

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**

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ABBREVIATIONS

^2H	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
$\mu\text{g/L}$	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 N70⁰E 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 (^2H 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 (^2H) and ^{18}O , 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 ($\mu\text{g/L}$) 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 $\mu\text{g/L}$. 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 $\mu\text{g/L}$. 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 (^2H 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 line¹ (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 ^2H 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 (^2H 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 ^2H and ^{18}O results provided on [Figure 4](#) and the chloride results presented on [Table 6](#) and plotted on [Plate 2](#). The ^2H 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 ^2H 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 ^2H 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 $\mu\text{g/L}$ 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 sample 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

Spring/ Seep Sample ID	MWH Sample ID	EPA Sample ID	VOCs (8260B)	Perchlorate (300M)	Radioactivity Testing						
					Radioactivity		Stable Isotopes		General Minerals		
					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	Chemical and	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				MRL (mg/L)	Perchlorate (mg/L)
			Toluene (mg/L)	Bromomethane (mg/L)	Acetone (mg/L)	Methylene Chloride (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-emitting 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 o/oo VSMOW)	Oxygen-18 (¹⁸ O) (d ¹⁸ O o/oo 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	<i>178</i>	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	<i>200</i>	83	7.9	95	311	ND (<2)	76.44	556.22	311	<i>1,241</i>
S22A	SSSW06S01	6/11/02	140	46	ND (< 5)	97	<i>340</i>	ND (<2)	71	300.54	<i>340</i>	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	<i>0.029</i>	<i>0.085</i>
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	<i>0.144</i>	--	--	0.018	0.026
S22A	SSSW06S01	SSFL-W-009J	6/11/02	0.01	0.034	--	--	--	--

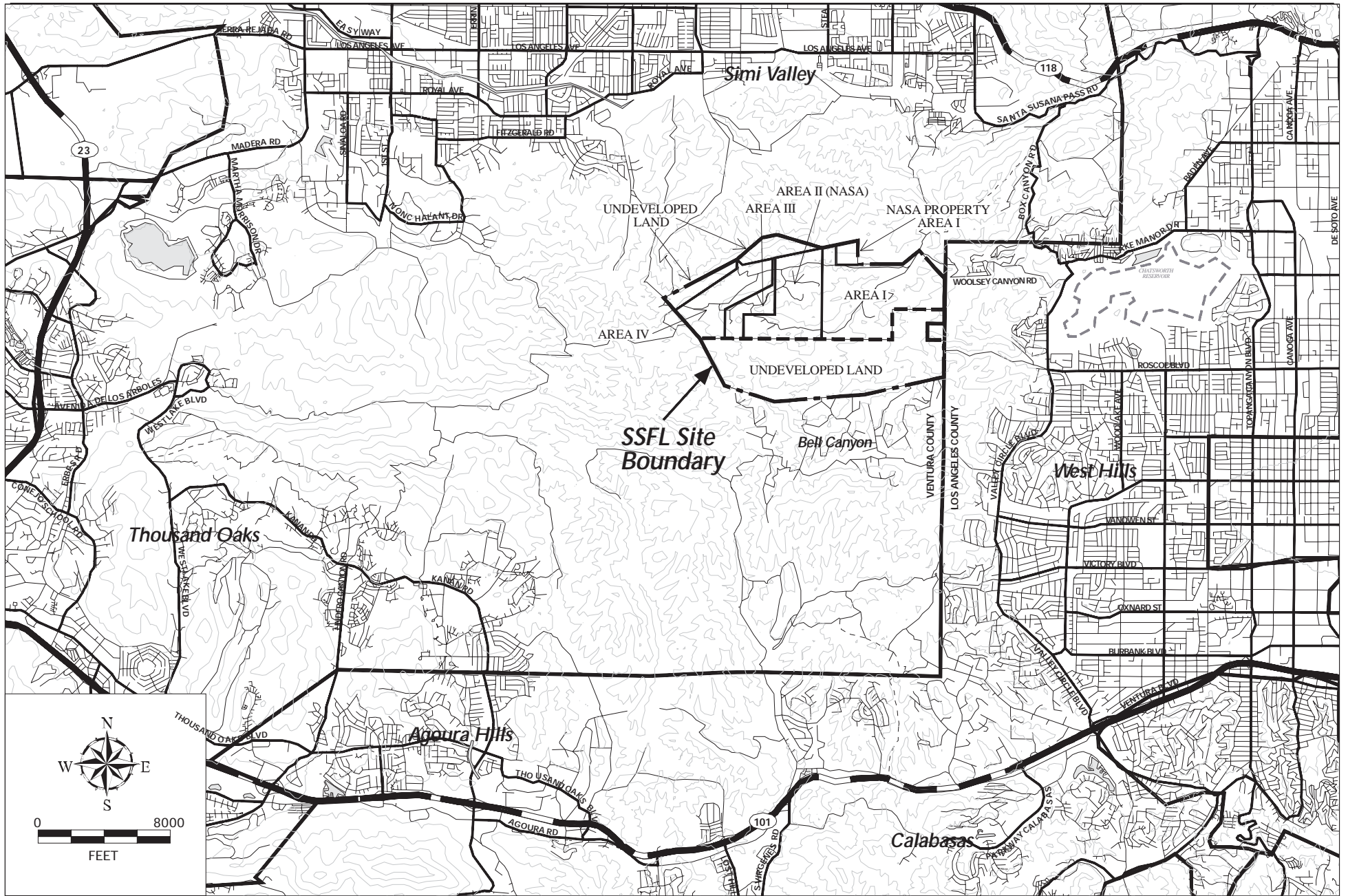
Notes:

results - mg/L - milligrams per liter, "--" indicates not detected

Bold indicates lowest concentration detected

Italics indicate highest concentration detected

MRL - method reporting limit (practical quantitation limit)

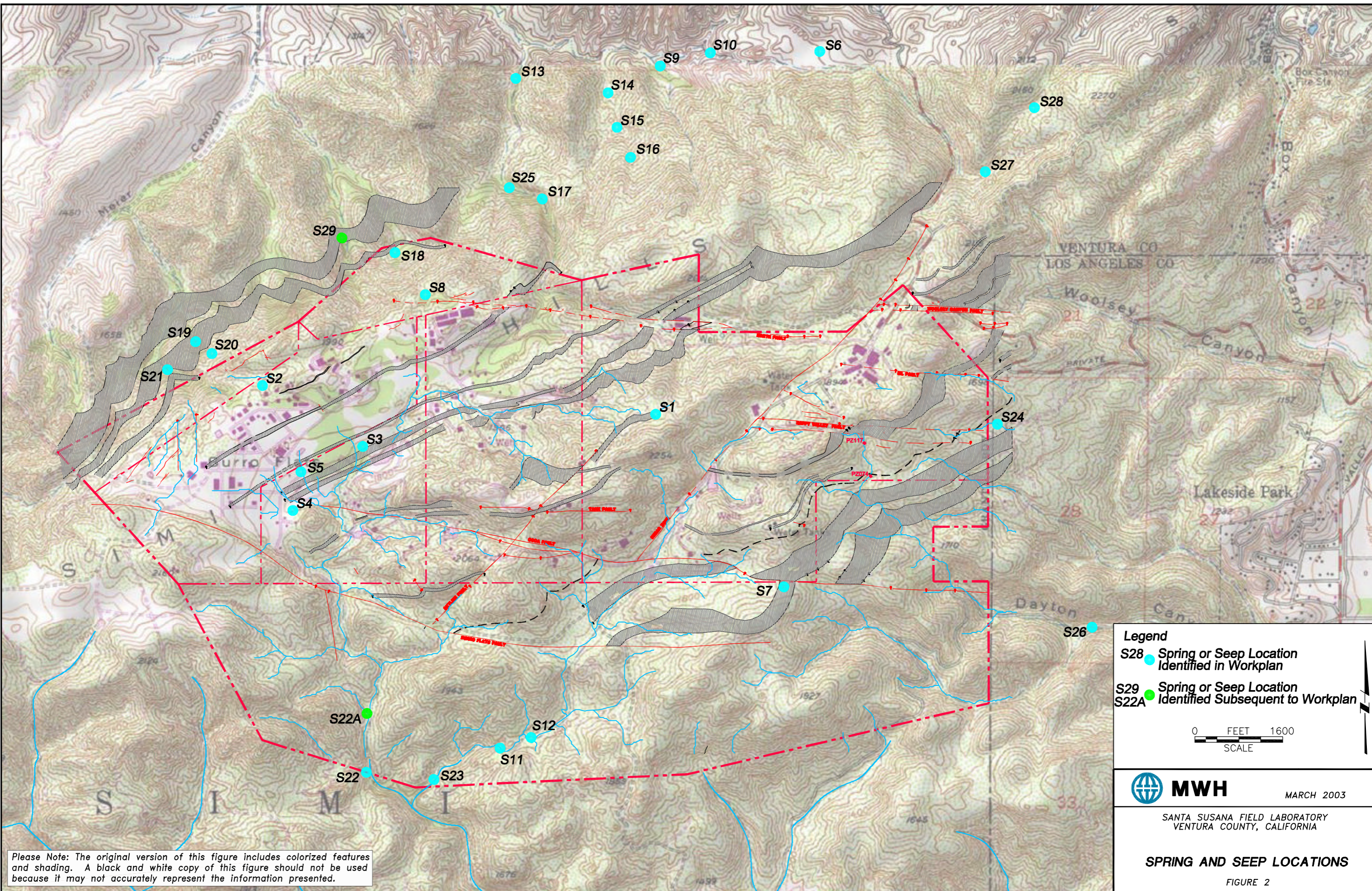


FIGURE

1



Regional Location Map
Santa Susana Field Laboratory



Please Note: The original version of this figure includes colored 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

- S28 ● Spring or Seep Location Identified in Workplan
- S29 ● Spring or Seep Location Identified Subsequent to Workplan
- S22A ● Spring or Seep Location Identified Subsequent to Workplan

0 FEET 1600
SCALE

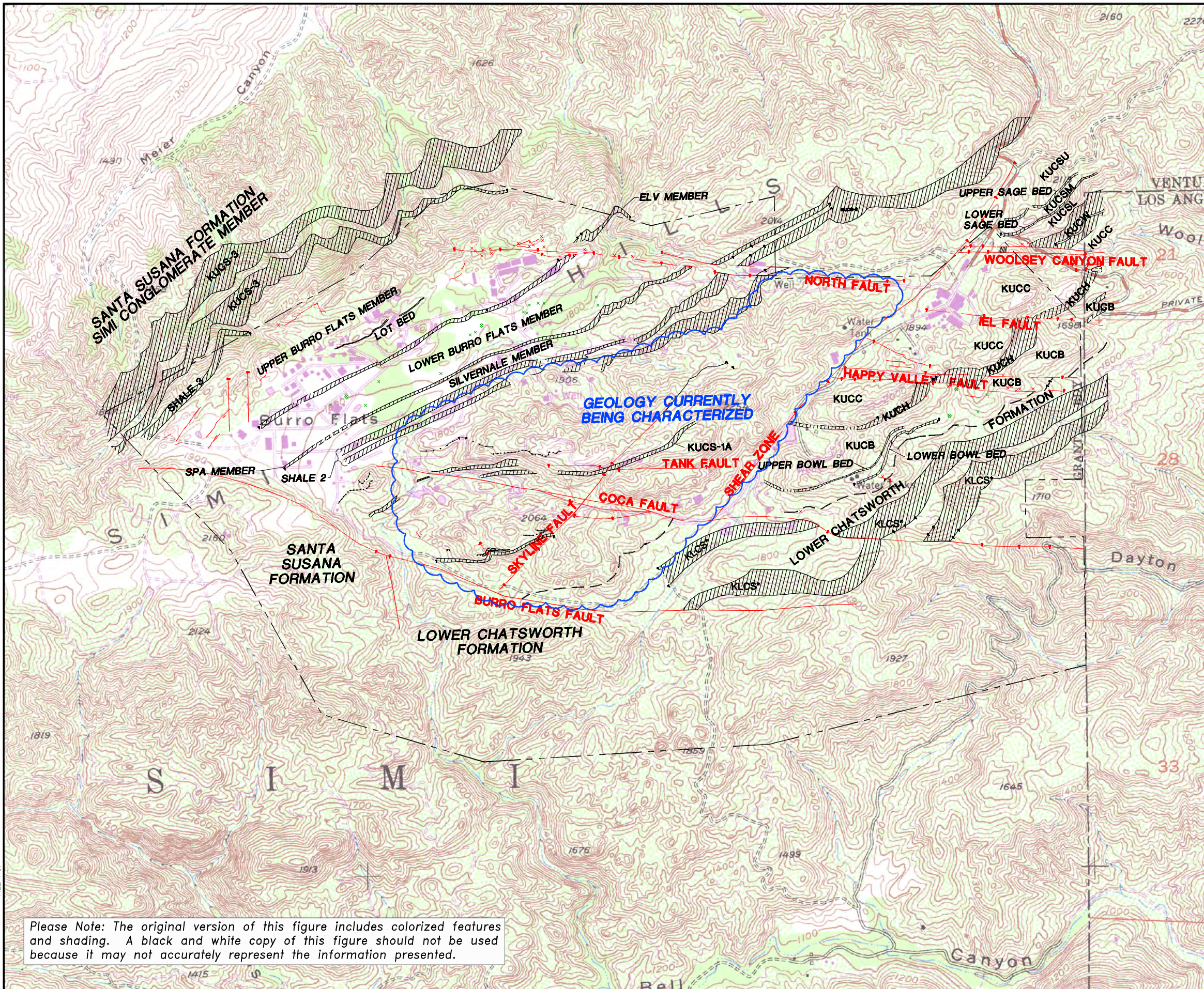
MWH MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

SPRING AND SEEP LOCATIONS

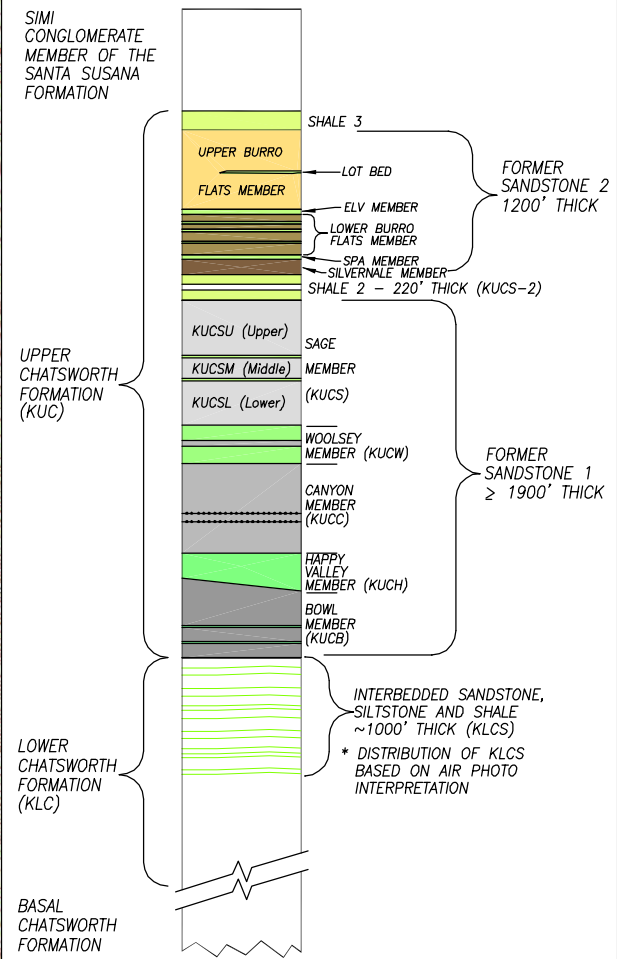
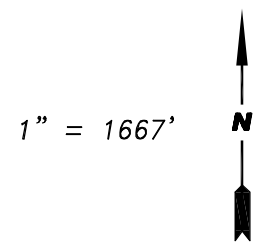
FIGURE 2

INDSVR\INDUSTRIAL\CAD_MLUEBKE\BOEING_SPRING_SEEP_GEO_MAP_12_2002
FILE No. ---
JOB No. ---



Please Note: The original version of this figure includes colored 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



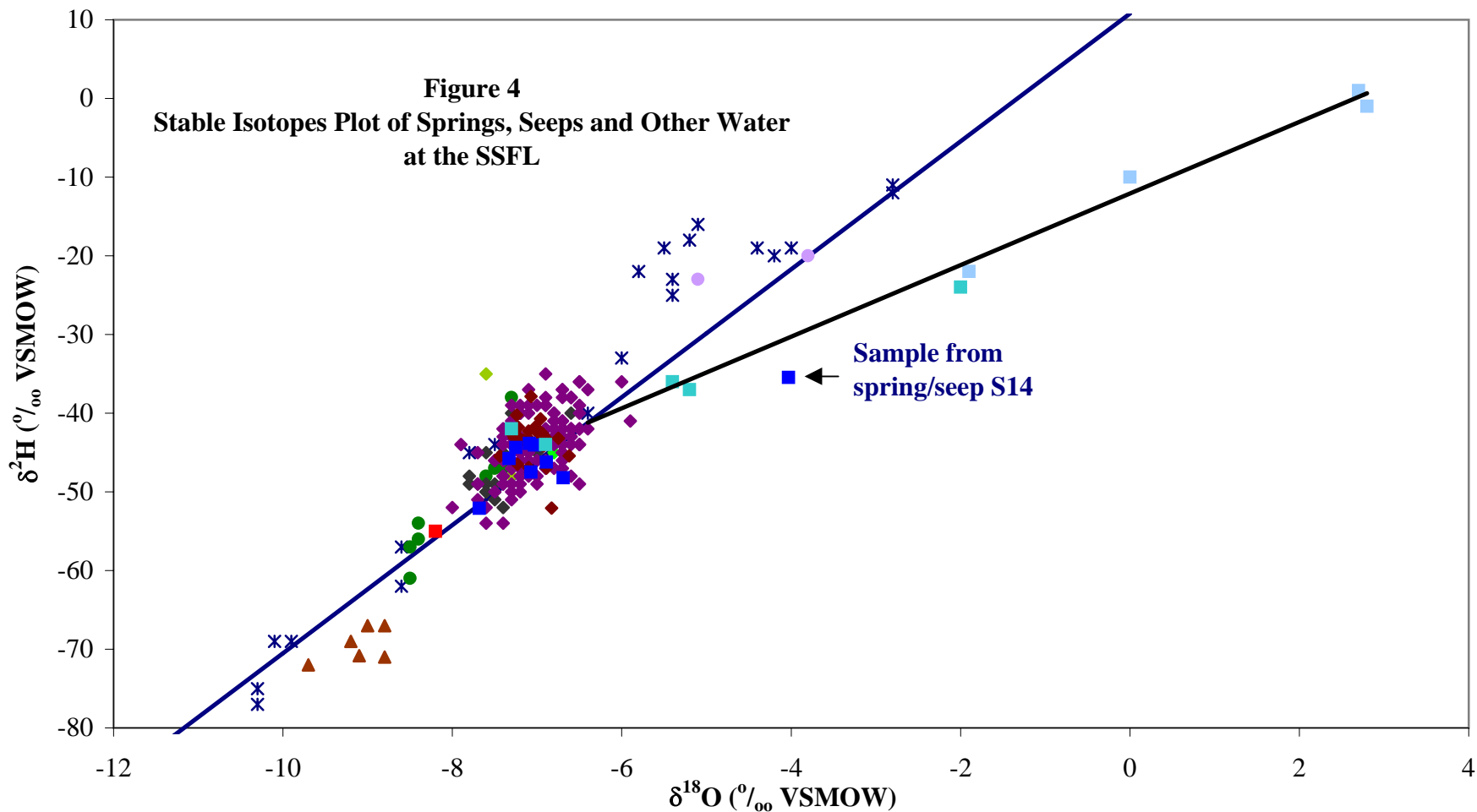
MWH MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

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

FIGURE 3

Figure 4
Stable Isotopes Plot of Springs, Seeps and Other Water
at the SSFL



- 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 comparability (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 completely 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 06/19/02 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.

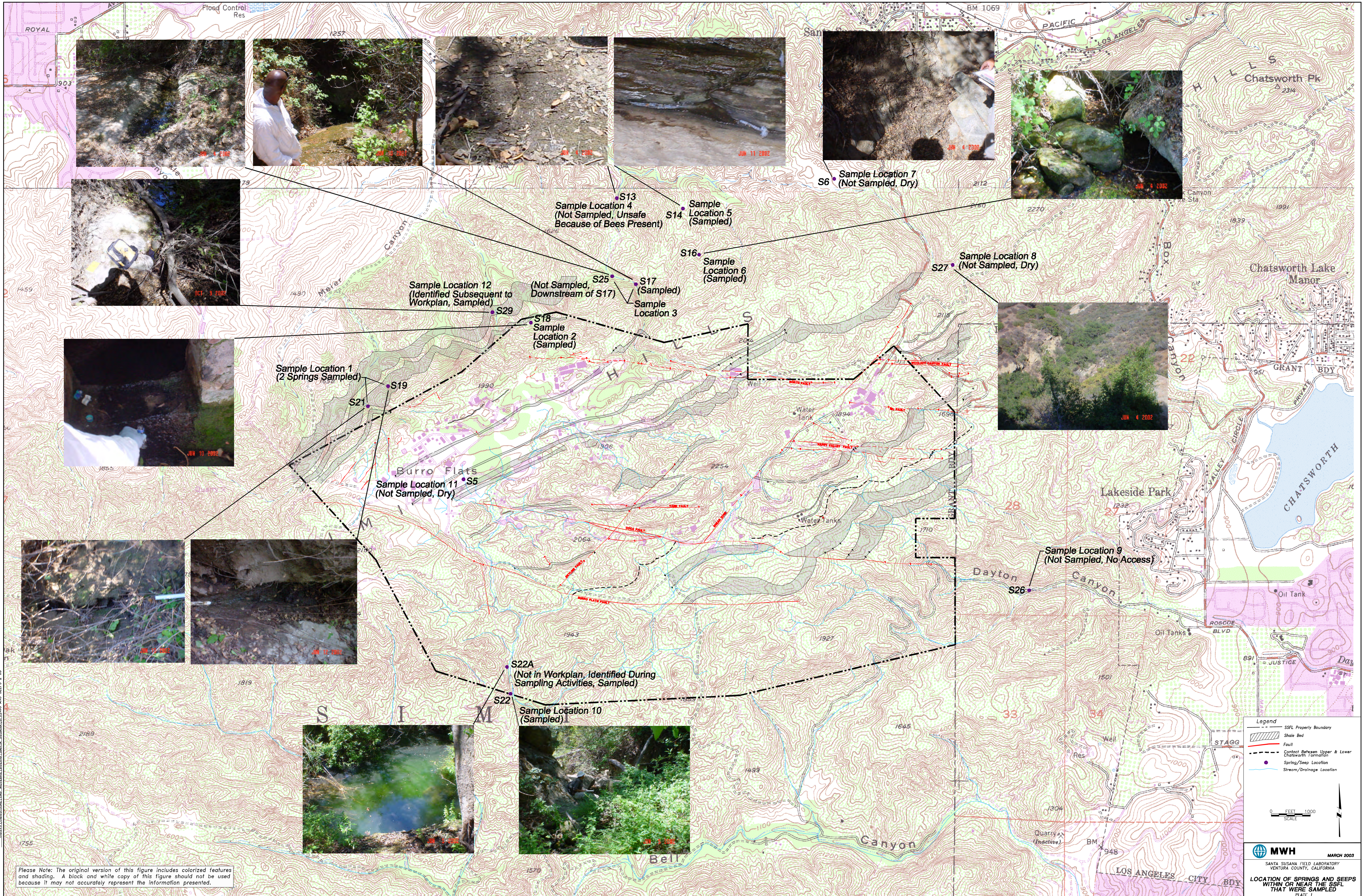
Ogden. 2000a. RCRA Facility Investigation Work Plan Addendum Amendment, Santa Susana Field Laboratory, Ventura County, California. June 2000.

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.

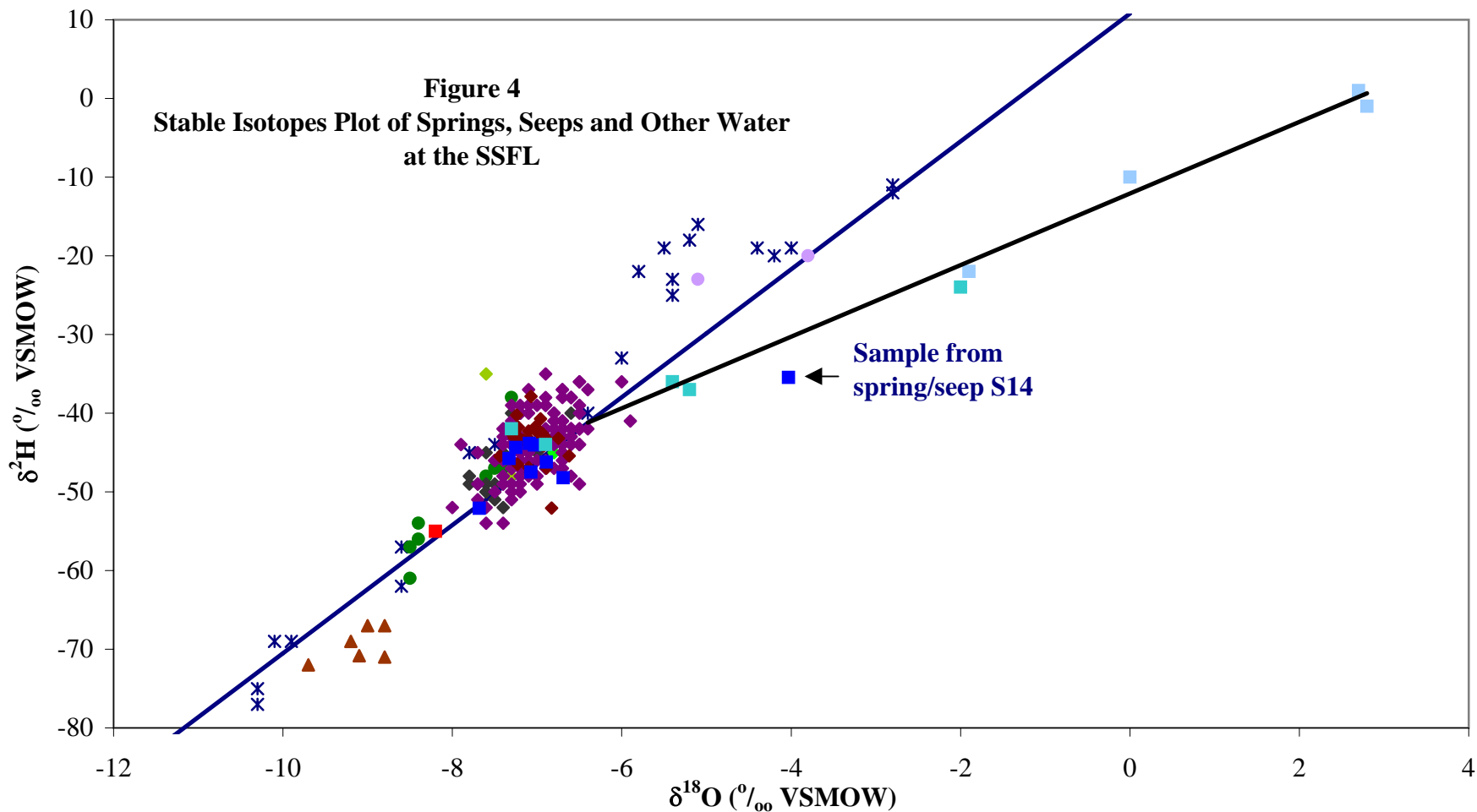
USEPA. 1994. CLP National Functional Guidelines for Inorganic Data Review.



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

INDUSTRIAL ROAD, MILLERLY BOUND, SANTA SUSANA SPRINGS, AND SEEPS 2, 03

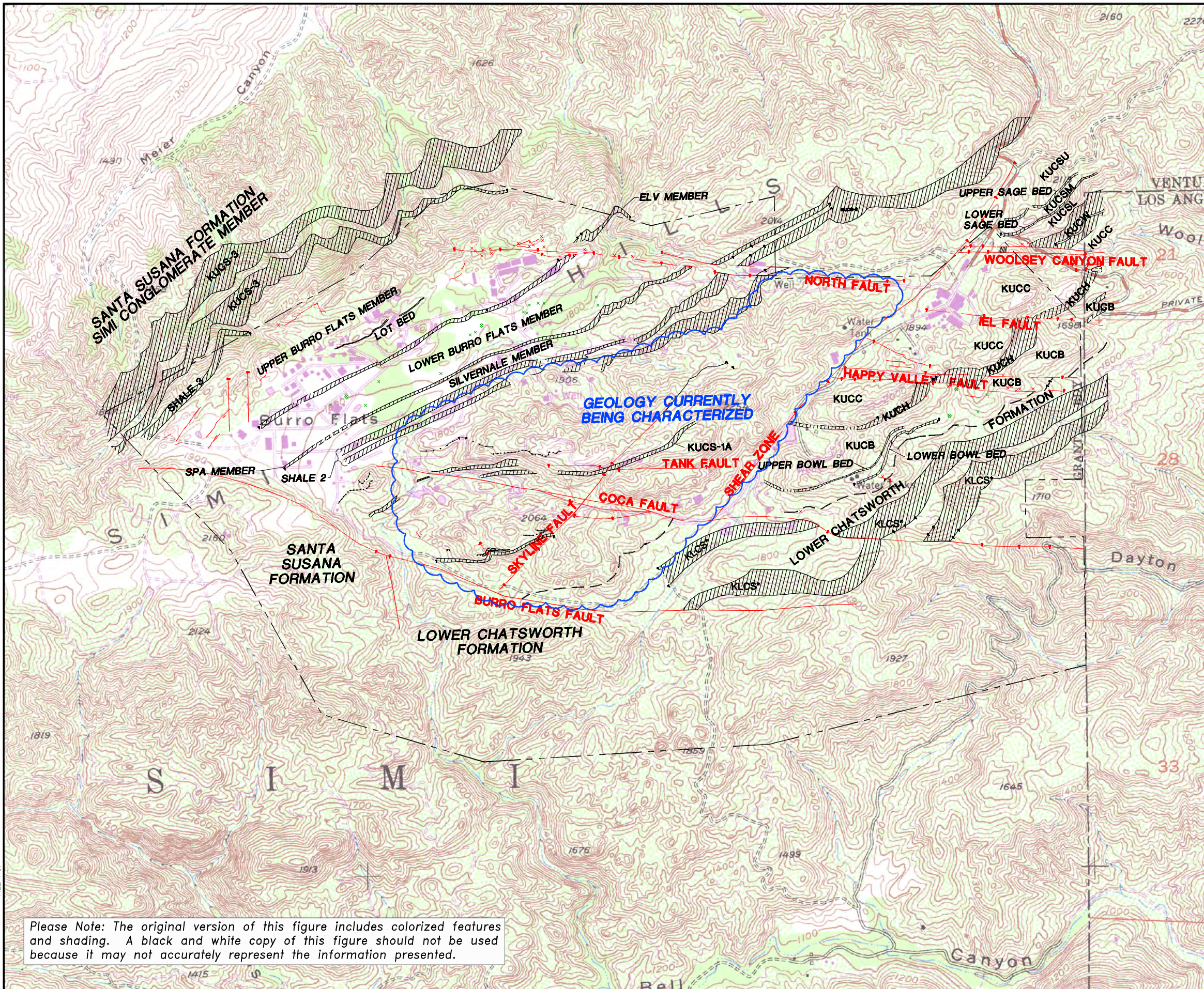
Figure 4
Stable Isotopes Plot of Springs, Seeps and Other Water
at the SSFL



- 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

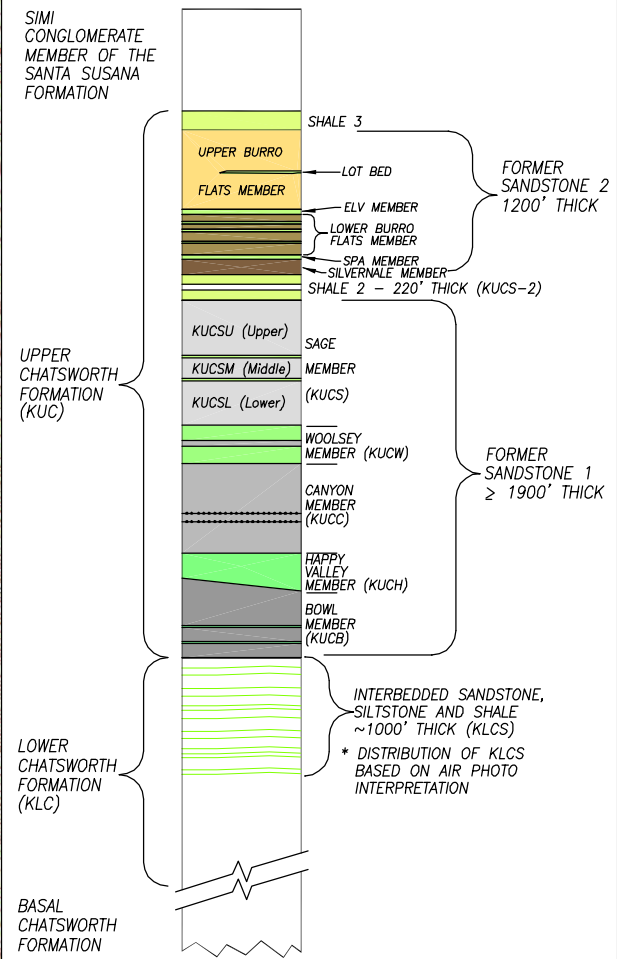
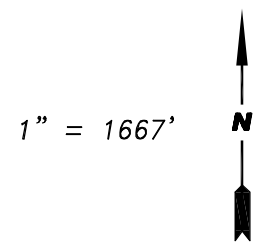
- * Rainfall Data 1994-1995
- Surface Drain, 1994-95
- Offsite Wells 1994-1995
- ◆ Water Supply Well, 1994-95
- ◆ CFOU Groundwater 1994-1995
- Springs and Seeps 2002
- Silvernale Pond 1994-1995

INDSVR\INDUSTRIAL\CAD_MLUEBKE\BOEING_SPRING_SEEP_GEO_MAP_12_2002
FILE No. ---
JOB No. ---



Please Note: The original version of this figure includes colored 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

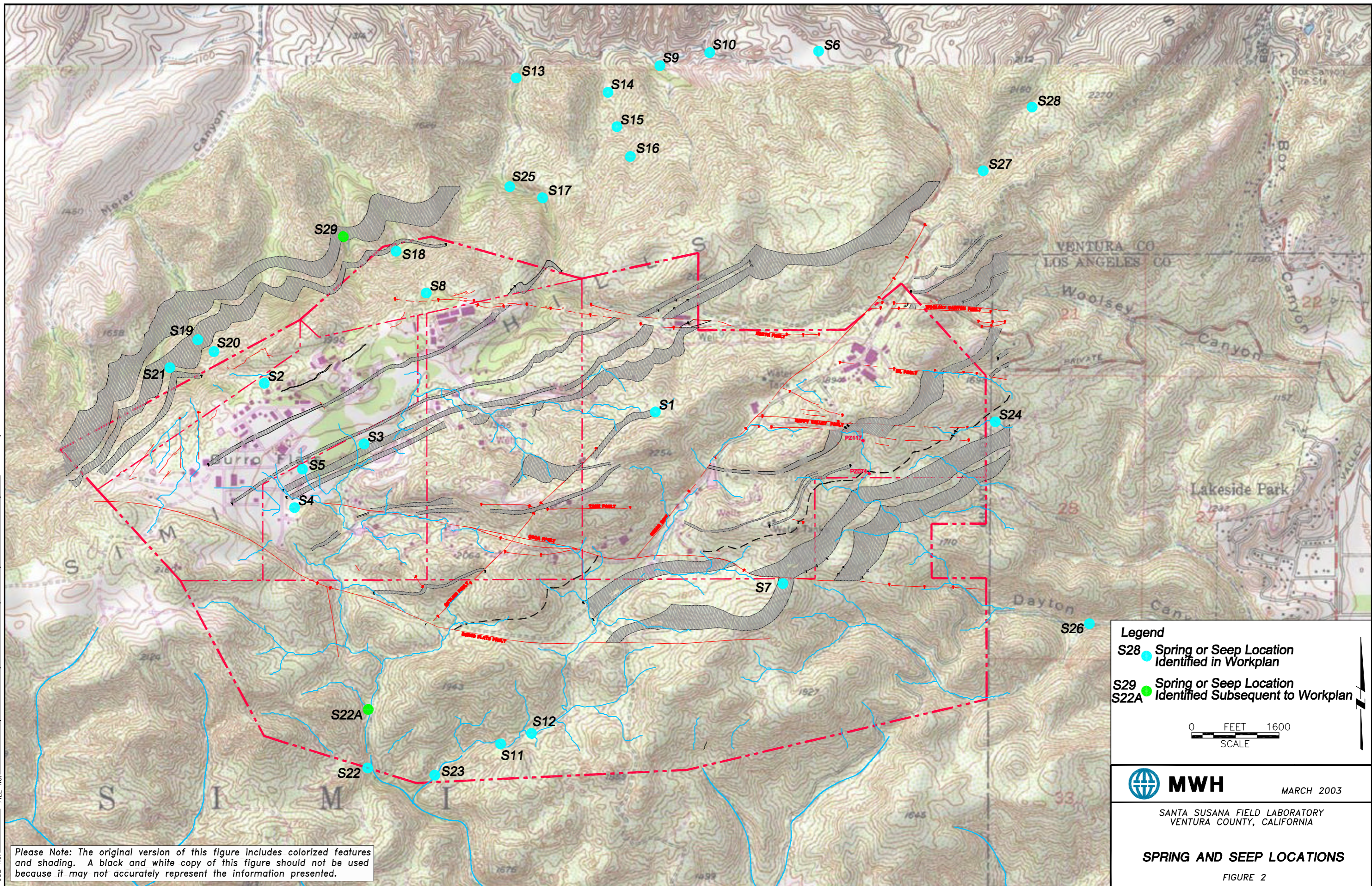


MWH MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

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

FIGURE 3



Please Note: The original version of this figure includes colored 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

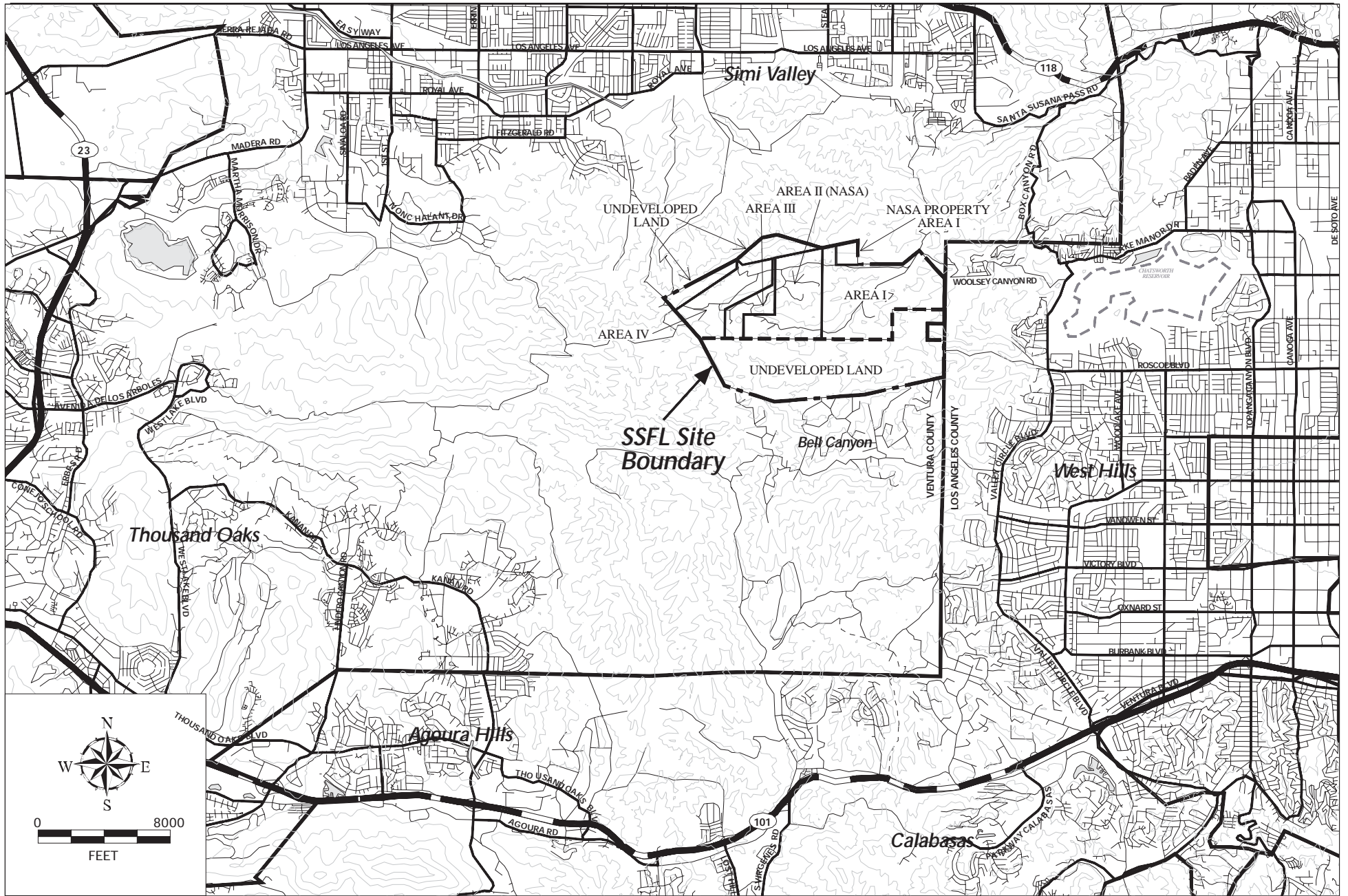
- S28 ● Spring or Seep Location Identified in Workplan
- S29 ● Spring or Seep Location Identified Subsequent to Workplan
- S22A ● Spring or Seep Location Identified Subsequent to Workplan

0 FEET 1600
SCALE

MWH MARCH 2003

SANTA SUSANA FIELD LABORATORY
VENTURA COUNTY, CALIFORNIA

SPRING AND SEEP LOCATIONS
FIGURE 2

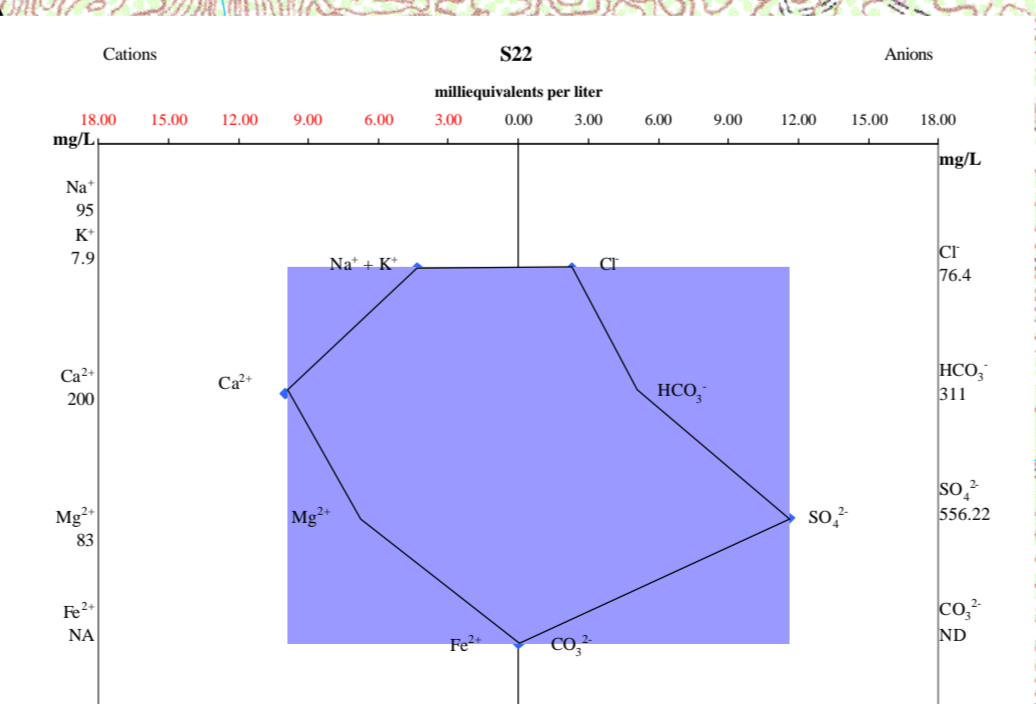
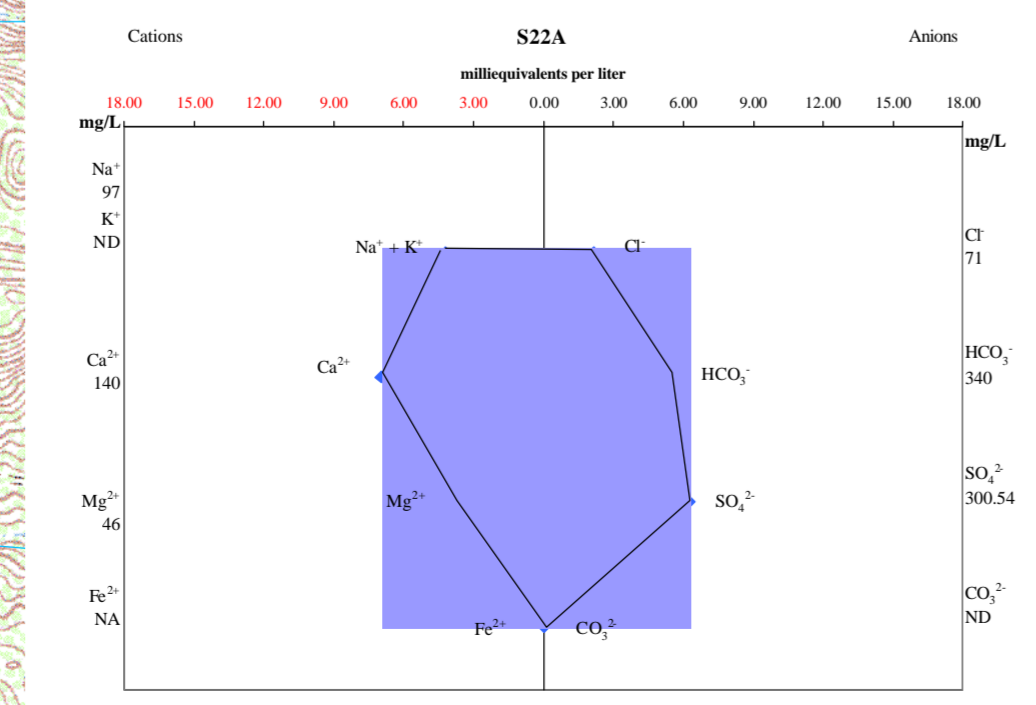
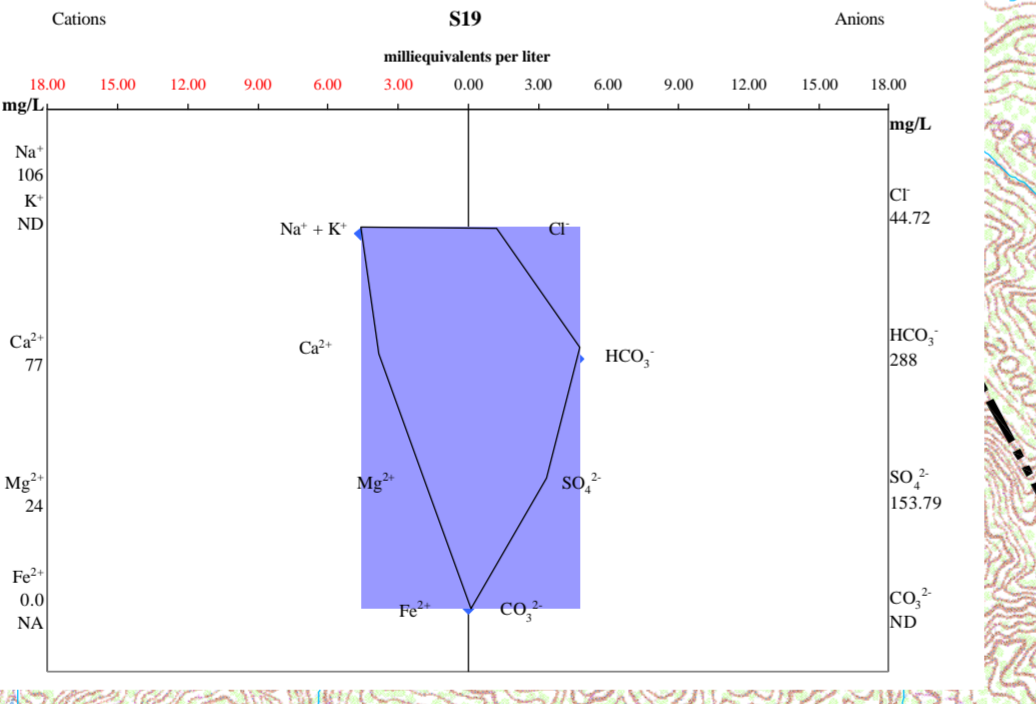
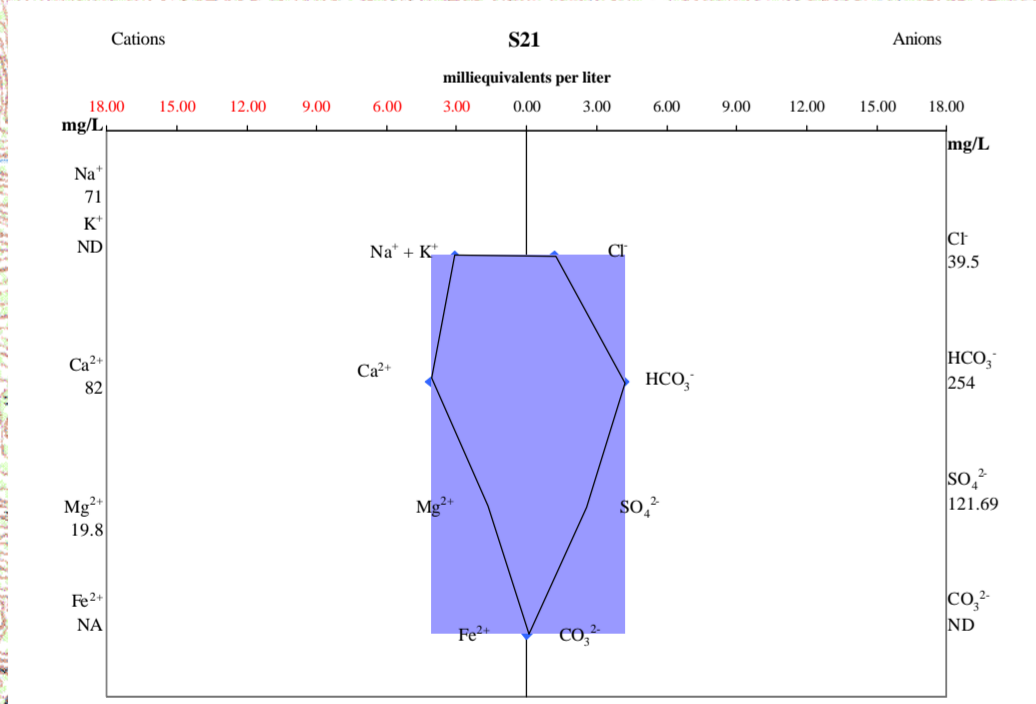
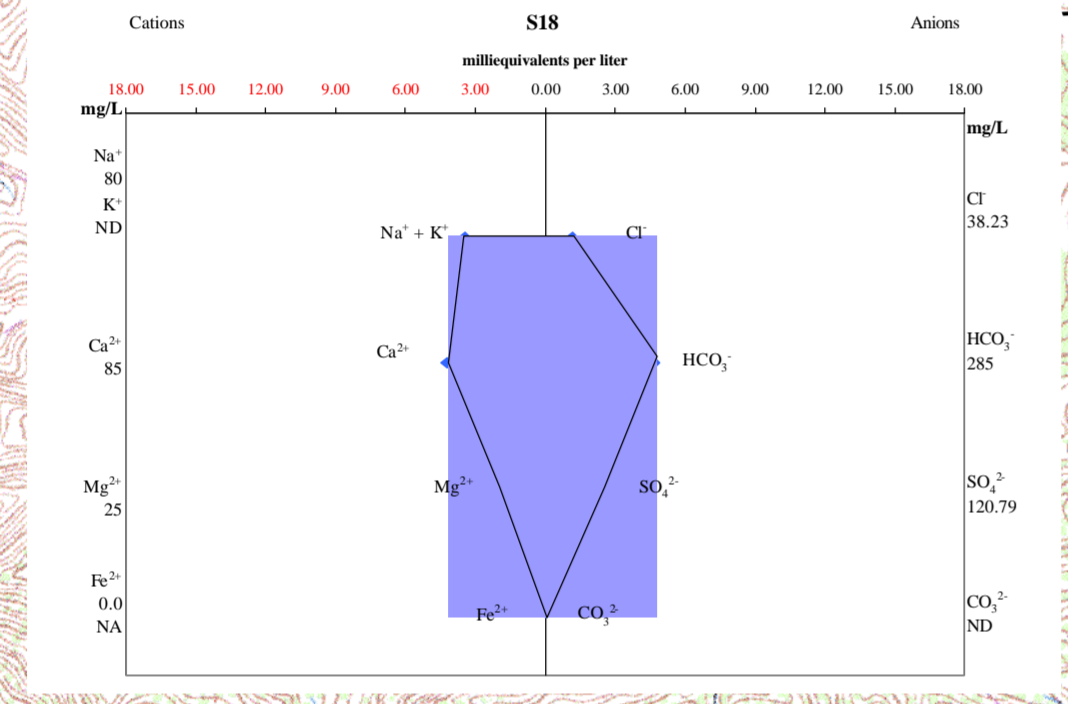
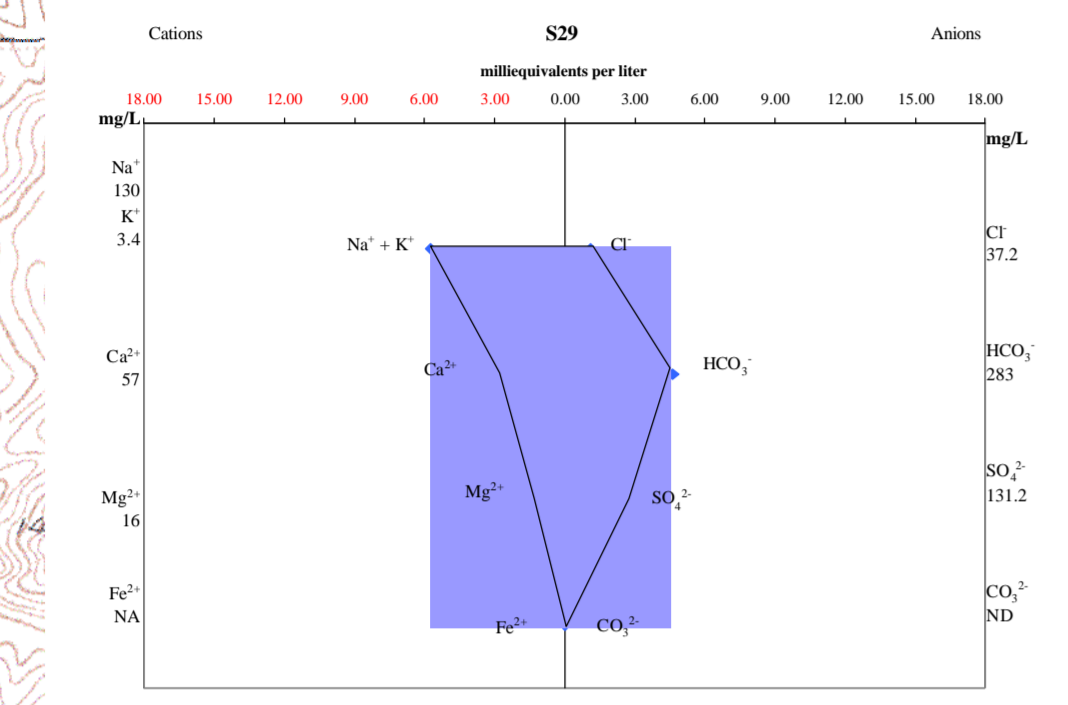
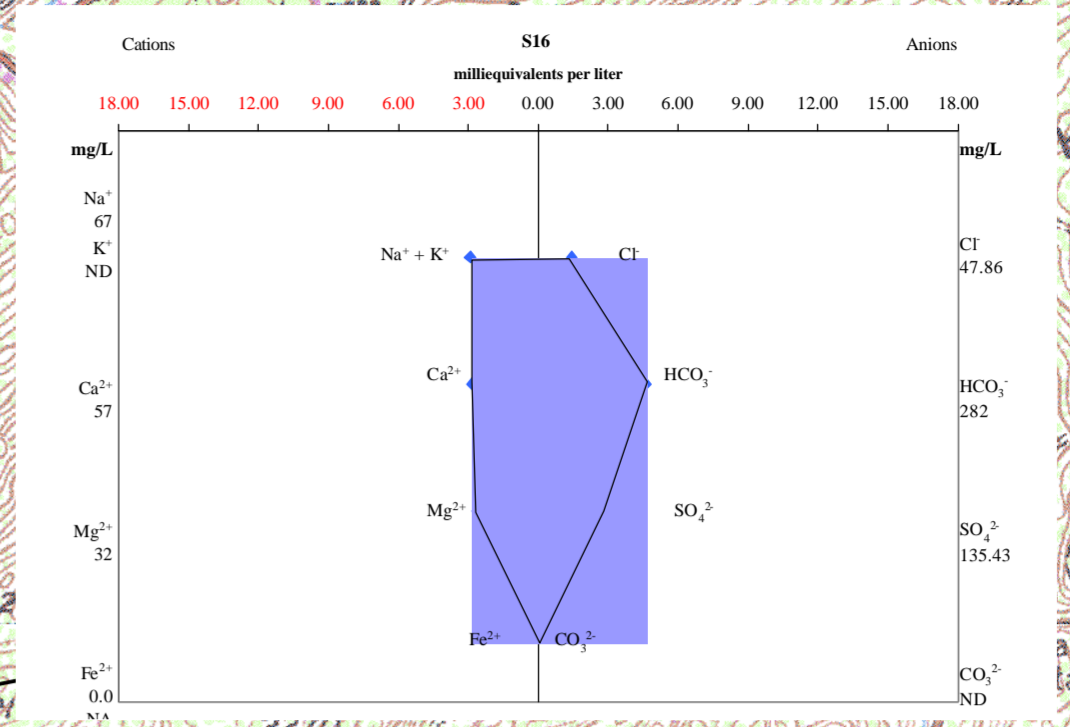
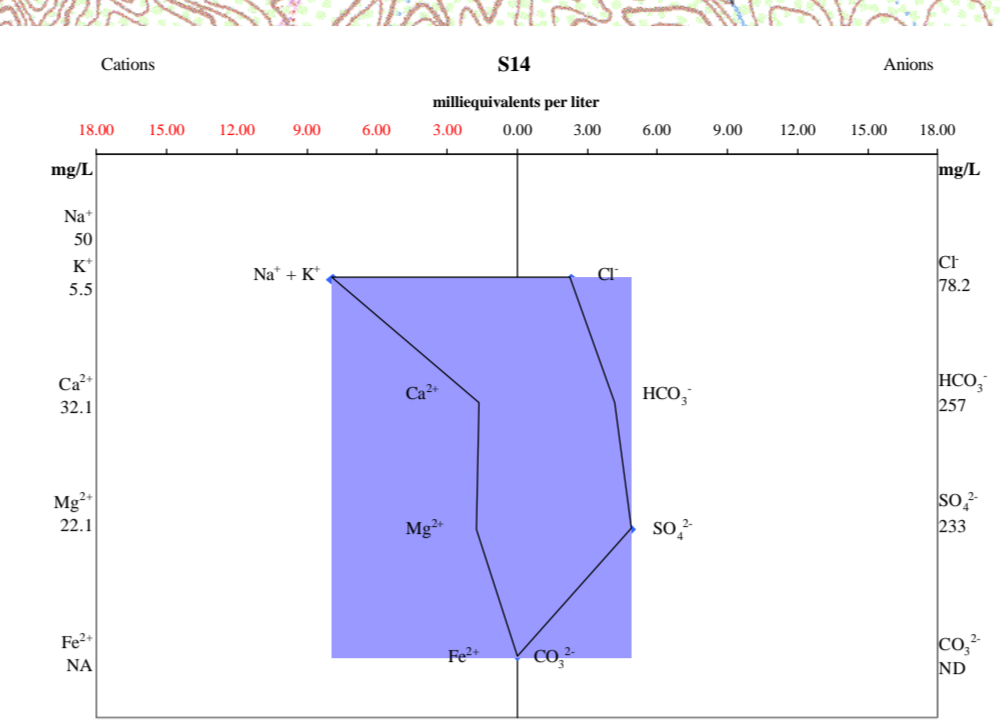
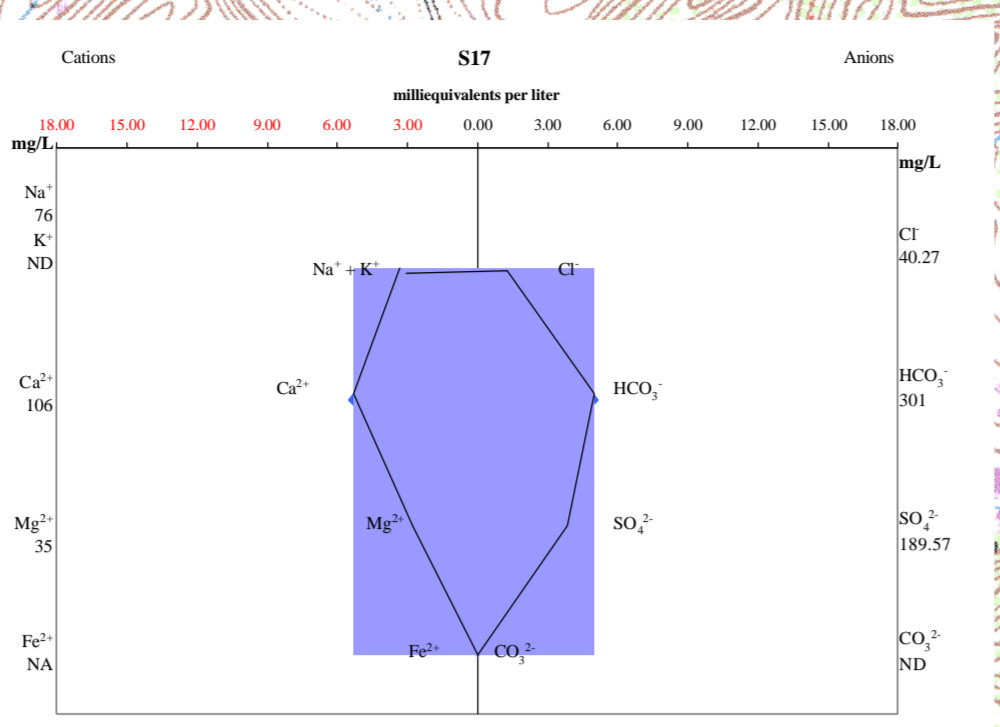
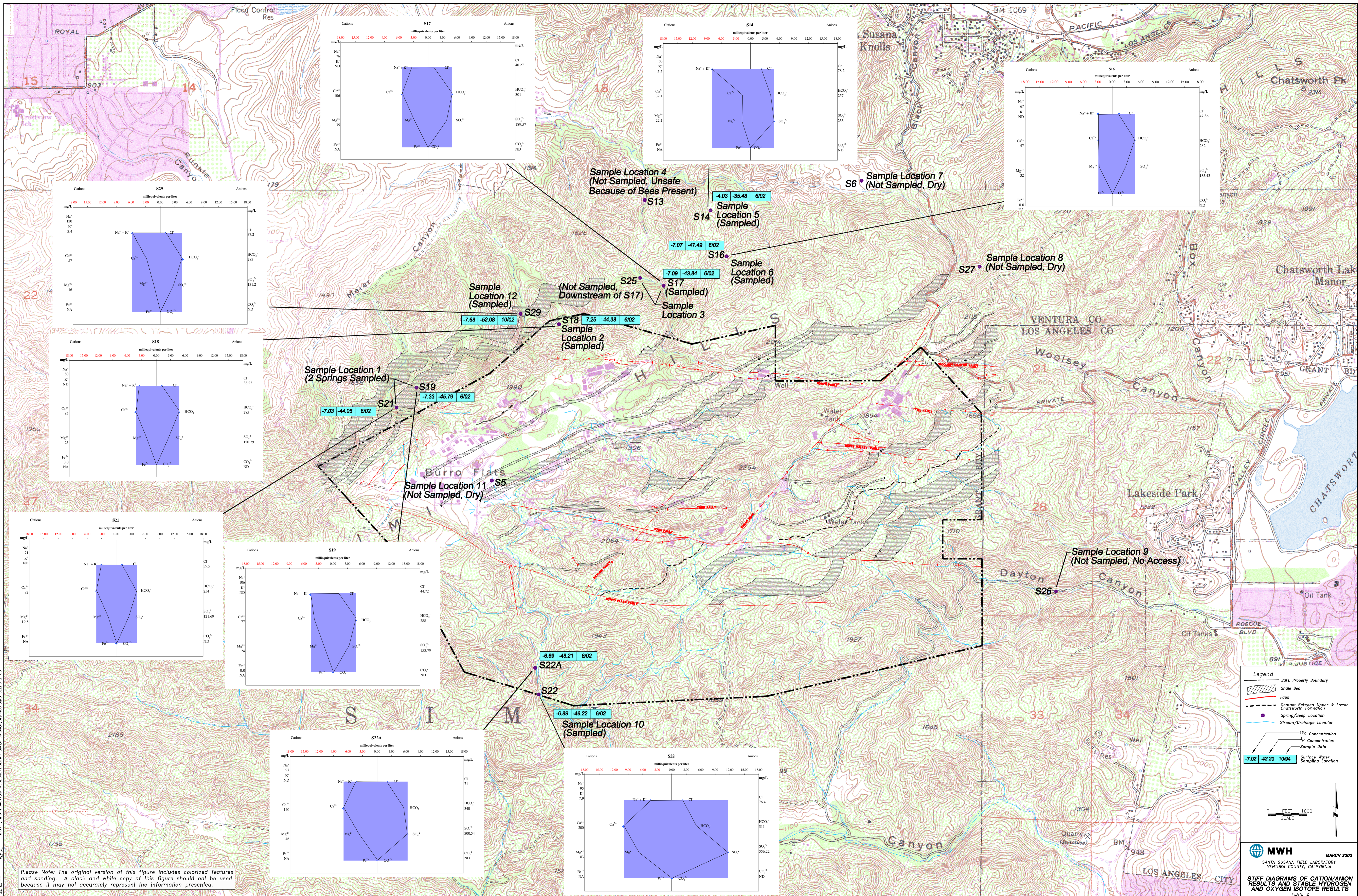


FIGURE

1



Regional Location Map
Santa Susana Field Laboratory



Please Note: The original version of this figure includes colored 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

- SSFL Property Boundary
- Shale Bed
- Fault
- Contact Between Upper & Lower Chatsworth Formation
- Spring/Seep Location
- Stream/Drainage Location
- 1st Concentration
- 2nd Concentration
- Sample Date
- Surface Water Sampling Location

0 FEET 1000 SCALE

▲ NORTH

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

07-09-02 13:56 Uofo, EarthScienceTerre

File: 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	δD_{VSMOW}	Comments
B02-127-001	MO047			-43.9	

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.

Jul-02-02 08:52 UofO, EarthScienceTerre

Box-126(1) wk-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) 288-1978 (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	$\delta^{18}O_{\text{DIPLOM}}$	Comments
B02-128-001	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.
 - fixed to E. Sarao and
 D. Hambrick 02/07/02.

Client: Hambrick
 Montgomery Watson Harza
 Project: Boeing SSFL

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

Environmental Isotope Lab
 2002-07-02
 1 of 1

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	-6.89		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

Client: Hambrick
Montgomery Watson Harza

ISQ# 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:
mepatton@uwaterloo.ca
or phone:
519 888 4732

Robert J. Drimmie
Laboratory Manager
rdrimmie@uwaterloo.ca
519 888 4567 ext 2530



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: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ 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.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	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 $\mu\text{g/L}$, 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. <u>LCS/BS</u>	One solid LCS sample was analyzed with the sample. Boron and molybdenum were not spiked into the LCS.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.
7. <u>MS/MSDs</u>	None.	No qualifications were required.

	Findings	Qualifications
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.
10. <u>Other</u>	None	No qualifications were required.
11. <u>Field QC Samples</u> FB: MJ055 (SDG MJ047) 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.
<u>Comments</u>	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.

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: 0.1

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

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	370			P
7440-36-0	Antimony	1.8	U		P
7440-38-2	Arsenic	6.0	B		P
7440-39-3	Barium	51	B		P
7440-41-7	Beryllium	0.48	U		P
7440-42-8	Boron	110	B		P
7440-43-9	Cadmium	0.35	U		P
7440-70-2	Calcium	57000			P
7440-47-3	Chromium	6.4	U		P
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
7439-95-4	Magnesium	16000			P
7439-96-5	Manganese	420			P
7439-97-6	Mercury	0.040	U		AV
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
7440-22-4	Silver	6.1	U		P
7440-23-5	Sodium	130000			P
7440-28-0	Thallium	3.1	B		P
7440-62-2	Vanadium	4.5	U		P
7440-66-6	Zinc	36			P

Qual Code
B
B

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: 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: Metals by Method ILM04
QC Level: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ 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.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	Sodium was detected in the method blank at 67.800 μ .g/L.	No qualifications were required.
5. <u>LCS/BS</u>	One aqueous LCS sample was analyzed with the sample. The recoveries were within the control limits of 80-120%.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.

	Findings	Qualifications
7. <u>MS/MSDs</u>	None.	No qualifications were required.
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.
10. <u>Other</u>	None.	No qualifications were required.
11. <u>Field QC Samples</u> FB: MJ055 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.
<u>Comments</u>	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): $\mu\text{G/L}$

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): $\mu\text{G/L}$

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
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

Rev Qual
Qual Code

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: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ C. The COC matched the samples and accounted for the analysis. No custody seals were present on the coolers.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	Metals were not detected in the method blank associated with the samples in this SDG.	No qualifications were required.
5. <u>LCS/BS</u>	One aqueous LCS sample was analyzed with the samples. The recoveries were within the laboratory defined QC limits.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.
7. <u>MS/MSDs</u>	None.	No qualifications were required.
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.

	Findings	Qualifications
<u>10. Other</u>	None.	No qualifications were required.
<u>11. Field QC Samples</u> FB: MJ055 ER: MJ056	Metals were not detected in the field QC samples.	No qualifications were required.
<u>Comments</u>	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	<i>Rw</i>	<i>Qual</i>
Calcium	0618	82	5		
Magnesium	0618	20	5		
Potassium	0618	ND	5		
Sodium	0618	71	5	<i>u</i>	

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: *kw*

Approved by: *BP* 187

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		
Sodium	0618	80	5	U	

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: *fw*

Approved by: *BP* **188**

CEIMIC Corporation
 "Analytical Chemistry for Environmental Management"

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	<i>hw</i> Qual	<i>Qual</i> <i>code</i>
Calcium	0618	106	5		
Magnesium	0618	35	5		
Potassium	0618	ND	5		
Sodium	0618	76	5	<i>u</i>	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: *hw*

Approved by: *BP* 189

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	Rw Qual	Qual Code
Calcium	0618	57	5		
Magnesium	0618	32	5		
Potassium	0618	ND	5		
Sodium	0618	67	5	u	

ND = Not Detected

LEVEL V AMEC VALIDATED

Reported by: Kew

Approved by: BP **190**

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	Raw Qual	Final Coll
Calcium	0618	140	5		
Magnesium	0618	46	5		
Potassium	0618	ND	5		
Sodium	0618	97	5	U	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: *KW*

Approved by: *BP* **191**

**CEIMIC
Corporation**

"Analytical Chemistry for Environmental Management"

**TOTAL METALS
SW846 METHOD 6010A**

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-07

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

Target Analyte	Preparation Batch	Sample Concentration	Quantitation Limit	By Qual	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: *mp* **192**

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	Rw Qual	Lyal Date
Calcium	0618	77	5		
Magnesium	0618	24	5		
Potassium	0618	ND	5		
Sodium	0618	106	5	u	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP **193**

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	kw Qual	Qual Coll
Calcium	0618	ND	5	4 ↓	
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 **194**



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DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	One water method blank was analyzed with this SDG. There were no detects in the method blank.	No qualifications were required.
4. <u>LCS/BS</u>	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. <u>MS/MSDs</u>	No MS/MSD analyses were performed in association with the sample in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: MJ056 (SDG MJ047) FB: MJ055 (SDG MJ047) Field duplicates: none	There were no detects in MJ055 or MJ056.	No qualifications were required
8. <u>Other</u>	None	No qualifications were required.

	Findings	Qualifications
<u>Comments</u>	None	None

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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: V¹
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. <u>Sample Management</u>	<p>Temperature upon receipt at Centrum Analytical Laboratories was above the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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.</p> <p>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.</p> <p>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.</p>	No qualifications were required.

	Findings	Qualifications
3. <u>Method Blanks</u>	Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity method blanks were analyzed.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u> MC047 – chloride only	Duplicate analyses were performed for chloride only. The RPD was less than 20%.	No qualifications were required.
7. <u>MS/MSDs</u> 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. <u>Other</u>	No raw data was provided for any of the analyses in this SDG.	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 FB: MJ055 Field duplicates: none	There were no applicable detects in either of the field QC samples.	No qualifications were required.
<u>Comments</u>	None	None

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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

Table with columns: Parameter, Result, Flag, Units, Dilution Factor, RL, Method, Analyzed, Worksheet #. Row 1: Perchlorate, ND, ug/L, 1, 3.0 EPA 314, 6/24/2002 dc, WS35335.

Authorized Signature (handwritten)

Flags for Data Qualifiers:

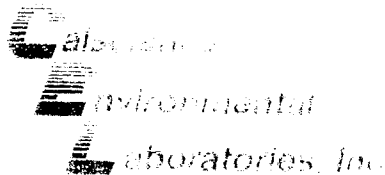
- B = Compound detected in the blank. Sample result equal or less than 10 times the concentration in the blank.
J = Analyte was detected. However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
H = Estimated 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.

ELAP # 1132
LACSD # 10143

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



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

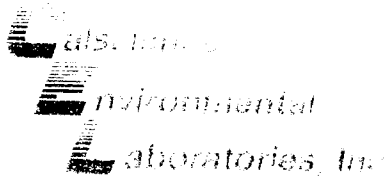
Page 1 of 1

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	0614AIKDP1

Parameter	Result	RL	DF	Qual	Units	Rev Qual	Qual Code
Alkalinity Total (as CaCO ₃)	250	5.0	1		mg/L	J	L

ANEC VALIDATED

LEVEL V



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

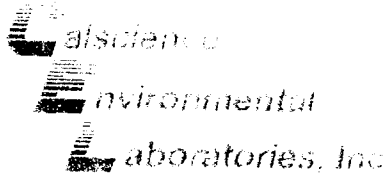
Project: 20674 / Boeing SSFL

Page 1 of 1

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	0614AikDP1				
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;"><u>Rev</u></td> <td style="text-align: center;"><u>Qual</u></td> </tr> <tr> <td style="text-align: center;"><u>Qual</u></td> <td style="text-align: center;"><u>Code</u></td> </tr> </table>	<u>Rev</u>	<u>Qual</u>	<u>Qual</u>	<u>Code</u>
<u>Rev</u>	<u>Qual</u>									
<u>Qual</u>	<u>Code</u>									
Bicarbonate (as CaCO ₃)	250	50	1		mg/L	<table border="1" style="display: inline-table; vertical-align: middle;"> <tr> <td style="text-align: center;">J</td> <td style="text-align: center;">L</td> </tr> </table>	J	L		
J	L									

AMEC VALIDATED

LEVEL V



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

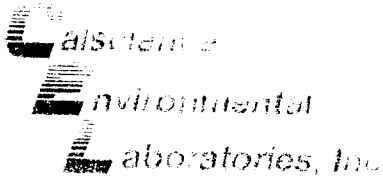
Project: 20674 / Boeing SSFL

Page 1 of 1

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	0614AIkDP1
<u>Parameter:</u>	<u>Result</u>	<u>RI</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Raw Qual</u> <u>Qual Code</u>
Carbonate	ND	1.0	1		mg/L	UJ L

AMEC VALIDATED

LEVEL V



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

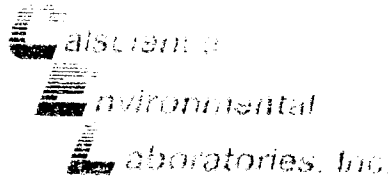
Client Sample Number	Lab Sample Number	Matrix	Date Collected	Date Prepared	Date Analyzed	QC Batch ID
MC047	02-06-0556-1	Aqueous	06/10/02	N/A	06/17/02	0617CICMB1
<u>Parameter</u>	<u>Result</u>	<u>R:</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Rev Qual</u> <u>Qual Code</u>
Chloride	47	2	1		mg/L	J L
Method Blank	099-05-057-1,078	Aqueous	N/A	N/A	06/17/02	0617CICMB1
<u>Parameter</u>	<u>Result</u>	<u>R:</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Rev Qual</u> <u>Qual Code</u>
Chloride	ND	2	1		mg/L	X

AMEC VALIDATED

L1111111111

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated



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

Page 1 of 1

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
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Per Qual</u> <u>Qual Code</u>
Sulfate	150	10	5	0	mg/L	
Method Blank	099-05-091-1,086	Aqueous	N/A	N/A	06/16/02	0616SO4MB1
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	
Sulfate	ND	2.0	1		mg/L	*

AMEC VALIDATED

LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated



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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: V¹
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. <u>Sample Management</u>	<p>Temperatures were within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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.</p> <p>Holding times were met, except for the seven day holding time for TDS.</p>	The TDS result for MJ093 was qualified "J."
3. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u>	None performed.	No qualifications were required.

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

ANEC 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	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	Qual		Method Reporting Limit	Date Prep'd	Date Analyzed
			Per	Code			
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: ITL

ANISO 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	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	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: V¹
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. <u>Sample Management</u>	Temperatures were within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for the remaining analyses.	No qualifications were required.
6. <u>Duplicates</u>	None performed.	No qualifications were required.
7. <u>MS/MSDs</u> MJ047 – perchlorate only	None performed.	No qualifications were required.

	Findings	Qualifications
10. Other	None	No qualifications were required.
11. Field QC Samples ER: MJ059, MJ060 FB: MJ055 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 Obs
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. Pankula

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: EW

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 Cods
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. P. MULL

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

ANEC VALIDATED
LEVEL V

**CEIMIC
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"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: PC

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. B. MUK

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

ANEC 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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u>	Not performed.	No qualifications were required.
7. <u>MS/MSDs</u> MJ047 – perchlorate only	The RPD was less than 20% and the recoveries were within 75-125%.	No qualifications were required.
10. <u>Other</u>	None	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 FB: MJ055 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."
<u>Comments</u>	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.

1782003

**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	Fee 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: RL

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: [Signature]

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	Per 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: [Signature]

**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	Per 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

TS

Reported by: _____

Approved by: _____

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	Per 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: RL

**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	Per 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	Res 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: ML

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	Res 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

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	Rw 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. P. Mink

Approved by: [Signature]

**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	Res 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. P. Mink

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	Pw 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. P. Mink

Approved by: A

**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. Pa. Mink

Approved by: hr

**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	Res 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. P. Mink

Approved by: JK

**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	Pw 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. R. Munk

Approved by: [Signature]

**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	Res 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. Pommik

Approved by: AL

**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	Raw 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. R. Mark

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	Re Qual	Prep 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. Perminic

Approved by: [Signature]

**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: 

**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: 

**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
Total Dissolved Solids	J	F	561	mg/L	10	06/18/02	06/19/02

AMEC VALIDATED

LEVEL V

Reported by: BP

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	Res 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: 

**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: [Signature]

**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	Re 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: 

**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	Res 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: [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	Raw 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 1

Reported by: BP

Approved by: [Signature]

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: PK

Approved by: 



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: V¹
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. <u>Sample Management</u>	<p>Temperature upon receipt at Centrum Analytical Laboratories was within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. All analyses were subcontracted to Calscience Environmental Laboratories.</p> <p>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.</p> <p>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.</p>	No qualifications were required.
3. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u> MC047 – TDS only	Duplicate analyses were performed for TDS only. The RPD was less than 20%.	No qualifications were required.
7. <u>MS/MSDs</u> None	None.	No qualifications were required.
10. <u>Other</u>	Raw data was provided only for TDS.	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 (SDG MJ047) FB: MJ055 (SDG MJ047) Field duplicates: none	TDS was reported in MJ056 at 914 mg/L.	TDS was estimated , "J," in MC093.
<u>Comments</u>	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.
 1401 Research Park Drive
 Suite 100
 Riverside, CA 92507-2111

Date Sampled: 10/03/02
 Date Received: 10/04/02
 Date Analyzed: 10/08/02

Attn: Marilu Escher
 RE: Boeing SSFL/21172

Work Order No.: 02-10-0288
 Method: EPA 314.0
 Page 1 of 1

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

<u>Sample Number</u>	<u>Perchlorate Concentration</u>	<u>Reporting Limit</u>	<u>Res Qual</u>	<u>Qual Code</u>
MC093	ND	2.0	U	
Method Blank	ND	2.0	*	

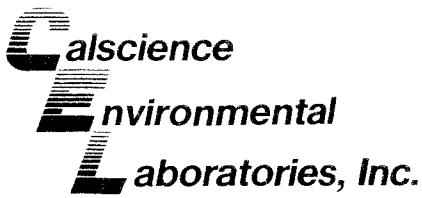
Analysis Not Validated

AMEC VALIDATED

Line 10/10/02 V

ND denotes not detected at indicated reportable limit.

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



ANALYTICAL REPORT

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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

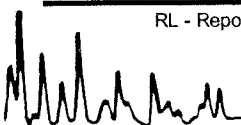
Parameter	Result	RL	DF	Qual	Units	Rev Qual	Qual Code
Alkalinity, Total (as CaCO3)	290	5.0	1		mg/L	J	L

AMEC VALIDATED

LEVEL V

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

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

Date Received: 10/04/02
Work Order No: 02-10-0288
Preparation: N/A
Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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	Res Qual	Qual Code
Bicarbonate (as CaCO ₃)	290	5.0	1		mg/L	J	L

AMEC VALIDATED

LEVEL V

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

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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 V. [unclear]

LEVEL V

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

ANALYTICAL REPORT

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: EPA 300.0

Project: Boeing SSFL/21172

Page 1 of 1

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	Result	RL	DF	Qual	Units	Parameter	Result	RL	DF	Qual	Units
Chloride	35	20	20		mg/L	Sulfate	130	20	20		mg/L

Method Blank	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
	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	ND	1.0	1		mg/L	Sulfate	ND	1.0	1		mg/L

Analysis Not Validated

ANEC VALIDATED

LEVEL V

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

General Chemistry

Client: Montgomery Watson
 Project: Boeing SSFL
 Job No.: 21172
 Matrix: Water
 Analyst: GF

Date Sampled: 10/03/02
 Date Received: 10/04/02

Analysis:	Total Dissolved Solids	
Method Number:	160.1	
Sample ID	mg/L	<i>Per</i> <i>Qual</i> <i>Qual</i> <i>Code</i>
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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u>	No duplicate analyses were performed in association with the samples in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: ME059, ME060 FB: ME055 (SDG 8458) Field duplicates: none	There were no detects in any of the field QC samples.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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 <u>8462</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206078-01</u>	Contract <u>JOB #1890607.0114</u>
Received Date <u>06/21/02</u>	Matrix <u>WATER</u>

Client
Sample ID

Lab

Sample ID	Collected	Analyzed	Nuclide	Results ± Zσ	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		
			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 <i>[Signature]</i>
Report Date <u>01/06/03</u>
Page 1

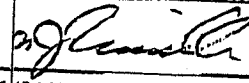
Eberline Services
ANALYSIS RESULTS

SDG <u>8462</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206078-01</u>	Contract <u>JOB #1890607.0114</u>
Received Date <u>06/21/02</u>	Matrix <u>WATER</u>

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	Cs57 (G)	U	pCi/L	5.50		
			07/19/02	Cs60 (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	64.8		

AMEC VALIDATED

LEVEL V

Certified by 
Report Date <u>01/06/03</u>
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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	Three water method blanks, one for gross alpha (E299DIAC), 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. <u>LCS/BS</u>	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. <u>Duplicates</u> 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 $\pm 2\sigma$.	No qualifications were required.
7. <u>Field QC Samples</u> ER: ME056 (SDG 8458) FB: ME055 (SDG 8458) Field duplicates: none	There were no detects in ME055 or ME056.	No qualifications were required
8. <u>Other</u>	None.	No qualifications were required.
<u>Comments</u>	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
 Lot-Sample No.: JZF180183-1
 Client Sample ID: MS047

SDG: 20380
 Report No.: 19857
 COC No.:

Collection Date: 6/10/2002 10:48:00 AM
 Received Date: 6/14/2002 11:00:00 AM
 Matrix: WATER

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	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 (2.8)	6/21/02 01:52 p	0.098	L	RICHRC5014 GPC10A
Batch: 2170276	Work Order: E273C1AC Report DB ID: 9E273C10											
BETA	6.82	U	2.0	2.2	3.29	pCi/L	100.00%	(2.1) (6.3)	6/21/02 01:42 p	0.1983	L	RICHRC5014 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 (0.87)	6/22/02 05:39 a		0.6	L	RICHRC5017 GER1\$1
CS-137	2.12	U	7.8 U	7.8	14.6	pCi/L	0.14 (0.54)	6/22/02 05:39 a		0.6	L	RICHRC5017 GER1\$1

Number of Results: 4

Comments:

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LEVEL V



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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u> 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. <u>Field QC Samples</u> ER: ME056 FB: ME055 Field duplicates: none	There were no detects in ME055 or ME056.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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 <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	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		
				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		
				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		

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA	Raw 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
07/23/02				Gross Beta	3.66 ± 1.4	pCi/L	1.93		
07/18/02				K 40 (G)	U	pCi/L	261		
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		

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	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	C C C ↓	
			07/23/02		Gross Beta	-0.143 ± 1.6	pCi/L	2.78		
		07/30/02		K 40 (G)	U	pCi/L	148			
				Co 57 (G)	U	pCi/L	10.8			
				Co 60 (G)	U	pCi/L	12.8			
				Cs 134 (G)	U	pCi/L	14.6			
				Cs 137 (G)	U	pCi/L	12.5			
				Tl 208 (G)	U	pCi/L	14.0			
				Pb 210 (G)	U	pCi/L	6480			
				Bi 212 (G)	U	pCi/L	87.7			
				Pb 212 (G)	U	pCi/L	23.5			
				Bi 214 (G)	U	pCi/L	36.0			
				Pb 214 (G)	U	pCi/L	27.6			
				Ra 226 (G)	U	pCi/L	219			
	Ac 228 (G)	U	pCi/L	50.4						
	Th 234 (G)	U	pCi/L	522						
	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	C	
			07/23/02		Gross Beta	3.30 ± 1.4	pCi/L	2.09		

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	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		
07/23/02 Gross Beta	-0.261 ± 1.3	pCi/L	2.27						
07/30/02 K 40 (G)	U	pCi/L	95.8						
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			

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Report Date <u>08/08/08</u>
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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	Sample ID	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA	Rev Qual	Qual Code
MEOS6				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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Report Date <u>08/08/02</u>
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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u>	No duplicate analyses were performed in association with the sample in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: none FB: none Field duplicates: none	There were no field QC samples associated with ME093.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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 <u>8494</u>	Client <u>MWH PASADENA</u>
Work Order <u>R210047-01</u>	Contract <u>1890607.0114</u>
Received Date <u>10/09/02</u>	Matrix <u>WATER</u>

Client	Lab	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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Report Date <u>10/31/02</u>
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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>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.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	All nondetect sample results were qualified as estimated, "UJ."
4. <u>Method Blanks</u>	One method blank was analyzed with this SDG. No target compounds were detected in the method blank.	No qualifications were required.
5. <u>LCS/BS</u>	One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	TICs were not provided with the sample in this SDG.	No qualifications were required.
<u>Comments</u>	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.

EPA 8260B - Volatile Organics

Client: Montgomery Watson
 Project: Boeing SSFL
 Job No.: 20674
 Matrix: Water
 Analyst: JTS/CP

Date Sampled: 06/10-12/02
 Date Received: 06/14/02
 Date Analyzed: 06/17/02
 Batch Number: M48260W749

Compounds	Sample ID: RL	Blank µg/L	MC047 µg/L	<i>rev</i> <i>qual</i>	<i>qual</i> <i>Code</i>
cis-1,3-Dichloropropene	0.5	ND	ND	<i>LS</i>	<i>*1</i>
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

EPA 8260B - Volatile Organics

Client: Montgomery Watson
 Project: Boeing SSFL
 Job No.: 20674
 Matrix: Water
 Analyst: JTS/CP

Date Sampled: 06/10-12/02
 Date Received: 06/14/02
 Date Analyzed: 06/17/02
 Batch Number: M48260W749

Compounds	Sample ID: RL	Blank µg/L	MC047 µg/L	<i>rel</i> <i>qual</i>	<i>qual</i> <i>Code</i>
Acetone	50	ND	ND	<i>UT</i>	<i>*1</i>
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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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.</p> <p>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 $4 \pm 2^\circ\text{C}$.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	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. <u>LCS/BS</u>	One LCS (VLCSLG) was analyzed with this SDG. All spiked compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	Sample MJ093 was analyzed for a list of 41 target compounds. TICs were not provided with the sample in this SDG. Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory.	No qualifications were required.
<u>Comments</u>	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.

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:		Q	REV QUAL	QUAL CODE
		(ug/L or ug/Kg)	UG/L			
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		↓	
75-00-3	Chloroethane	5	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		↓	

FORM I VOA

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LEVEL V 12

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		

FORM I VOA

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LEVEL V ¹³



550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.</p> <p>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 $4 \pm 2^\circ\text{C}$.</p> <p>The analyses of the samples were performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	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. <u>LCS/BS</u>	Two LCSs (VLCS2 and VLCSQE) were analyzed with this SDG. All spiked compounds were recovered within the QC limits.	No qualifications were required.

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

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	C ↓ 5 ↓ 5 ↓ 5 ↓ 4 ↓	
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		B
75-35-4	1,1-Dichloroethene	5	U		
75-09-2	Methylene Chloride	20	B		B
75-15-0	Carbon Disulfide	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		
540-59-0	1,2-Dichloroethene (total)	10	U		
67-66-3	Chloroform	1	J		
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		

FORM I VOA

AMEC VALIDATED

LEVEL V

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

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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

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LEVEL V

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

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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: 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

14
LEVEL V



550 South Wadsworth Boulevard, Suite 500, Lakewood, CO 80026
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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>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.</p> <p>The samples were analyzed within 14 days of sample collection.</p>	All target compounds were qualified as estimated, "J" for detects and "UJ," for nondetects," in samples MJ047, MJ048, and MJ049.
4. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Surrogates</u>	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. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.
8. <u>Field QC Samples</u> ER: MJ056 ER: MJ059, MJ060 (MJ051 only) TB: None FB: MJ055 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. <u>Other</u>	All of the samples in this SDG were analyzed for added compounds chlorotrifluoroethene, 1,1,2-trichlorotrifluoroethane, and 2-chloroethyl vinyl ether. TICs were not provided with the samples in this SDG. Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory.	No qualifications were required.
<u>Comments</u>	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.

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	U	U.S	*1
75-71-8	Dichlorodifluoromethane	5 U	U	↓	L
74-87-3	Chloromethane	5 U	U	↓	↓
75-01-4	Vinyl Chloride	5 U	U	U.S	
74-83-9	Bromomethane	5 U	U	↓	
75-00-3	Chloroethane	5 U	U	↓	
75-69-4	Trichlorofluoromethane	5 U	U	↓	
76-13-1	1,1,2-Trichlorotrifluoroethane	5 U	U	↓	
67-64-1	Acetone	10 U	U	↓	
75-35-4	1,1-Dichloroethene	5 U	U	U.S	L
75-09-2	Methylene Chloride	5 U	U	↓	
156-60-5	trans-1,2-Dichloroethene	5 U	U	↓	
75-34-3	1,1-Dichloroethane	5 U	U	↓	
78-93-3	2-Butanone	10 U	U	↓	
156-59-2	cis-1,2-Dichloroethene	5 U	U	↓	
67-66-3	Chloroform	5 U	U	↓	
71-55-6	1,1,1-Trichloroethane	5 U	U	↓	
56-23-5	Carbon Tetrachloride	5 U	U	↓	
107-06-2	1,2-Dichloroethane	5 U	U	↓	
71-43-2	Benzene	5 U	U	↓	
79-01-6	Trichloroethene	5 U	U	↓	
110-75-8	2-Chloroethylvinyl ether	10 U	U	↓	
75-27-4	Bromodichloromethane	5 U	U	↓	
108-88-3	Toluene	5 U	U	↓	
10061-02-6	trans-1,3-Dichloropropene	5 U	U	↓	
79-00-5	1,1,2-Trichloroethane	5 U	U	↓	
127-18-4	Tetrachloroethene	5 U	U	↓	
108-90-7	Chlorobenzene	5 U	U	↓	
630-20-6	1,1,1,2-Tetrachloroethane	5 U	U	↓	
100-41-4	Ethylbenzene	5 U	U	↓	
1330-20-7	Xylenes (total)	15 U	U	↓	
75-25-2	Bromoform	5 U	U	↓	
79-34-5	1,1,2,2-Tetrachloroethane	5 U	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		US	X 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			

FORM I VOA

AMEC VALIDATED

LEVEL V¹²

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		US	*1
75-71-8	Dichlorodifluoromethane	5	U		US	L
74-87-3	Chloromethane	5	U		↓	↓
75-01-4	Vinyl Chloride	5	U		US	
74-83-9	Bromomethane	5	U		↓	
75-00-3	Chloroethane	5	U		↓	
75-69-4	Trichlorofluoromethane	5	U		↓	
76-13-1	1,1,2-Trichlorotrifluoroethane	5	U		↓	
67-64-1	Acetone	10	U		↓	
75-35-4	1,1-Dichloroethene	5	U		↓	
75-09-2	Methylene Chloride	5	U		US	L
156-60-5	trans-1,2-Dichloroethene	5	U		US	
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		↓	

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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			

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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		US	*1
75-71-8	Dichlorodifluoromethane	5	U		US	L
74-87-3	Chloromethane	5	U		↓	↓
75-01-4	Vinyl Chloride	5	U		↓	
74-83-9	Bromomethane	5	U		US	
75-00-3	Chloroethane	5	U		↓	
75-69-4	Trichlorofluoromethane	5	U		↓	
76-13-1	1,1,2-Trichlorotrifluoroethane	5	U		J	S
67-64-1	Acetone	2	J		↓	
75-35-4	1,1-Dichloroethene	5	U		US	
75-09-2	Methylene Chloride	5	U		↓	L
156-60-5	trans-1,2-Dichloroethene	5	U		US	
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		↓	

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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		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		

REV
QUAL QUAL CODE
US
*1
↓
↓

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-Trichlorotrifluoroethane	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			

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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			

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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		u	L
74-87-3	Chloromethane	5	U		↓	↓
75-01-4	Vinyl Chloride	5	U		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-Trichlorotrifluoroethane	5	U		↓	
67-64-1	Acetone	21				
75-35-4	1,1-Dichloroethene	5	U		u	
75-09-2	Methylene Chloride	5	U		u	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		↓	
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		↓	

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LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW SAMPLE NO.

MJC51

Lab Name: CEIMIC CORP

Contract: MW

Lab Code: CEIMIC

Case No.: BOEING

SAS No.: 020581

SDG No.: MJC47

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

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/L	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		

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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		uS	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-Trichlorotrifluoroethane	5	U			
67-64-1	Acetone	10	U		↓	
75-35-4	1,1-Dichloroethene	5	U			
75-09-2	Methylene Chloride	5	U		uS	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			

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LEVEL ²¹ 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: 020581-05

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					
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 22 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		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	UJ		
74-83-9	Bromomethane	5	U	↓		
75-00-3	Chloroethane	5	U	↓		
75-69-4	Trichlorofluoromethane	5	U	↓		
76-13-1	1,1,2-Trichlorotrifluoroethane	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	↓		

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LEVEL V

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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			US	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			↓	↓

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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	LODI
79-38-9	Chlorotrifluoroethene	5 U		u		
75-71-8	Dichlorodifluoromethane	5 U		u		
74-87-3	Chloromethane	5 U		u		L
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-Trichlorotrifluoroethane	5 U		↓		
67-64-1	Acetone	10 U		↓		
75-35-4	1,1-Dichloroethene	5 U		↓		
75-09-2	Methylene Chloride	5 U		u		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

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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				
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

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LEVEL V

FORM 1
VOLATILE ORGANICS ANALYSIS DATA SHEET

MW 6/14/2 SAMPLE NO.

MJ055 *FB*

Lab Name: CEIMIC CORP

Contract: MW

Lab Code: CEIMIC Case No.: BOEING SAS No.: 020581 SDG No.: MJ0:7

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
79-38-9	Chlorotrifluoroethene	5 U	REV QUAL QUAL GSDI u ↓ J 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	
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

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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	REF	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

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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 CODE
79-38-9	Chlorotrifluoroethene	5	U		u ↓ 5 2 ↓
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-Trichlorotrifluoroethane	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		
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

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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		↓	
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 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		REV QUAL	QUAL CODE
79-38-9	Chlorotrifluoroethene	5	U	u	
75-71-8	Dichlorodifluoromethane	5	U	u	L
74-87-3	Chloromethane	5	U	u	L
75-01-4	Vinyl Chloride	5	U	u	L
74-83-9	Bromomethane	5	U	u	
75-00-3	Chloroethane	5	U	u	
75-69-4	Trichlorofluoromethane	5	U	u	
76-13-1	1,1,2-Trichlorotrifluoroethane	5	U	u	
67-64-1	Acetone	4	J	u	S
75-35-4	1,1-Dichloroethene	5	U	u	
75-09-2	Methylene Chloride	5	U	u	L
156-60-5	trans-1,2-Dichloroethene	5	U	u	
75-34-3	1,1-Dichloroethane	5	U	u	
78-93-3	2-Butanone	10	U	u	
156-59-2	cis-1,2-Dichloroethene	5	U	u	
67-66-3	Chloroform	5	U	u	
71-55-6	1,1,1-Trichloroethane	5	U	u	
56-23-5	Carbon Tetrachloride	5	U	u	
107-06-2	1,2-Dichloroethane	5	U	u	
71-43-2	Benzene	5	U	u	
79-01-6	Trichloroethene	5	U	u	
110-75-8	2-Chloroethylvinyl ether	10	U	u	
75-27-4	Bromodichloromethane	5	U	u	
108-88-3	Toluene	5	U	u	
10061-02-6	trans-1,3-Dichloropropene	5	U	u	
79-00-5	1,1,2-Trichloroethane	5	U	u	
127-18-4	Tetrachloroethene	5	U	u	
108-90-7	Chlorobenzene	5	U	u	
630-20-6	1,1,1,2-Tetrachloroethane	5	U	u	
100-41-4	Ethylbenzene	5	U	u	
1330-20-7	Xylenes (total)	15	U	u	
75-25-2	Bromoform	5	U	u	
79-34-5	1,1,2,2-Tetrachloroethane	5	U	u	

FORM I VOA

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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				
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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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.</p> <p>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 $4 \pm 2^\circ\text{C}$.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	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. <u>LCS/BS</u>	One LCS (VLCSLG) was analyzed with this SDG. All spiked compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	Sample MJ093 was analyzed for a list of 41 target compounds. TICs were not provided with the sample in this SDG. Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory.	No qualifications were required.
<u>Comments</u>	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.

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		↓	
75-00-3	Chloroethane	5	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		↓	

FORM I VOA

AMEC VALIDATED

LEVEL V 12

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	↓	
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		

FORM I VOA

AMEC VALIDATED

LEVEL V ¹³



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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>The COC was signed by both field and laboratory personnel. No sample receipt information was recorded on the COC.</p> <p>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 $4 \pm 2^\circ\text{C}$.</p> <p>The analyses of the samples were performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.
8. <u>Field QC Samples</u> ER: None TB: None FB: None FD: None	Sample MJ059 was identified as a silicone blank on the COC. Sample MJ060 was identified as a tubing blank on the COC.	No qualifications were required.
9. <u>Other</u>	Samples MJ059 and MJ060 were initially analyzed for a list of 37 target compounds and was reanalyzed for the added compound 1,4-dioxane. TICs were not provided with the sample in this SDG. Compounds reported below the reporting limits were qualified as estimated, "J," by the laboratory.	No qualifications were required.
<u>Comments</u>	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.

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	C ↓ 5 ↓ 5 ↓ 5 ↓ 4 ↓	
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		B
75-35-4	1,1-Dichloroethene	5	U		
75-09-2	Methylene Chloride	20	B		B
75-15-0	Carbon Disulfide	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		
540-59-0	1,2-Dichloroethene (total)	10	U		
67-66-3	Chloroform	1	J		
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		

FORM I VOA

AMEC VALIDATED

LEVEL V

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			
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

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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: 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

14
LEVEL V



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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>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.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	All nondetect sample results were qualified as estimated, "UJ."
4. <u>Method Blanks</u>	One method blank was analyzed with this SDG. No target compounds were detected in the method blank.	No qualifications were required.
5. <u>LCS/BS</u>	One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	TICs were not provided with the sample in this SDG.	No qualifications were required.
<u>Comments</u>	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.

EPA 8260B - Volatile Organics

Client: Montgomery Watson
 Project: Boeing SSFL
 Job No.: 20674
 Matrix: Water
 Analyst: JTS/CP

Date Sampled: 06/10-12/02
 Date Received: 06/14/02
 Date Analyzed: 06/17/02
 Batch Number: M48260W749

Compounds	Sample ID: RL	Blank µg/L	MC047 µg/L	<i>rev</i> <i>qual</i>	<i>qual</i> <i>Code</i>
cis-1,3-Dichloropropene	0.5	ND	ND	<i>LS</i>	<i>*1</i>
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

EPA 8260B - Volatile Organics

Client: Montgomery Watson
 Project: Boeing SSFL
 Job No.: 20674
 Matrix: Water
 Analyst: JTS/CP

Date Sampled: 06/10-12/02
 Date Received: 06/14/02
 Date Analyzed: 06/17/02
 Batch Number: M48260W749

Compounds	Sample ID: RL	Blank µg/L	MC047 µg/L	<i>rel</i> <i>qual</i>	<i>qual</i> <i>Code</i>
Acetone	50	ND	ND	<i>UJ</i>	<i>*1</i>
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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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>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.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	One method blank was analyzed with this SDG. No target compounds were detected in the method blank.	No qualifications were required.
5. <u>LCS/BS</u>	One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	TICs were not provided with the sample in this SDG.	No qualifications were required.
<u>Comments</u>	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.



EPA 8260B - Volatile Organics

Client: Montgomery Watson
Project: Boeing SSFL
Job No.: 21172
Matrix: Water
Analyst: ZL

Date Sampled: 10/03/02
Date Received: 10/04/02
Date Analyzed: 10/04-07/02
Batch Number: MS48260W2893

Compounds	Sample ID: RL	Blank µg/L	MC093 µg/L	<i>rev</i> <i>qual</i>	<i>qual</i> <i>code</i>
Acetone	50	ND	ND		
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		



EPA 8260B - Volatile Organics

Client: Montgomery Watson
Project: Boeing SSFL
Job No.: 21172
Matrix: Water
Analyst: ZL

Date Sampled: 10/03/02
Date Received: 10/04/02
Date Analyzed: 10/04-07/02
Batch Number: MS48260W2893

Compounds	Sample ID: RL	Blank µg/L	MC093 µg/L	<i>red</i> <i>gub</i>	<i>gub</i> <i>cool</i>
cis-1,3-Dichloropropene	0.5	ND	ND	<i>u</i>	
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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DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ C. The COC matched the samples and accounted for the analysis. No custody seals were present on the coolers.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	Metals were not detected in the method blank associated with the samples in this SDG.	No qualifications were required.
5. <u>LCS/BS</u>	One aqueous LCS sample was analyzed with the samples. The recoveries were within the laboratory defined QC limits.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.
7. <u>MS/MSDs</u>	None.	No qualifications were required.
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.

	Findings	Qualifications
<u>10. Other</u>	None.	No qualifications were required.
<u>11. Field QC Samples</u> FB: MJ055 ER: MJ056	Metals were not detected in the field QC samples.	No qualifications were required.
<u>Comments</u>	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	<i>kw</i> <i>Goal</i>	<i>Goal</i> <i>kw</i>
Calcium	0618	82	5		
Magnesium	0618	20	5		
Potassium	0618	ND	5		
Sodium	0618	71	5	<i>u</i>	

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: *kw*

Approved by: *BP* 187

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	Dual Code
Calcium	0618	85	5		
Magnesium	0618	25	5		
Potassium	0618	ND	5		
Sodium	0618	80	5	U	

ND = Not Detected

AMEC VALIDATED

LEVEL V

Reported by: *fw*

Approved by: *BP* **188**

CEIMIC Corporation
 "Analytical Chemistry for Environmental Management"

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	<i>hw</i> Qual	<i>Qual</i> <i>code</i>
Calcium	0618	106	5		
Magnesium	0618	35	5		
Potassium	0618	ND	5		
Sodium	0618	76	5	<i>u</i>	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: *hw*

Approved by: *BP* 189

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	Rw Qual	Qual Code
Calcium	0618	57	5		
Magnesium	0618	32	5		
Potassium	0618	ND	5		
Sodium	0618	67	5	u	

ND = Not Detected

LEVEL V AMEC VALIDATED

Reported by: Kew

Approved by: BP **190**

CEIMIC Corporation
 "Analytical Chemistry for Environmental Management"

TOTAL METALS
 SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ052

Date Sampled: 06/11/02

Laboratory ID: 020581-06

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 Qual	Final Coll
Calcium	0618	140	5		
Magnesium	0618	46	5		
Potassium	0618	ND	5		
Sodium	0618	97	5	U	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: kw

Approved by: BP 191

**CEIMIC
Corporation**

"Analytical Chemistry for Environmental Management"

TOTAL METALS
SW846 METHOD 6010A

Client: Montgomery Watson

Client Sample ID: MJ053

Date Sampled: 06/11/02

Date Sample Received: 06/14/02

Matrix: Aqueous

Laboratory ID: 020581-07

Date Analysis Completed: 06/18/02

Concentration in: mg/L (ppm)

Target Analyte	Preparation Batch	Sample Concentration	Quantitation Limit	By Qual	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: *mp* **192**

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	Rw Qual	Lyal Code
Calcium	0618	77	5		
Magnesium	0618	24	5		
Potassium	0618	ND	5		
Sodium	0618	106	5	U	

ND = Not Detected

LEVEL V

AMEC VALIDATED

Reported by: KW

Approved by: BP **193**

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	kw Qual	Qual Coll
Calcium	0618	ND	5	4 ↓	
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 **194**



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: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ 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.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	Sodium was detected in the method blank at 67.800 μ .g/L.	No qualifications were required.
5. <u>LCS/BS</u>	One aqueous LCS sample was analyzed with the sample. The recoveries were within the control limits of 80-120%.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.

	Findings	Qualifications
7. <u>MS/MSDs</u>	None.	No qualifications were required.
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.
10. <u>Other</u>	None.	No qualifications were required.
11. <u>Field QC Samples</u> FB: MJ055 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.
<u>Comments</u>	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): $\mu\text{G/L}$

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): $\mu\text{G/L}$

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
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

Rev Qual
Qual Code

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: V¹
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. <u>Sample Management</u>	<p>The coolers were received within the temperature QC limits of $4^{\circ}\pm 2^{\circ}$ 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.</p> <p>The analysis was performed within the 6 month holding time for metals.</p>	No qualifications were required.
3. <u>Method Blanks</u>	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 $\mu\text{g/L}$, 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. <u>LCS/BS</u>	One solid LCS sample was analyzed with the sample. Boron and molybdenum were not spiked into the LCS.	No qualifications were required.
6. <u>Duplicates</u>	None.	No qualifications were required.
7. <u>MS/MSDs</u>	None.	No qualifications were required.

	Findings	Qualifications
9. <u>ICP Serial Dilution</u>	None.	No qualifications were required.
10. <u>Other</u>	None	No qualifications were required.
11. <u>Field QC Samples</u> FB: MJ055 (SDG MJ047) 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.
<u>Comments</u>	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.

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MJ093

Lab Name: Cemic Laboratories Contract: Rocketdyne
 Lab Code: CEMFC 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: 0.1

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

CAS No.	Analyte	Concentration	C	Q	M	Res 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	U	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	U	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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DATA ASSESSMENT FORM

Project Title: Rocketdyne SSFL RFI
Project Manager: D. Hambrick
Analysis/Method: Metals by Method ILM04
QC Level: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	One water method blank was analyzed with this SDG. There were no detects in the method blank.	No qualifications were required.
4. <u>LCS/BS</u>	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. <u>MS/MSDs</u>	No MS/MSD analyses were performed in association with the sample in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: MJ056 (SDG MJ047) FB: MJ055 (SDG MJ047) Field duplicates: none	There were no detects in MJ055 or MJ056.	No qualifications were required
8. <u>Other</u>	None	No qualifications were required.

	Findings	Qualifications
<u>Comments</u>	None	None

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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u>	Not performed.	No qualifications were required.
7. <u>MS/MSDs</u> MJ047 – perchlorate only	The RPD was less than 20% and the recoveries were within 75-125%.	No qualifications were required.
10. <u>Other</u>	None	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 FB: MJ055 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."
<u>Comments</u>	None	None

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1782003

**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	Fee 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: [Signature]

**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: [Signature]

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	Per 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: [Signature]

**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	Per 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: W

**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	Per 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: RL

**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	Per 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	Res 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: ML

**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	Raw 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: RL

**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	Res 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

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	Rw 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. P. Mink

Approved by: [Signature]

**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	Res 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. P. Mink

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	Pw 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. Perdue

Approved by: A

**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. Pa. Mink

Approved by: hr

**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	Res 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. P. Mink

Approved by: JK

**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	Pw 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. R. Munk

Approved by: [Signature]

**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	Res 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. Pommik

Approved by: AL

**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	Res 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. R. Mark

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	Re Qual	Prep 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. Perminic

Approved by: [Signature]

**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: 

**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: 

**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
Total Dissolved Solids	J	F	561	mg/L	10	06/18/02	06/19/02

AMEC VALIDATED

LEVEL V

Reported by: BP

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	Res 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: 

**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: [Signature]

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	Revised	Revised 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: [Signature]

**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	Res 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: [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	Raw 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 1

Reported by: BP

Approved by: [Signature]

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: PK

Approved by: 



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: V¹
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. <u>Sample Management</u>	Temperatures were within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	All recoveries were within the control limits of 87-110% for perchlorate and 80-120% for the remaining analyses.	No qualifications were required.
6. <u>Duplicates</u>	None performed.	No qualifications were required.
7. <u>MS/MSDs</u> MJ047 – perchlorate only	None performed.	No qualifications were required.

	Findings	Qualifications
10. Other	None	No qualifications were required.
11. Field QC Samples ER: MJ059, MJ060 FB: MJ055 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 Obs
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. Pankula

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: EW

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 Cods
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. P. MULL

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

ANEC 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: PC

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. B. MUK

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

ANEC 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: V¹
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. <u>Sample Management</u>	<p>Temperatures were within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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.</p> <p>Holding times were met, except for the seven day holding time for TDS.</p>	The TDS result for MJ093 was qualified "J."
3. <u>Method Blanks</u>	There were no detects in any of the method blanks.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u>	None performed.	No qualifications were required.

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

ANEC 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	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	Qual		Method Reporting Limit	Date Prep'd	Date Analyzed
			Per	Code			
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: ITL

ANISO 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	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	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: V¹
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. <u>Sample Management</u>	<p>Temperature upon receipt at Centrum Analytical Laboratories was above the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. 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.</p> <p>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.</p> <p>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.</p>	No qualifications were required.

	Findings	Qualifications
3. <u>Method Blanks</u>	Perchlorate, sulfate, and chloride were not detected in the method blanks. No alkalinity method blanks were analyzed.	No qualifications were required.
5. <u>LCS/BS</u>	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. <u>Duplicates</u> MC047 – chloride only	Duplicate analyses were performed for chloride only. The RPD was less than 20%.	No qualifications were required.
7. <u>MS/MSDs</u> 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. <u>Other</u>	No raw data was provided for any of the analyses in this SDG.	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 FB: MJ055 Field duplicates: none	There were no applicable detects in either of the field QC samples.	No qualifications were required.
<u>Comments</u>	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.



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

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

Attn.: Marilu Escher

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

Table with columns: Parameter, Result, Flag, Units, Dilution Factor, RL, Method, Analyzed, Worksheet #. Row 1: Perchlorate, ND, ug/L, 1, 3.0 EPA 314, 6/24/2002 dc, WS35335.

Authorized Signature (handwritten signature)

Flags for Data Qualifiers:

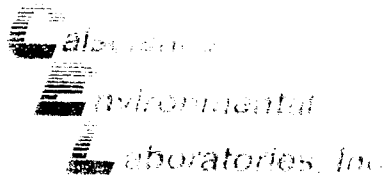
- B = Compound detected in the blank. Sample result equal or less than 10 times the concentration in the blank.
J = Analyte was detected. However, the analyte concentration is an estimated value, which is between the Method Detection Limit (MDL) and the Practical Quantitation Limit (PQL).
H = Estimated 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.

ELAP # 1132
LACSD # 10143

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



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

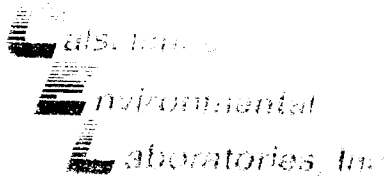
Page 1 of 1

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	0614AIKDP1

Parameter	Result	RL	DF	Qual	Units	Rev Qual	Qual Code
Alkalinity Total (as CaCO ₃)	250	5.0	1		mg/L	J	L

ANEC VALIDATED

LEVEL V



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

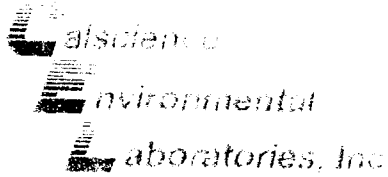
Page 1 of 1

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	0614AikDP1				
<u>Parameter:</u>	<u>Result:</u>	<u>RL:</u>	<u>DF:</u>	<u>Qual:</u>	<u>Units:</u>	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"><u>Rev Qual</u></td> <td style="width: 50%;"><u>Qual Code</u></td> </tr> <tr> <td>J</td> <td>L</td> </tr> </table>	<u>Rev Qual</u>	<u>Qual Code</u>	J	L
<u>Rev Qual</u>	<u>Qual Code</u>									
J	L									
Bicarbonate (as CaCO ₃)	250	50	1		mg/L					

AMEC VALIDATED

LEVEL V

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers



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

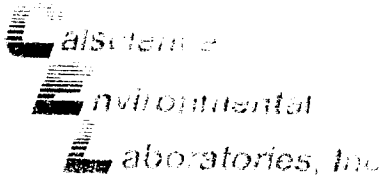
Project: 20674 / Boeing SSFL

Page 1 of 1

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	0614AIkDP1
<u>Parameter:</u>	<u>Result</u>	<u>RI</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Raw Qual</u> <u>Qual Code</u>
Carbonate	ND	1.0	1		mg/L	UJ L

AMEC VALIDATED

LEVEL V



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

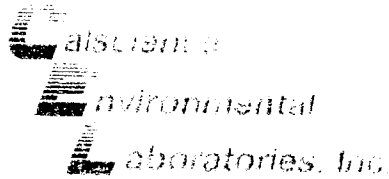
Client Sample Number	Lab Sample Number	Matrix	Date Collected	Date Prepared	Date Analyzed	QC Batch ID
MC047	02-06-0556-1	Aqueous	06/10/02	N/A	06/17/02	0617CICMB1
<u>Parameter</u>	<u>Result</u>	<u>R:</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Rev Qual</u> <u>Qual Code</u>
Chloride	47	2	1		mg/L	J L
Method Blank	099-05-057-1,078	Aqueous	N/A	N/A	06/17/02	0617CICMB1
<u>Parameter</u>	<u>Result</u>	<u>R:</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	
Chloride	ND	2	1		mg/L	*

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10/10/02

RL - Reporting Limit DF - Dilution Factor Qual - Qualifiers

Analysis Not Validated



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

Page 1 of 1

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
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Per Qual</u> <u>Qual Code</u>
Sulfate	150	10	5	0	mg/L	
Method Blank	099-05-091-1,086	Aqueous	N/A	N/A	06/16/02	0616SO4MB1
<u>Parameter</u>	<u>Result</u>	<u>RL</u>	<u>DF</u>	<u>Qual</u>	<u>Units</u>	<u>Per Qual</u> <u>Qual Code</u>
Sulfate	ND	2.0	1		mg/L	*

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LEVEL V

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: V¹
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. <u>Sample Management</u>	<p>Temperature upon receipt at Centrum Analytical Laboratories was within the QC limits of $4^{\circ}\pm 2^{\circ}\text{C}$. All analyses were subcontracted to Calscience Environmental Laboratories.</p> <p>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.</p> <p>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.</p>	No qualifications were required.
3. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u> MC047 – TDS only	Duplicate analyses were performed for TDS only. The RPD was less than 20%.	No qualifications were required.
7. <u>MS/MSDs</u> None	None.	No qualifications were required.
10. <u>Other</u>	Raw data was provided only for TDS.	No qualifications were required.
11. <u>Field QC Samples</u> ER: MJ056 (SDG MJ047) FB: MJ055 (SDG MJ047) Field duplicates: none	TDS was reported in MJ056 at 914 mg/L.	TDS was estimated , "J," in MC093.
<u>Comments</u>	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.
 1401 Research Park Drive
 Suite 100
 Riverside, CA 92507-2111

Date Sampled: 10/03/02
 Date Received: 10/04/02
 Date Analyzed: 10/08/02

Attn: Marilu Escher
 RE: Boeing SSFL/21172

Work Order No.: 02-10-0288
 Method: EPA 314.0
 Page 1 of 1

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

<u>Sample Number</u>	<u>Perchlorate Concentration</u>	<u>Reporting Limit</u>	<u>Raw Qual</u>	<u>Qual Code</u>
MC093	ND	2.0	U	
Method Blank	ND	2.0	*	

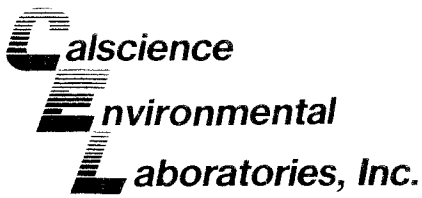
Analysis Not Validated

AMEC VALIDATED

Line 10/08/02 V

ND denotes not detected at indicated reportable limit.

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



ANALYTICAL REPORT

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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

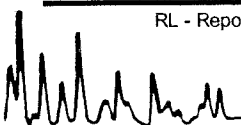
Parameter	Result	RL	DF	Qual	Units	Rev Qual	Qual Code
Alkalinity, Total (as CaCO3)	290	5.0	1		mg/L	J	L

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

Date Received: 10/04/02
Work Order No: 02-10-0288
Preparation: N/A
Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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	Res Qual	Qual Code
Bicarbonate (as CaCO ₃)	290	5.0	1		mg/L	J	L

AMEC VALIDATED

LEVEL V

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

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: SM 2320B

Project: Boeing SSFL/21172

Page 1 of 1

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 V. [unclear]

LEVEL V

ANALYTICAL REPORT

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

Date Received: 10/04/02
 Work Order No: 02-10-0288
 Preparation: N/A
 Method: EPA 300.0

Project: Boeing SSFL/21172

Page 1 of 1

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	Result	RL	DF	Qual	Units	Parameter	Result	RL	DF	Qual	Units
Chloride	35	20	20		mg/L	Sulfate	130	20	20		mg/L

Method Blank	Lab Sample Number	Date Collected	Matrix	Date Prepared	Date Analyzed	QC Batch ID
	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	ND	1.0	1		mg/L	Sulfate	ND	1.0	1		mg/L

Analysis Not Validated

ANEC VALIDATED

LEVEL V

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



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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u> 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. <u>Field QC Samples</u> ER: ME056 FB: ME055 Field duplicates: none	There were no detects in ME055 or ME056.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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.

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	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		
				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		
				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		

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA	Raw 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
07/23/02				Gross Beta	3.66 ± 1.4	pCi/L	1.93		
07/18/02				K 40 (G)	U	pCi/L	261		
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		

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Report Date <u>08/08/02</u>
Page 2

Eberline Services

ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	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	07/23/02	GrossAlpha	-0.555 ± 1.2	pCi/L	2.51	C C C ↓	
					Gross Beta	-0.143 ± 1.6	pCi/L	2.78		
					07/30/02	K 40 (G)	U	pCi/L		148
					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	07/23/02	GrossAlpha	1.78 ± 2.0	pCi/L	2.69	C	
					Gross Beta	3.30 ± 1.4	pCi/L	2.09		

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LEVEL V

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ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	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		
			07/30/02	K 40 (G)	U	pCi/L	95.8		
			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		

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LEVEL V

Certified by <u><i>M. Smith</i></u>
Report Date <u>08/08/02</u>
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Eberline Services

ANALYSIS RESULTS

SDG <u>8458</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206045-01</u>	Contract _____
Received Date <u>06/14/02</u>	Matrix <u>WATER</u>

Client	Lab	Sample ID	Collected	Analyzed	Nuclide	Results ± 2σ	Units	MDA	Rev Qual	Qual Code
MEOS6				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

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Report Date <u>08/08/02</u>
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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	Three water method blanks, one for gross alpha (E299DIAC), 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. <u>LCS/BS</u>	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. <u>Duplicates</u> 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 $\pm 2\sigma$.	No qualifications were required.
7. <u>Field QC Samples</u> ER: ME056 (SDG 8458) FB: ME055 (SDG 8458) Field duplicates: none	There were no detects in ME055 or ME056.	No qualifications were required
8. <u>Other</u>	None.	No qualifications were required.
<u>Comments</u>	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
 Lot-Sample No.: JZF180183-1
 Client Sample ID: MS047

SDG: 20380
 Report No.: 19857
 COC No.:

Collection Date: 6/10/2002 10:48:00 AM
 Received Date: 6/14/2002 11:00:00 AM
 Matrix: WATER

Ordered by Client Sample ID, Batch No.

Parameter	Result	Qual	Count Error (2 s)	Total Uncert(2 s)	MDC MDA, Action Lev	Rpt Unit, Lc	Yield CRDL(RL)	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 (2.8)	6/21/02 01:52 p	0.098	L	RICHRC5014 GPC10A
Batch: 2170276	Work Order: E273C1AC Report DB ID: 9E273C10											
BETA	6.82	U	2.0	2.2	3.29	pCi/L	100.00%	(2.1) (6.3)	6/21/02 01:42 p	0.1983	L	RICHRC5014 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 (0.87)	6/22/02 05:39 a		0.6	L	RICHRC5017 GER1\$1
CS-137	2.12	U	7.8 U	7.8	14.6	pCi/L	0.14 (0.54)	6/22/02 05:39 a		0.6	L	RICHRC5017 GER1\$1

Number of Results: 4

Comments:

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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u>	No duplicate analyses were performed in association with the samples in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: ME059, ME060 FB: ME055 (SDG 8458) Field duplicates: none	There were no detects in any of the field QC samples.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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 <u>8462</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206078-01</u>	Contract <u>JOB #1890607.0114</u>
Received Date <u>06/21/02</u>	Matrix <u>WATER</u>

Client	Lab	Sample ID	Collected	Analyzed	Nuclide	Results ± Zσ	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	U	
				Gross Beta	4.23 ± 1.7	pci/L	2.46			
				K40 (G)	234 ± 110	pci/L	71.3			
				Co57 (G)	U	pci/L	4.68			
				Co60 (G)	U	pci/L	7.22			
				Cs134 (G)	U	pci/L	7.21			
				Cs137 (G)	U	pci/L	7.01			
				Tl208 (G)	U	pci/L	11.0			
				Pb210 (G)	U	pci/L	1330			
				Bi212 (G)	U	pci/L	52.3			
				Pb212 (G)	U	pci/L	12.6			
				Bi214 (G)	U	pci/L	13.7			
				Pb214 (G)	U	pci/L	12.6			
				Ra226 (G)	U	pci/L	98.7			
				Ac228 (G)	U	pci/L	31.5			
				Th234 (G)	U	pci/L	192			
				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	U	
				Gross Beta	-0.028 ± 1.1	pci/L	1.87			
				K40 (G)	U	pci/L	148			
				Co57 (G)	U	pci/L	5.34			
				Co60 (G)	U	pci/L	7.96			
				Cs134 (G)	U	pci/L	8.42			
				Cs137 (G)	U	pci/L	7.19			
				Tl208 (G)	U	pci/L	7.57			
				Pb210 (G)	U	pci/L	1420			
				Bi212 (G)	U	pci/L	53.9			
				Pb212 (G)	U	pci/L	10.3			
				Bi214 (G)	U	pci/L	14.3			
				Pb214 (G)	U	pci/L	13.3			
				Ra226 (G)	U	pci/L	118			
				Ac228 (G)	U	pci/L	33.0			
				Th234 (G)	U	pci/L	235			
				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	U	
				Gross Beta	-0.722 ± 1.3	pci/L	2.24			

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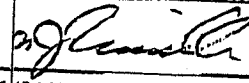
Eberline Services
ANALYSIS RESULTS

SDG <u>8462</u>	Client <u>MWH PASADENA</u>
Work Order <u>R206078-01</u>	Contract <u>JOB #1890607.0114</u>
Received Date <u>06/21/02</u>	Matrix <u>WATER</u>

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	Cs57 (G)	U	pCi/L	5.50		
			07/19/02	Cs60 (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	64.8		

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Report Date <u>01/06/03</u>
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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: V¹
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. <u>Sample Management</u>	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. <u>Method Blanks</u>	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. <u>LCS/BS</u>	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. <u>Duplicates</u>	No duplicate analyses were performed in association with the sample in this SDG.	No qualifications were required.
7. <u>Field QC Samples</u> ER: none FB: none Field duplicates: none	There were no field QC samples associated with ME093.	No qualifications were required
8. <u>Other</u>	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."
<u>Comments</u>	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 <u>8494</u>	Client <u>MWH PASADENA</u>
Work Order <u>R210047-01</u>	Contract <u>1890607.0114</u>
Received Date <u>10/09/02</u>	Matrix <u>WATER</u>

Client	Lab	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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DATA ASSESSMENT FORM

Project Title: Rocketdyne, SSFL RFI Program
Project Manager: D. Hambrick
Analysis/Method: Volatiles by Method 8260B
QC Level: V¹
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. <u>Sample Management</u>	<p>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.</p> <p>The analysis of the sample was performed within 14 days of sample collection.</p>	No qualifications were required.
4. <u>Method Blanks</u>	One method blank was analyzed with this SDG. No target compounds were detected in the method blank.	No qualifications were required.
5. <u>LCS/BS</u>	One LCS/LCSD pair was analyzed with this SDG. Spike compounds were recovered within the QC limits.	No qualifications were required.
6. <u>Surrogates</u>	All surrogate recoveries were within the laboratory-established QC limits.	No qualifications were required.
7. <u>MS/MSDs</u>	No MS/MSD analyses were associated with this SDG.	No qualifications were required.

	Findings	Qualifications
8. <u>Field QC Samples</u> ER: MJ056 TB: None FB: MJ055 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. <u>Other</u>	TICs were not provided with the sample in this SDG.	No qualifications were required.
<u>Comments</u>	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.



EPA 8260B - Volatile Organics

Client: Montgomery Watson
Project: Boeing SSFL
Job No.: 21172
Matrix: Water
Analyst: ZL

Date Sampled: 10/03/02
Date Received: 10/04/02
Date Analyzed: 10/04-07/02
Batch Number: MS48260W2893

Compounds	Sample ID: RL	Blank µg/L	MC093 µg/L	<i>rev</i> <i>qual</i>	<i>qual</i> <i>code</i>
Acetone	50	ND	ND		
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		



EPA 8260B - Volatile Organics

Client: Montgomery Watson
Project: Boeing SSFL
Job No.: 21172
Matrix: Water
Analyst: ZL

Date Sampled: 10/03/02
Date Received: 10/04/02
Date Analyzed: 10/04-07/02
Batch Number: MS48260W2893

Compounds	Sample ID: RL	Blank µg/L	MC093 µg/L	<i>red</i> <i>gub</i>	<i>gub</i> <i>cool</i>
cis-1,3-Dichloropropene	0.5	ND	ND	<i>u</i>	
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