF | Qual | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | | | 35 | 20 | 20 | | mg/L | Sulfate | | | 130 | 20 | 20 | | mg/L |

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Method Blank** | | | | | **099-05-118-1,453** | | | **N/A** | | **Aqueous** | **N/A** | | **10/04/02** | | **021004L01** |

| Parameter | | Result | RL | DF | Qual | Units | Parameter | | Result | RL | DF | Qual | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Chloride | ~~X~~ | ND | 1.0 | 1 | | mg/L | Sulfate | ~~X~~ | ND | 1.0 | 1 | | mg/L |

Analysis Not Validated

AMEC VALIDATED

RL - Reporting Limit , DF - Dilution Factor , Qual - Qualifiers

Centrum Analytical Laboratories, Inc.

## General Chemistry

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | | |
| Matrix: | Water | | |
| Analyst: | GF | | |

| Analysis: | Total Dissolved Solids | | |
|---|---|---|---|
| Method Number: | 160.1 | | |
| Sample ID | mg/L | Qual | Qual Code |
| MC093 | 610 | J | L, F |
| Reporting Limit: | 10 | | |
| Date Analyzed: | 10/09/02 | | |
| QC Batch # : | 1601W0305 | | |

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 900.0M and 901.1
QC Level: V[1]
SDG: 8458
Matrix: Water
No. of Samples: 9
REs/DLs: 0
Date Reviewed: February 11, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME047, ME048, ME049, ME050, ME052, ME053, ME054, ME055, ME056

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No sample receipt information was provided by the laboratory. Analyses were performed within the holding time of 180 days. | As the case narrative did not note that the samples were received damaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (8458-011) was analyzed with the samples in this SDG. There were no detects in the method blank. The method blank was not analyzed for lead-210. | As lead-210 was not reported in any of the site samples, no qualifications were required. |
| 4. LCS/BS | An aqueous LCS sample (8458-010) was analyzed with the samples in this SDG. The LCS was only fortified with gross alpha, gross beta, cobalt-60, and cesium-137. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 90-110%. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 6. Duplicates<br>ME049 | The duplicate analyses were performed on sample ME049 in association with the samples in this SDG. All RPDs were within the laboratory-established control limit of $\pm 3\sigma$. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME056<br>FB: ME055<br>Field duplicates: none | There were no detects in ME055 or ME056. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | None. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME047 | 8458-001 | 06/10/02 | 07/23/02 | GrossAlpha | 0.209 ± 1.1 | pCi/L | 1.96 | U | |
| | | | 07/23/02 | Gross Beta | 3.29 ± 1.4 | pCi/L | 1.94 | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 220 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 9.70 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 16.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 16.5 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 13.9 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 15.7 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 969 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 106 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 20.3 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 26.7 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 27.7 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 200 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 67.6 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 315 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 74.4 | | |
| ME048 | 8458-002 | 06/10/02 | 07/23/02 | GrossAlpha | 1.17 ± 1.6 | pCi/L | 2.25 | U | |
| | | | 07/23/02 | Gross Beta | 4.10 ± 1.5 | pCi/L | 2.06 | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 92.7 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 3.28 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 10.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 9.88 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 8.10 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 8.16 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 142 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 63.8 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 9.10 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 15.4 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 13.1 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 89.8 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 34.7 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 112 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 26.1 | | |
| ME049 | 8458-003 | 06/10/02 | 07/23/02 | GrossAlpha | 0.023 ± 1.7 | pCi/L | 3.05 | U | |
| | | | 07/23/02 | Gross Beta | 1.66 ± 1.8 | pCi/L | 2.85 | U | |

**AMEC VALIDATED**

LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME049 | | | | | | | | | |
| | | | 07/18/02 | K 40 (G) | U | pCi/L | 195 | U | |
| | | | 07/18/02 | Co 57 (G) | U | pCi/L | 7.98 | | |
| | | | 07/18/02 | Co 60 (G) | U | pCi/L | 13.5 | | |
| | | | 07/18/02 | Cs 134 (G) | U | pCi/L | 14.7 | | |
| | | | 07/18/02 | Cs 137 (G) | U | pCi/L | 11.0 | | |
| | | | 07/18/02 | Tl 208 (G) | U | pCi/L | 12.2 | | |
| | | | 07/18/02 | Pb 210 (G) | U | pCi/L | 807 | | |
| | | | 07/18/02 | Bi 212 (G) | U | pCi/L | 93.5 | | |
| | | | 07/18/02 | Pb 212 (G) | U | pCi/L | 16.8 | | |
| | | | 07/18/02 | Bi 214 (G) | U | pCi/L | 22.9 | | |
| | | | 07/18/02 | Pb 214 (G) | U | pCi/L | 22.5 | | |
| | | | 07/18/02 | Ra 226 (G) | U | pCi/L | 168 | | |
| | | | 07/18/02 | Ac 228 (G) | U | pCi/L | 54.8 | | |
| | | | 07/18/02 | Th 234 (G) | U | pCi/L | 257 | | |
| | | | 07/18/02 | U 235 (G) | U | pCi/L | 61.5 | | |
| ME050 | 8458-004 | 06/11/02 | 07/23/02 | GrossAlpha | 1.47 ± 1.5 | pCi/L | 1.93 | U | |
| | | | 07/23/02 | Gross Beta | 3.66 ± 1.4 | pCi/L | 1.93 | | |
| | | | 07/18/02 | K 40 (G) | U | pCi/L | 261 | U | |
| | | | 07/18/02 | Co 57 (G) | U | pCi/L | 10.2 | | |
| | | | 07/18/02 | Co 60 (G) | U | pCi/L | 17.4 | | |
| | | | 07/18/02 | Cs 134 (G) | U | pCi/L | 16.8 | | |
| | | | 07/18/02 | Cs 137 (G) | U | pCi/L | 15.0 | | |
| | | | 07/18/02 | Tl 208 (G) | U | pCi/L | 16.9 | | |
| | | | 07/18/02 | Pb 210 (G) | U | pCi/L | 1020 | | |
| | | | 07/18/02 | Bi 212 (G) | U | pCi/L | 114 | | |
| | | | 07/18/02 | Pb 212 (G) | U | pCi/L | 20.6 | | |
| | | | 07/18/02 | Bi 214 (G) | U | pCi/L | 30.2 | | |
| | | | 07/18/02 | Pb 214 (G) | U | pCi/L | 30.0 | | |
| | | | 07/18/02 | Ra 226 (G) | U | pCi/L | 209 | | |
| | | | 07/18/02 | Ac 228 (G) | U | pCi/L | 73.1 | | |
| | | | 07/18/02 | Th 234 (G) | U | pCi/L | 324 | | |
| | | | 07/18/02 | U 235 (G) | U | pCi/L | 81.6 | | |
| ME052 | 8458-005 | 06/11/02 | 07/23/02 | GrossAlpha | 0.788 ± 1.2 | pCi/L | 1.70 | U | |
| | | | 07/23/02 | Gross Beta | 0.915 ± 1.2 | pCi/L | 2.00 | U | |

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LEVEL V

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Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME052 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 140 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 10.4 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 11.3 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 14.3 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 11.3 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 14.0 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 4150 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 92.6 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 23.9 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 27.4 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 28.0 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 309 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 52.1 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 509 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 84.5 | | |
| ME053 | 8458-006 | 06/11/02 | 07/23/02 | GrossAlpha | -0.555 ± 1.2 | pCi/L | 2.51 | U | |
| | | | 07/23/02 | Gross Beta | -0.143 ± 1.6 | pCi/L | 2.78 | U | |
| | | | 07/30/02 | K 40 (G) | U | pCi/L | 148 | U | |
| | | | 07/30/02 | Co 57 (G) | U | pCi/L | 10.8 | | |
| | | | 07/30/02 | Co 60 (G) | U | pCi/L | 12.8 | | |
| | | | 07/30/02 | Cs 134 (G) | U | pCi/L | 14.6 | | |
| | | | 07/30/02 | Cs 137 (G) | U | pCi/L | 12.5 | | |
| | | | 07/30/02 | Tl 208 (G) | U | pCi/L | 14.0 | | |
| | | | 07/30/02 | Pb 210 (G) | U | pCi/L | 6480 | | |
| | | | 07/30/02 | Bi 212 (G) | U | pCi/L | 87.7 | | |
| | | | 07/30/02 | Pb 212 (G) | U | pCi/L | 23.5 | | |
| | | | 07/30/02 | Bi 214 (G) | U | pCi/L | 36.0 | | |
| | | | 07/30/02 | Pb 214 (G) | U | pCi/L | 27.6 | | |
| | | | 07/30/02 | Ra 226 (G) | U | pCi/L | 219 | | |
| | | | 07/30/02 | Ac 228 (G) | U | pCi/L | 50.4 | | |
| | | | 07/30/02 | Th 234 (G) | U | pCi/L | 522 | | |
| | | | 07/30/02 | U 235 (G) | U | pCi/L | 79.6 | | |
| ME054 | 8458-007 | 06/12/02 | 07/23/02 | GrossAlpha | 1.78 ± 2.0 | pCi/L | 2.69 | U | |
| | | | 07/23/02 | Gross Beta | 3.30 ± 1.4 | pCi/L | 2.09 | | |

AMEC VALIDATED

LEVEL V

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Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Codes |
|---|---|---|---|---|---|---|---|---|---|
| ME054 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 295 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 8.74 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 12.7 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 15.1 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 11.9 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 11.8 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 2130 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 95.2 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 15.8 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 23.2 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 22.8 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 178 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 55.5 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 363 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 68.2 | | |
| ME055 | 8458-008 | 06/13/02 | 07/23/02 | GrossAlpha | -0.119 ± 0.42 | pCi/L | 0.866 | U | |
| | | | 07/23/02 | Gross Beta | -0.261 ± 1.3 | pCi/L | 2.27 | U | |
| | | | 07/30/02 | K 40 (G) | U | pCi/L | 95.8 | U | |
| | | | 07/30/02 | Co 57 (G) | U | pCi/L | 7.06 | | |
| | | | 07/30/02 | Co 60 (G) | U | pCi/L | 7.80 | | |
| | | | 07/30/02 | Cs 134 (G) | U | pCi/L | 9.38 | | |
| | | | 07/30/02 | Cs 137 (G) | U | pCi/L | 8.48 | | |
| | | | 07/30/02 | Tl 208 (G) | U | pCi/L | 9.27 | | |
| | | | 07/30/02 | Pb 210 (G) | U | pCi/L | 3390 | | |
| | | | 07/30/02 | Bi 212 (G) | U | pCi/L | 101 | | |
| | | | 07/30/02 | Pb 212 (G) | U | pCi/L | 16.3 | | |
| | | | 07/30/02 | Bi 214 (G) | U | pCi/L | 17.9 | | |
| | | | 07/30/02 | Pb 214 (G) | U | pCi/L | 19.0 | | |
| | | | 07/30/02 | Ra 226 (G) | U | pCi/L | 148 | | |
| | | | 07/30/02 | Ac 228 (G) | U | pCi/L | 33.9 | | |
| | | | 07/30/02 | Th 234 (G) | U | pCi/L | 347 | | |
| | | | 07/30/02 | U 235 (G) | U | pCi/L | 55.2 | | |
| ME056 | 8458-009 | 06/13/02 | 07/23/02 | GrossAlpha | -0.028 ± 0.38 | pCi/L | 0.772 | U | |
| | | | 07/23/02 | Gross Beta | -0.162 ± 1.1 | pCi/L | 1.92 | U | |

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LEVEL V

Certified by
Report Date 08/08/02

# Eberline Services

## ANALYSIS RESULTS

SDG 8458
Work Order R206045-01
Received Date 06/14/02

Client MWH PASADENA
Contract
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME056 | | | | | | | | | |
| | | | 07/31/02 | K 40 (G) | U | pCi/L | 318 | U | |
| | | | 07/31/02 | Co 57 (G) | U | pCi/L | 6.81 | | |
| | | | 07/31/02 | Co 60 (G) | U | pCi/L | 14.6 | | |
| | | | 07/31/02 | Cs 134 (G) | U | pCi/L | 15.4 | | |
| | | | 07/31/02 | Cs 137 (G) | U | pCi/L | 12.7 | | |
| | | | 07/31/02 | Tl 208 (G) | U | pCi/L | 11.5 | | |
| | | | 07/31/02 | Pb 210 (G) | U | pCi/L | 504 | | |
| | | | 07/31/02 | Bi 212 (G) | U | pCi/L | 86.8 | | |
| | | | 07/31/02 | Pb 212 (G) | U | pCi/L | 15.0 | | |
| | | | 07/31/02 | Bi 214 (G) | U | pCi/L | 24.8 | | |
| | | | 07/31/02 | Pb 214 (G) | U | pCi/L | 22.6 | | |
| | | | 07/31/02 | Ra 226 (G) | U | pCi/L | 154 | | |
| | | | 07/31/02 | Ac 228 (G) | U | pCi/L | 54.0 | | |
| | | | 07/31/02 | Th 234 (G) | U | pCi/L | 175 | | |
| | | | 07/31/02 | U 235 (G) | U | pCi/L | 51.8 | | |

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LEVEL V

Certified by
Report Date 08/08/02

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 20380
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: MS047

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. The laboratory provided no temperature information. No custody seals were present on the coolers. Analyses were performed within the holding time of 180 days. | Due to the nonvolatile nature of the analytes and as the sample was noted to be received undamaged, no qualifications were required. |
| 3. Method Blanks | Three water method blanks, one for gross alpha (E299D1AC), one for gross beta (E299K1AA), and one for cesium-134 and cesium-137 (E299Q1AA) were analyzed with the sample in this SDG. There were no detects in the method blanks above the applicable MDAs. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | Three aqueous LCS samples, one for gross alpha (E299D1AC), one for gross beta (E299K1AC), and one for cesium-134 and cesium-137 (E299Q1AC) were analyzed with the sample in this SDG. The recoveries were within the laboratory-established control limits of 70-130%. | No qualifications were required. |
| 6. Duplicates<br>MS047 | The duplicate analyses were performed on sample MS047 for gross alpha only. Gross alpha was nondetected in the original result and detected above the MDA in the duplicate result.; however, the results were within ±2σ. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME056 (SDG 8458)<br>FB: ME055 (SDG 8458)<br>Field duplicates: none | There were no detects in ME055 or ME056. | No qualifications were required |
| 8. Other | None. | No qualifications were required. |
| Comments | None. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# FORM I

## SAMPLE RESULTS

**Date:** 26-Jun-02

| | | | | | |
|---|---|---|---|---|---|
| **Lab Name:** | STL Richland | **SDG:** | 20380 | **Collection Date:** | 6/10/2002 10:48:00 AM |
| **Lot-Sample No.:** | J2F180183-1 | **Report No. :** | 19857 | **Received Date:** | 6/14/2002 11:00:00 AM |
| **Client Sample ID:** | MS047 | **COC No. :** | | **Matrix:** | WATER |

Ordered by Client Sample ID, Batch No.

| Parameter | Result | Qual | Count Error ( 2 s) | Rev Qual | Qual Code | Total Uncert( 2 s) | MDC\|MDA, Action Lev | Rpt Unit, Lc | Yield CRDL(RL) | Rst/MDC, Rst/TotUcert | Analysis, Prep Date | Total Sa Size | Aliquot Size | Analy Method, Primary Detector |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Batch:** 2170274 | **Work Order:** | E273C1AA | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| ALPHA | 1.76 | U | 1.2 | U | | 1.2 | 1.87 | pCi/L | 100.00% | *0.94* | 6/21/02 01:52 p | | 0.098 | RICHRC5014 |
| | | | | | | | | 0.786 | 1.0 | *(2.8)* | | | L | GPC10A |
| **Batch:** 2170276 | **Work Order:** | E273C1AC | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| BETA | 6.82 | | 2.0 | | | 2.2 | 3.29 | pCi/L | 100.00% | *(2.1)* | 6/21/02 01:42 p | | 0.1983 | RICHRC5014 |
| | | | | | | | | 1.56 | 4.0 | *(6.3)* | | | L | GPC26A |
| **Batch:** 2170282 | **Work Order:** | E273C1AD | | | | **Report DB ID:** | 9E273C10 | | | | | | | |
| CS-134 | 3.93 | U | 9.1 | U | | 9.1 | 17.5 | pCi/L | | *0.22* | 6/22/02 05:39 a | | 0.6 | RICHRC5017 |
| | | | | | | | | | | *0.87* | | | L | GER1$1 |
| CS-137 | 2.12 | U | 7.8 | U | | 7.8 | 14.6 | pCi/L | | *0.14* | 6/22/02 05:39 a | | 0.6 | RICHRC5017 |
| | | | | | | | | | 20.0 | *0.54* | | | L | GER1$1 |

**Number of Results:** 4

**Comments:**

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LEVEL V



MDC|MDA,Lc - Detection, Decision Level based on instrument background or blank, adjusted by the sample Efficiency, Yield, and Volume.
U Qual - Analyzed for, but the result is less than the Mdc/Mda|Total Uncert or gamma scan software did not identify the nuclide.

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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 8462
Matrix: Water
No. of Samples: 3
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME058, ME059, ME060

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No sample receipt information was provided by the laboratory. Analyses were performed within the holding time of 180 days. | As the case narrative did not note that the samples were received damaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (2024-003) was analyzed with the samples in this SDG. There were no detects in the method blank. The method blank was not analyzed for cobalt-57, thallium-208, lead-210, lead-212, lead-214, bismuth-212, bismuth-214, thorium-234, or actinium-228. | As cobalt-57, thallium-208, lead-210, lead-212, lead-214, bismuth-212, bismuth-214, thorium-234, or actinium-228 were not reported in any of the site samples, no qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | An aqueous LCS sample (2024-004) was analyzed with the samples in this SDG. The LCS was only fortified with gross alpha, gross beta, cesium-137, and radium-226. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 85-110% and were deemed reasonable by the reviewer. | No qualifications were required. |
| 6. Duplicates | No duplicate analyses were performed in association with the samples in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: ME059, ME060<br>FB: ME055 (SDG 8458)<br>Field duplicates: none | There were no detects in any of the field QC samples. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | Potassium-40 was reported in site sample ME058. Potassium-40 occurs naturally in soil and water. This sample also had beta activity greater than the MDA, which is expected since potassium-40 decays by beta emission. Additionally, the beta activity reported in ME058 was approximately five times less than the California Primary Drinking Water Standard. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8462
Work Order R206078-01
Received Date 06/21/02

Client MWH PASADENA
Contract JOB #1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME058 | 8462-001 | 06/18/02 | 07/24/02 | GrossAlpha | 0.435 ± 2.3 | pCi/L | 3.96 | U | |
| | | | 07/24/02 | Gross Beta | 4.23 ± 1.7 | pCi/L | 2.46 | | |
| | | | 07/19/02 | K40 (G) | 234 ± 110 | pCi/L | 71.3 | | |
| | | | 07/19/02 | Co57 (G) | U | pCi/L | 4.68 | U | |
| | | | 07/19/02 | Co60 (G) | U | pCi/L | 7.22 | | |
| | | | 07/19/02 | Cs134 (G) | U | pCi/L | 7.21 | | |
| | | | 07/19/02 | Cs137 (G) | U | pCi/L | 7.01 | | |
| | | | 07/19/02 | Tl208 (G) | U | pCi/L | 11.0 | | |
| | | | 07/19/02 | Pb210 (G) | U | pCi/L | 1330 | | |
| | | | 07/19/02 | Bi212 (G) | U | pCi/L | 52.3 | | |
| | | | 07/19/02 | Pb212 (G) | U | pCi/L | 12.6 | | |
| | | | 07/19/02 | Bi214 (G) | U | pCi/L | 13.7 | | |
| | | | 07/19/02 | Pb214 (G) | U | pCi/L | 12.6 | | |
| | | | 07/19/02 | Ra226 (G) | U | pCi/L | 98.7 | | |
| | | | 07/19/02 | Ac228 (G) | U | pCi/L | 31.5 | | |
| | | | 07/19/02 | Th234 (G) | U | pCi/L | 192 | | |
| | | | 07/19/02 | U235 (G) | U | pCi/L | 37.5 | | |
| ME059 | 8462-002 | 06/19/02 | 07/24/02 | GrossAlpha | -0.288 ± 0.30 | pCi/L | 0.797 | U | |
| | | | 07/24/02 | Gross Beta | -0.028 ± 1.1 | pCi/L | 1.87 | | |
| | | | 07/24/02 | K40 (G) | U | pCi/L | 148 | | |
| | | | 07/24/02 | Co57 (G) | U | pCi/L | 5.34 | | |
| | | | 07/24/02 | Co60 (G) | U | pCi/L | 7.96 | | |
| | | | 07/24/02 | Cs134 (G) | U | pCi/L | 8.42 | | |
| | | | 07/24/02 | Cs137 (G) | U | pCi/L | 7.19 | | |
| | | | 07/24/02 | Tl208 (G) | U | pCi/L | 7.57 | | |
| | | | 07/24/02 | Pb210 (G) | U | pCi/L | 1420 | | |
| | | | 07/24/02 | Bi212 (G) | U | pCi/L | 53.9 | | |
| | | | 07/24/02 | Pb212 (G) | U | pCi/L | 10.3 | | |
| | | | 07/24/02 | Bi214 (G) | U | pCi/L | 14.3 | | |
| | | | 07/24/02 | Pb214 (G) | U | pCi/L | 13.3 | | |
| | | | 07/24/02 | Ra226 (G) | U | pCi/L | 118 | | |
| | | | 07/24/02 | Ac228 (G) | U | pCi/L | 33.0 | | |
| | | | 07/24/02 | Th234 (G) | U | pCi/L | 235 | | |
| | | | 07/24/02 | U235 (G) | U | pCi/L | 45.7 | | |
| ME060 | 8462-003 | 06/20/02 | 07/24/02 | GrossAlpha | 0.208 ± 0.52 | pCi/L | 0.851 | U | |
| | | | 07/24/02 | Gross Beta | -0.722 ± 1.3 | pCi/L | 2.24 | | |

AMEC VALIDATED
LEVEL V

Certified by
Report Date 01/06/03
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# Eberline Services

## ANALYSIS RESULTS

SDG 8462
Work Order R206078-01
Received Date 06/21/02

Client MWH PASADENA
Contract JOB #1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME060 | | | 07/19/02 | K40 (G) | U | pCi/L | 146 | U | |
| | | | 07/19/02 | Co57 (G) | U | pCi/L | 5.50 | | |
| | | | 07/19/02 | Co60 (G) | U | pCi/L | 8.87 | | |
| | | | 07/19/02 | Cs134 (G) | U | pCi/L | 9.71 | | |
| | | | 07/19/02 | Cs137 (G) | U | pCi/L | 8.39 | | |
| | | | 07/19/02 | Tl208 (G) | U | pCi/L | 15.3 | | |
| | | | 07/19/02 | Pb210 (G) | U | pCi/L | 570 | | |
| | | | 07/19/02 | Bi212 (G) | U | pCi/L | 69.9 | | |
| | | | 07/19/02 | Pb212 (G) | U | pCi/L | 11.6 | | |
| | | | 07/19/02 | Bi214 (G) | U | pCi/L | 16.1 | | |
| | | | 07/19/02 | Pb214 (G) | U | pCi/L | 15.4 | | |
| | | | 07/19/02 | Ra226 (G) | U | pCi/L | 115 | | |
| | | | 07/19/02 | Ac228 (G) | U | pCi/L | 37.4 | | |
| | | | 07/19/02 | Th234 (G) | U | pCi/L | 181 | | |
| | | | 07/19/02 | U235 (G) | U | pCi/L | 44.8 | | |

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LEVEL V

Certified by [signature]
Report Date 01/06/03
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# DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Radiochemical Analyses by Method EPA 9310 and 901.1M
QC Level: V[1]
SDG: 8494
Matrix: Water
No. of Samples: 1
REs/DLs: 0
Date Reviewed: February 12, 2003
Reviewer: P. Meeks
Reference: National Functional Guidelines for Inorganic Data Review (2/94)
Samples Reviewed: ME093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed and dated by field and laboratory personnel and accounted for the analyses presented in this SDG. No temperature information was provided by the laboratory. The sample was received intact. No custody seals were present on the cooler. Analyses were performed within the holding time of 180 days. | Due to the nonvolatile nature of the analytes and as the sample was received undamaged, no qualifications were required. |
| 3. Method Blanks | One water method blank (7720-003) was analyzed with the sample in this SDG. There were no detects in the method blank. The method blank was only analyzed for gross alpha and gross beta (see comment section). | All remaining analytes except bismuth-214 and lead-214 were nondetected in ME093. As the possibility of bismuth-214 and lead-214 blank contamination could not be evaluated, bismuth-214 and lead-214 detected in ME093 were qualified as estimated, "J.". |

| | Findings | Qualifications |
|---|---|---|
| 4. LCS/BS | An aqueous LCS sample (7720-003) was analyzed with the sample in this SDG. The LCS was only fortified with gross alpha, gross beta, cobalt-60, cesium-137, and uranium-235. No laboratory-established control limits were provided by the laboratory; however, the recoveries for all analytes were within 85-110% and were deemed acceptable. | No qualifications were required. |
| 6. Duplicates | No duplicate analyses were performed in association with the sample in this SDG. | No qualifications were required. |
| 7. Field QC Samples<br>ER: none<br>FB: none<br>Field duplicates: none | There were no field QC samples associated with ME093. | No qualifications were required |
| 8. Other | The laboratory did not report gross alpha or gross beta reported below the MDA as nondetected, "U." | Results reported below the MDA were qualified as nondetected, "U." |
| Comments | Sample ME093 had detects for lead-214 and bismuth-214. These two isotopes are short-lived daughter products of naturally-occurring uranium-238. Other precursors in this decay chain are radon-222 and radium-226. Uranium-238 and radium-226 were analyzed for but were not detected at large MDAs. These MDAs were probably large enough to support the detection of lead-214 and bismuth-214. Of these detects, only beta activity is regulated by the National Primary Drinking Water Standards and the California Primary Drinking Water Standards. | No qualifications were required. |

[1] Level V validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

# Eberline Services

## ANALYSIS RESULTS

SDG 8494
Work Order R210047-01
Received Date 10/09/02

Client MWH PASADENA
Contract 1890607.0114
Matrix WATER

| Client Sample ID | Lab Sample ID | Collected | Analyzed | Nuclide | Results ± 2σ | Units | MDA | Rev Qual | Qual Code |
|---|---|---|---|---|---|---|---|---|---|
| ME093 | 8494-001 | 10/03/02 | 10/23/02 | GrossAlpha | 0.390 ± 2.5 | pCi/L | 4.46 | U | |
| | | | 10/23/02 | Gross Beta | 5.51 ± 4.3 | pCi/L | 6.92 | | |
| | | | 10/15/02 | K40 | U | pCi/L | 253 | | |
| | | | 10/15/02 | Co57 | U | pCi/L | 5.21 | | |
| | | | 10/15/02 | Co60 | U | pCi/L | 7.89 | | |
| | | | 10/15/02 | Cs134 | U | pCi/L | 9.26 | | |
| | | | 10/15/02 | Cs137 | U | pCi/L | 8.16 | | |
| | | | 10/15/02 | Tl208 | U | pCi/L | 14.2 | | |
| | | | 10/15/02 | Pb210 | U | pCi/L | 1790 | | |
| | | | 10/15/02 | Bi212 | U | pCi/L | 61.0 | | |
| | | | 10/15/02 | Pb212 | U | pCi/L | 11.2 | | |
| | | | 10/15/02 | Bi214 | 17.8 ± 16 | pCi/L | 16.6 | J | *3 |
| | | | 10/15/02 | Pb214 | 29.5 ± 16 | pCi/L | 18.4 | J | *3 |
| | | | 10/15/02 | Ra226 | U | pCi/L | 122 | U | |
| | | | 10/15/02 | Ac228 | U | pCi/L | 36.4 | | |
| | | | 10/15/02 | Th234 | U | pCi/L | 246 | | |
| | | | 10/15/02 | U235 | U | pCi/L | 48.4 | | |

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LEVEL V

Certified by [signature]
Report Date 10/31/02
Page 1

550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
303.935.6505, Fax 303.935.6575

# DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V[1]
SDG: MC093
Matrix: Water
No. of Samples: 1
No. of Reanalyses/Dilutions: 0
Date Reviewed: 01/08/03
Reviewer: S. Boehnke
Reference: National Functional Guidelines for Organic Data Review (2/94)
Samples Reviewed: MC093

## Data Validation Findings

| | Findings | Qualifications |
|---|---|---|
| 1. Sample Management | The COC was signed by both field and laboratory personnel. Sample receipt information was recorded on the COC. The VOC sample vials were received intact. The cooler temperature was recorded as 4°C, within the temperature limits of 4 ± 2°C. No custody seal information was provided by the laboratory.<br><br>The analysis of the sample was performed within 14 days of sample collection. | No qualifications were required. |
| 4. Method Blanks | One method blank was analyzed with this SDG. No target compounds were detected in the method blank. | No qualifications were required. |
| 5. LCS/BS | One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits. | No qualifications were required. |
| 6. Surrogates | All surrogate recoveries were within the laboratory-established QC limits. | No qualifications were required. |
| 7. MS/MSDs | No MS/MSD analyses were associated with this SDG. | No qualifications were required. |

| | Findings | Qualifications |
|---|---|---|
| 8. Field QC Samples<br><br>ER: MJ056<br>TB: None<br>FB: MJ055<br>FD: None | Chloroform was reported in samples MJ055 and MJ056 at 2µg/L, each. Chloroform was not reported in the site sample in this SDG. | No qualifications were required. |
| 9. Other | TICs were not provided with the sample in this SDG. | No qualifications were required. |
| Comments | None. | None. |

[1] Level V Validation consists of cursory review of the summary forms only. The reported values on the summary forms are presumed to be correct and no verification of the values from the raw instrument output is performed.

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | Date Analyzed: | 10/04-07/02 |
| Matrix: | Water | Batch Number: | MS48260W2893 |
| Analyst: | ZL | | |

| | Sample ID: | Blank | MC093 rev | qual | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | | |
| Acetone | 50 | ND | ND | U | |
| tert-Amyl Methyl Ether (TAME) | 5.0 | ND | ND | | |
| Benzene | 0.5 | ND | ND | | |
| Bromobenzene | 1.0 | ND | ND | | |
| Bromochloromethane | 1.0 | ND | ND | | |
| Bromodichloromethane | 0.5 | ND | ND | | |
| Bromoform | 0.5 | ND | ND | | |
| Bromomethane | 0.5 | ND | ND | | |
| tert-Butanol (TBA) | 10 | ND | ND | | |
| 2-Butanone (MEK) | 10 | ND | ND | | |
| n-Butylbenzene | 0.5 | ND | ND | | |
| sec-Butylbenzene | 0.5 | ND | ND | | |
| tert-Butylbenzene | 0.5 | ND | ND | | |
| Carbon disulfide | 10 | ND | ND | | |
| Carbon tetrachloride | 0.5 | ND | ND | | |
| Chlorobenzene | 0.5 | ND | ND | | |
| Chloroethane | 0.5 | ND | ND | | |
| Chloroform | 0.5 | ND | ND | | |
| Chloromethane | 0.5 | ND | ND | | |
| 2-Chlorotoluene | 0.5 | ND | ND | | |
| 4-Chlorotoluene | 0.5 | ND | ND | | |
| Dibromochloromethane | 0.5 | ND | ND | | |
| 1,2-Dibromoethane | 0.5 | ND | ND | | |
| 1,2-Dibromo-3-chloropropane | 10 | ND | ND | | |
| Dibromomethane | 0.5 | ND | ND | | |
| 1,2-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,3-Dichlorobenzene | 0.5 | ND | ND | | |
| 1,4-Dichlorobenzene | 0.5 | ND | ND | | |
| Dichlorodifluoromethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethane | 0.5 | ND | ND | | |
| 1,2-Dichloroethane | 0.5 | ND | ND | | |
| 1,1-Dichloroethene | 0.5 | ND | ND | | |
| cis-1,2-Dichloroethene | 0.5 | ND | ND | | |
| trans-1,2-Dichloroethene | 0.5 | ND | ND | | |
| 1,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,3-Dichloropropane | 0.5 | ND | ND | | |
| 2,2-Dichloropropane | 0.5 | ND | ND | | |
| 1,1-Dichloropropene | 0.5 | ND | ND | | |

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LEVEL V

Centrum Analytical Laboratories, Inc.

# EPA 8260B - Volatile Organics

| | | | |
|---|---|---|---|
| Client: | Montgomery Watson | Date Sampled: | 10/03/02 |
| Project: | Boeing SSFL | Date Received: | 10/04/02 |
| Job No.: | 21172 | Date Analyzed: | 10/04-07/02 |
| Matrix: | Water | Batch Number: | MS48260W2893 |
| Analyst: | ZL | | |

| | Sample ID: | Blank | MC093 | RL | qual code |
|---|---|---|---|---|---|
| **Compounds** | **RL** | µg/L | µg/L | qual | |
| cis-1,3-Dichloropropene | 0.5 | ND | ND | U | |
| trans-1,3-Dichloropropene | 0.5 | ND | ND | | |
| Diisopropyl Ether (DIPE) | 5.0 | ND | ND | | |
| Ethylbenzene | 0.5 | ND | ND | | |
| Ethyl tert-Butyl Ether (EtBE) | 5.0 | ND | ND | | |
| Hexachlorobutadiene | 0.5 | ND | ND | | |
| 2-Hexanone | 10 | ND | ND | | |
| Isopropylbenzene | 0.5 | ND | ND | | |
| p-Isopropyltoluene | 0.5 | ND | ND | | |
| Methylene chloride | 50 | ND | ND | | |
| 4-Methyl-2-pentanone | 5.0 | ND | ND | | |
| Methyl-tert-butyl ether (MtBE) | 1.0 | ND | ND | | |
| Naphthalene | 0.5 | ND | ND | | |
| n-Propylbenzene | 0.5 | ND | ND | | |
| Styrene | 0.5 | ND | ND | | |
| 1,1,1,2-Tetrachloroethane | 0.5 | ND | ND | | |
| 1,1,2,2-Tetrachloroethane | 1.0 | ND | ND | | |
| Tetrachloroethene | 0.5 | ND | ND | | |
| Toluene | 0.5 | ND | ND | | |
| 1,2,3-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,2,4-Trichlorobenzene | 0.5 | ND | ND | | |
| 1,1,1-Trichloroethane | 0.5 | ND | ND | | |
| 1,1,2-Trichloroethane | 0.5 | ND | ND | | |
| Trichloroethene | 0.5 | ND | ND | | |
| 1,2,3-Trichloropropane | 0.5 | ND | ND | | |
| Trichlorofluoromethane | 0.5 | ND | ND | | |
| Trichlorotrifluoroethane | 5.0 | ND | ND | | |
| 1,2,4-Trimethylbenzene | 0.5 | ND | ND | | |
| 1,3,5-Trimethylbenzene | 0.5 | ND | ND | | |
| Vinyl chloride | 0.5 | ND | ND | | |
| Xylenes, m-,p- | 1.0 | ND | ND | | |
| Xylene, o- | 0.5 | ND | ND | | |

**Surrogates (% recovery)** Limits: 70 - 130

| Sample ID: | Blank | MC093 |
|---|---|---|
| Dibromofluoromethane | 98 | 101 |
| Toluene-d8 | 98 | 97 |
| Bromofluorobenzene | 97 | 95 |

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LEVEL V