

#### **Technical Memorandum**

August 17, 2016

DOE Area IV Spring 2016 Seep Probe Sampling Results

This memorandum documents the results of sampling seep monitoring probes conducted by CDM Smith for DOE from April 4 to April 20, 2016. Ten samples (eight primary and two duplicates) were collected from three seep well clusters located down gradient of Area IV, as shown in Figure 1. Two of the seep probe clusters (SP-424 and SP-19) are located on Brandeis property and one seep probe cluster (SP-TO2) is located in the NBZ. Seep probe cluster SP-900 located on Brandeis property was dry and was not sampled. Table 1 provides the description details for these seep probes.

#### **Seep Probe Cluster Observations**

A total of twelve seep probes were visited during this event. Four of the seep probes were dry and unable to provide groundwater samples. These included all of the SP-900 cluster (A, B, and C) and one of the T-02 wells (A). Notably, all three of the SP-424 wells had artisan conditions with water flowing at the surface. Water was also observed seeping from the ground surrounding this well cluster. Stainless steel well coverings had been secured with wire cable and key locks. At many of the well locations, these key locks were rusted and unable to open. Lock lubricant and/or a different, secure lock set-up are recommended the future to provide for easier probe access.

#### **Seep Probe Groundwater Sampling**

Seep probes were purged and groundwater samples were obtained using a ¼-inch polyethylene tubing either attached to a peristaltic pump, or inserted into well casing for artesian probes (i.e., static water level was above ground surface and groundwater was flowing out of the well). If the seep well was purged dry before sampling occurred, the well was allowed to recover and sampled four days later. The purge water was monitored using an YSI sonde meter for field parameters (temperature, specific conductance, pH, turbidity, and ORP). Samples were obtained once these parameters stabilized. Table 2 provides the purge water quality results.

Samples submitted for volatile organic compounds (VOC) analysis were collected into 40-mL glass vials with Teflon caps. All other samples were collected in 250 mL amber glass containers and 250 mL poly containers. Water samples were submitted to Eurofins Lancaster Labs in Lancaster, PA for VOC and other chemical analyses as shown in Table 1. Samples for radionuclide analysis were sent to Pace Analytical in Greensburg, PA.

Table 3 provides the chemical results and Table 4 the radionuclide results. Total Dissolved Solids (TDS), Total Suspended Solids (TSS), Potassium 40, and Strontium 90 were analyzed at all seeps well locations except the SP-TO2 cluster due to insufficient water. Samples were submitted for TPH-GRO and 1,4 Dioxane instead of VOCs for the SP-19 wells (A and B).

#### **Data Quality Assessment**

A data validation review was performed on the dataset. Quality assurance (QA) objectives for data are expressed in terms of measurement performance data quality indicators, precision, accuracy, representativeness, comparability, completeness, and sensitivity (PARCCS). QA objectives provide a mechanism for ongoing quality control (QC) and evaluating and measuring data quality throughout the project. These QA objectives are outlined in the Site Wide QAPP (Haley & Aldrich 2010; Appendix B).

The data review was conducted to demonstrate that the measurement performance criteria established in the QAPP had been met. In general, the following data measurement objectives were considered:

- Appropriate laboratory analytical QC requirements were followed and achieved
- Required measurement performance criteria for data quality indicators (PARCCS) were met
- Adherence to sampling and sample handling procedures
- Adherence to the sampling design and deviations documented on field change notifications

Data verification, data validation and data assessment were used to verify adherence to the QAPP procedures and requirements. These assessments were used to reconcile the planned objectives detailed in the QAPP against the investigation results. The outputs serve to verify that the collected data are of sufficient quality to support their intended use.

The data were provided in seven data packages for chemical analyses and four data packages for radionuclides. All data were validated at Level 4 criteria by Laboratory Data Consultants, Inc., Carlsbad, California.

Two field duplicates and matrix spike/matrix spike duplicate (MS/MSD) samples were collected as part of this effort. The laboratories performed field duplicate and MS/MSD analyses as required by the methods.

The Level 4 validation was performed using the following documents:

- Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1, December 2010
- Multi Agency Radiological Laboratory Analytical Protocols, July 2004
- USEPA Contract Laboratory Program National Functional Guidelines, CLP NFG, for Superfund Organic Methods Data Review, June 2008
- USEPA Contract Laboratory Program National Functional Guidelines, CLP NFG, for Inorganic Superfund Data Review, January 2010

■ EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; Update IV, February 2007; and update V July 2014

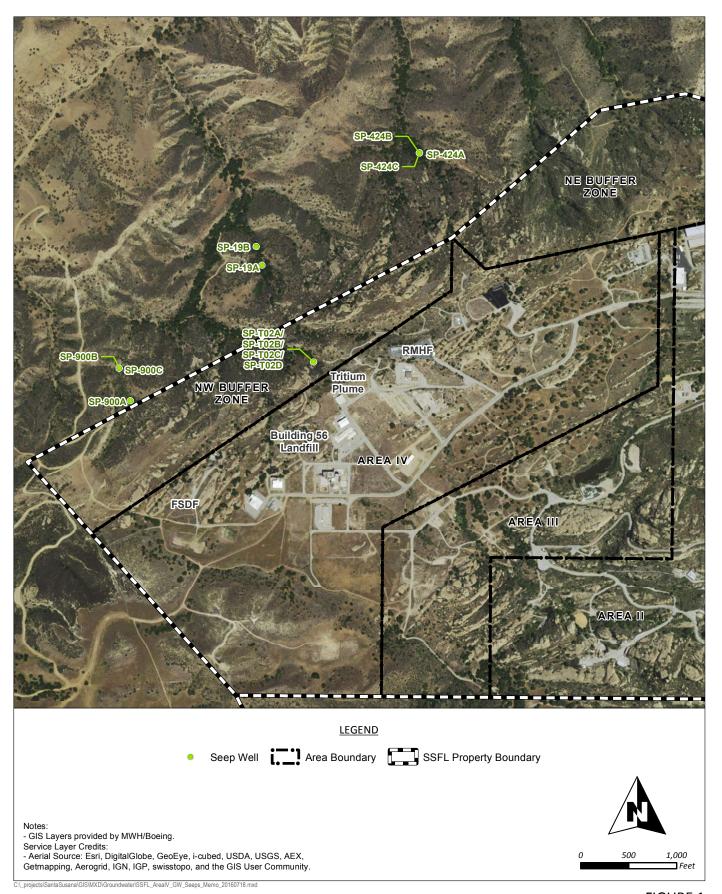
Data validation reports for the 11 data packages are provided in Appendix A. Specific details of the validation are provided within these reports. In summary, some analytes were qualified as estimated (J/UJ), nondetect (U) or rejected (R) based on validation criteria. Below is a summary of the qualifications:

- Applicable results for some VOC analytes were qualified as estimated based on initial calibration results. Nondetect results for 2-chloroethyl vinyl ether were rejected.
- The nondetect 2-chloroethyl vinyl ether result for one matrix spike sample was rejected based on low matrix spike recovery.
- Applicable strontium results were qualified as estimated based on inductively coupled plasma interference and serial dilution analyses.
- Some aluminum, chromium, cobalt and copper results were qualified as nondetect based on blank criteria.
- Applicable uranium-235 results were qualified as nondetect based on blank criteria.
- Applicable uranium-232 results were qualified as estimated based on tracer recovery criteria

In summary, all of the validated data are suitable for their intended use for site characterization except for two 2-chloroethyl vinyl ether results which were rejected. Sample results that were qualified as estimated are usable for project decisions.

#### **Conclusions**

Seep sampling was conducted according to the planning objectives. Some seep sample locations were dry and were not able to be sampled. Data quality was met for all analytes except two 2-chloroethyl vinyl ether results which are not usable for project purposes. Completeness goals for the number of samples to be collected was met for seep locations that contained water and for the number of results that are usable for project goals.





**Table 1. Seep Probe Details and Spring 2016 Laboratory Analyses** 

Probe ID	Seep Probe Location	Probe Total Depth (ft. bgs)	Screen Interval (ft bgs)	Measured Depth to Water (ft bgs)	Sample Number	Laboratory Analyses
SP-TO2A		9.48	7.5-9.48	Dry	No water for sample	Not Sampled
SP-TO2B	NBZ - Area IV	12.42	10-12.42	7.1	SP-T02B_041216_01_L	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900
SP-TO2C	North of Tritium Plume	24.3	19-24.3	7.27	SP-T02C_041216_01_L	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900
SP-T02D		35.18	30-35	7.47	SP-424A_041416_01_L SP-T02D_040616_36_L Duplicate	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900
SP-424A	North of NBZ	8.8	3.3-8.8	Above Ground Surface	SP-424A_041416_01_L SP-424A_041416_36_L Duplicate	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900, Perchlorate EPA 314, Mercury EPA 7471, Metals EPA 6010, Metals EPA 6020, 1,4 Dioxane EPA 8279, Flouride EPA 300
SP-424B	and SRE Area (Brandeis Property)	16.9	15-16.9	Above Ground Surface	SP-424B_041316_01_L	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900, Perchlorate EPA 314, Mercury EPA 7471, Metals EPA 6010, Metals EPA 6020, 1,4 Dioxane EPA 8279, Flouride EPA 300
SP-424C		19.6	16.6-19.6	Above Ground Surface	SP-424C_041316_01_L	VOCs EPA 8260B, Tritium EPA 906, Radionuclides EPA 900, Perchlorate EPA 314, Mercury EPA 7471, Metals EPA 6010, Metals EPA 6020, 1,4 Dioxane EPA 8279, Flouride EPA 300
SP-19A	North of NBZ and Tritium	10	7-10	7.05	SP-424A_041416_01_L	TPH-GRO EPA 8015, 1,4 Dioxane 8260 SIM, Tritium EPA 906, Radionuclides EPA 900, Perchlorate EPA 314, Mercury EPA 7471, Metals EPA 6010, Metals EPA 6020, 1,4 Dioxane EPA 8279, Flouride EPA 300
SP-19B	Plume Area (Brandeis Property)	18.83	16-18.8	8.65	SP-19B_041916_01_L	TPH-GRO EPA 8015, 1,4 Dioxane 8260 SIM, Tritium EPA 906, Radionuclides EPA 900, Perchlorate EPA 314, Mercury EPA 7471, Metals EPA 6010, Metals EPA 6020, 1,4 Dioxane EPA 8279, Flouride EPA 300
SP-900A	North of NBZ	10	3.74-10	Dry	No water for sample	Not Sampled
SP-900B	and FSDF Area	18.41	16-18.41	Dry	No water for sample	Not Sampled
SP-900C	(Brandeis	30.13	26.5-30.0	Dry	No water for sample	Not Sampled

NBZ - northern Buffer Zone

FSDF - Former Sodium Disposal Facility

SRE - Sodium Reactor Experiment

**Table 2. Seep Probe Purge Water Quality Data** 

	p i i obc i u		Cumulative		Specific					
Seep Probe ID	Date	Time	Volume (m/L)	Temperature (°C)	Conductance (μS/cm)	рН	Turbidity (NTUs)	ORP	PID (ppm)	Comments
SP-TO2A	4/8/2016								0.0	Dry.
SP-TO2B	4/8/2016	9:35							0.0	Dry.
	4/12/2016	14:00	350						0.0	Sample collected
SP-TO2C	4/8/2016	10:00		15.5	1089	6.16		-107	0.0	
		10:03							0.0	Probe purged dry, no parameters due to lack of water
	4/12/2016	14:30	1000						0.0	Sample collected
SP-TO2D	4/6/2016	10:25	25	19.6	1079	6.69	22.7	79	0.1	Water pumped at about 5 mL/min.
		10:30	50	18.4	1079	6.69	16.3	73	0.1	Slight organic odor noticed during pumping
		10:35	75	18.2	1077	6.72	5.18	69	0.1	
		10:40	100	17.9	1078	6.73	4.85	68	0.1	
		10:45	125	17.8	1078	6.75	4.21	66	0.1	
		10:50	150						0.1	Sample collected
SP-424A	4/14/2016	10:15	250	16.9	910.0	8.71	11.4		0.1	Artesian flow conditions, pumping at about 100 mL/min.
		10:20	700	16.6	892.6	8.37	1.48		0.1	ORP meter would not calibrate
		10:25	1200	16.6	891.3	8.22	0.72		0.2	
		10:30	1500						0.0	Sample collected
SP-424B	4/13/2016	11:10	240	17.5	925.2	8.90	3.60		0.1	Artesian flow conditions, pumping at about 75 mL/min.
		11:15	490	17.2	889.5	8.44	0.44		0.1	ORP meter would not calibrate
		11:20	738						0.1	Sampled collected
SP-424C	4/13/2016	11:45	250	17.3	881.1	8.21	35.5		0.1	Artesian flow conditions, pumping at about 70 mL/min.
		11:50	500	17.4	885.1	8.03	1.21		0.1	ORP meter would not calibrate
		11:55	800	17.4	885.0	7.94	0.36		0.1	
		12:00	1000							Sample collected
SP-19A	4/19/2016	8:48	20	17.9	1159	7.63	53.6		0.1	
		8:49	40	16.7	1175	7.62	18.0		0.0	ORP meter would not calibrate
		8:50	60	17.5	1197	7.53	3.96		0.3	Sample collected
SP-19B	4/19/2016	7:18	15	17.1	2050	8.53	4.98		0.2	
		7:31	45	16.7	2100	7.28	0.83		0.1	ORP meter would not calibrate
		7:41	80	20.0	2103	7.16	2.60		0.1	Organic odor during pumping
		7:48	120	18.4	2103	7.02	1.08		0.1	
		7:56	150	16.6	2105	6.89	1.36		0.1	
		8:00	180						0.1	Sample collected
SP-900A	4/7/2016	14:18							0.0	Went dry after pumping for 30 seconds.
SP-900B	4/7/2016	11:05							0.0	Dry.
SP-900C	4/7/2016	13:05							0.0	Dry.

		Seep	Probe	SP-19A	SP-19B	SP-424A	SP-424A	SP-424B
		Campla	Nama	SP-	SP-	SP-	SP-	SP-
		Sample		4/19/2016	4/19/2016	4/14/2016	424A_041416_36_ 4/14/2016	4/13/2016
		Sample		N	N	N	FD	N
Method	Chemical Name	Fraction	Unit	Result	Result	Result	Result	Result
E300.0	Fluoride		mg/L	1.1	0.75	1.9	2	2.3
SW6010C	Aluminum		mg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
SW6010C SW6010C	Aluminum Antimony		mg/L mg/L	0.393 J 0.04 U	0.4 U 0.04 U	0.4 U 0.04 U	0.113 U 0.04 U	0.4 U 0.04 U
SW6010C	Antimony		mg/L	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Arsenic		mg/L	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Arsenic		mg/L	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Barium		mg/L	0.036	0.0388	0.0319	0.0323	0.0406
SW6010C	Barium		mg/L	0.0387	0.0405	0.0319	0.0336	0.0458
SW6010C	Beryllium Beryllium		mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
SW6010C SW6010C	Boron		mg/L mg/L	0.01 U 0.123	0.01 U 0.074 J	0.01 U 0.0659 J	0.01 U 0.0668 J	0.01 U 0.0669 J
SW6010C	Boron		mg/L	0.119	0.074 J	0.0627 J	0.0006 J	0.0664 J
SW6010C	Cadmium		mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
SW6010C	Cadmium	T I	mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
SW6010C	Calcium		mg/L	208	97.1	85.2	86	82.8
SW6010C	Calcium		mg/L	215	98.8	82.6	82.7	83.9
SW6010C SW6010C	Chromium Chromium		mg/L	0.0025 J 0.0048 U	0.03 U	0.0021 J 0.0023 U	0.03 U 0.0025 U	0.002 J
SW6010C SW6010C	Cobalt		mg/L mg/L	0.0048 U 0.01 U	0.0024 U 0.01 U	0.0023 U 0.01 U	0.0025 U 0.01 U	0.0021 U 0.01 U
SW6010C	Cobalt		mg/L	0.00095 U	0.01 U	0.01 U	0.01 U	0.01 U
SW6010C	Copper		mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SW6010C	Copper		mg/L	0.0079 U	0.02 U	0.0033 U	0.02 U	0.0042 U
SW6010C	Iron		mg/L	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
SW6010C	Iron		mg/L	0.709	0.229 J	0.0717 J	0.0456 J	0.17 J
SW6010C SW6010C	Lead Lead		mg/L mg/L	0.03 U 0.03 U	0.03 U 0.03 U	0.03 U 0.03 U	0.03 U 0.03 U	0.03 U 0.03 U
SW6010C	Lithium		mg/L	0.119	0.0823	0.0508	0.0508	0.0483
SW6010C	Lithium		mg/L	0.124	0.0873	0.051	0.0532	0.0522
SW6010C	Magnesium	D I	mg/L	74	30.4	23.8	24.1	22.8
SW6010C	Magnesium		mg/L	73.5	30.8	23.7	24.7	23.9
SW6010C	Manganese		mg/L	0.0212	0.0259	0.234	0.239	0.281
SW6010C SW6010C	Manganese Molybdenum		mg/L	0.03 0.02 U	0.0281 0.02 U	0.23 0.02 U	0.242 0.02 U	0.367 0.0021 J
SW6010C	Molybdenum		mg/L mg/L	0.02 U	0.02 U	0.002 J	0.02 U	0.0021 J
SW6010C	Nickel		mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SW6010C	Nickel		mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SW6010C	Phosphorus		mg/L	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
SW6010C	Phosphorus		mg/L			0.2 U	0.2 U	0.2 U
SW6010C SW6010C	Potassium Potassium		mg/L mg/L	4.64 4.54	2.91 2.82	3.34 3.25	3.39 3.36	3.29 3.22
SW6010C	Sodium		mg/L	184	160	83.6	85	87.3
SW60100	Sodium		mg/L	189	164	80.5	82.7	84
SW6010C	Tin		mg/L	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Tin		mg/L	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Titanium		mg/L	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
SW6010C SW6010C	Titanium Vanadium		mg/L mg/L	0.032 0.01 U	0.0052 J 0.01 U	0.0058 J 0.01 U	0.0059 J 0.01 U	0.0066 J 0.01 U
SW6010C SW6010C	Vanadium		mg/L mg/L	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
SW6010C	Zinc		mg/L	0.0053 J	0.04 U	0.04 U	0.01 U	0.01 U
SW6010C	Zinc		mg/L	0.0114 J	0.04 U	0.04 U	0.04 U	0.04 U
SW6010C	Zirconium		mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SW6010C	Zirconium		mg/L	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
SW6020A SW6020A	Selenium Selenium		mg/L mg/L	0.004 U 0.0015 J	0.004 U 0.004 U	0.004 U 0.004 U	0.004 U 0.004 U	0.004 U 0.004 U
SW6020A SW6020A	Silver		mg/L mg/L	0.0015 J 0.001 U	0.004 U 0.001 U	0.004 U 0.001 U	0.004 U 0.001 U	0.004 U 0.001 U
SW6020A	Silver		mg/L	0.0001 J	0.001 U	0.001 U	0.001 U	0.001 U
SW6020A	Strontium	D I	mg/L	1.77 J	0.781 J	0.436 J	0.415 J	0.403 J
SW6020A	Strontium		mg/L	1.62 J	0.789 J	0.419 J	0.41 J	0.428 J
SW6020A	Thallium		mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
SW6020A	Thallium		mg/L	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
SW6850 SW7470A	Perchlorate Mercury		ug/L mg/L	1 U 0.0002 U	1 U 0.0002 U	1 U 0.0002 U	1 U 0.0002 U	1 U 0.0002 U
SW7470A	Mercury		mg/L	0.0002 U	0.0002 U	0.0002 U	0.0002 U	0.0002 U
SW8015B	Gasoline Range Organics (C5-C12)		ug/L	50 U	50 U			
SW8260B	1,1,1,2-Tetrachloroethane		ug/L			1 U	1 U	1 U
SW8260B	1,1,1-Trichloroethane	N t	ug/L			1 U	1 U	1 U

		Seep P	Probe	SP-19A	SP-19B	SP-424A	SP-424A	SP-424B
		осор .	.020	SP-	SP-	SP-	SP-	SP-
		•			19B_041916_01_L			
		Sample		4/19/2016	4/19/2016	4/14/2016	4/14/2016	4/13/2016
CMOSCOR	1 1 2 2 Totrophloropthons	Sample		N	N	N	FD	N 1 U
SW8260B SW8260B	1,1,2,2-Tetrachloroethane 1,1,2-Trichloro-1,2,2-trifluoroethan		ıg/L ıg/L			1 U 10 U	1 U 10 U	10 U
SW8260B	1,1,2-Trichloroethane		ıg/L ıg/L			1 U	1 U	1 U
SW8260B	1,1-Dichloroethane		ıg/L			1 U	1 U	1 U
SW8260B	1,1-Dichloroethene		ıg/L			1 U	1 U	1 U
SW8260B	1,1-Dichloropropene	N u	ıg/L			5 U	5 U	5 U
SW8260B	1,2,3-Trichlorobenzene		ıg/L			5 U	5 U	5 U
SW8260B	1,2,3-Trichloropropane		ıg/L			5 U	5 U	5 U
SW8260B	1,2,4-Trichlorobenzene		ıg/L			5 U	5 U	5 U
SW8260B SW8260B	1,2,4-Trimethylbenzene 1,2-Dibromo-3-chloropropane		ıg/L ıg/L			5 U 5 U	5 U 5 U	5 U 5 U
SW8260B	1,2-Dibromoethane		ıg/L ıg/L			1 U	1 U	1 U
SW8260B	1,2-Dichlorobenzene		ıg/L			5 U	5 U	5 U
SW8260B	1,2-Dichloroethane		ıg/L			1 U	1 U	1 U
SW8260B	1,2-Dichloropropane	N u	ıg/L			1 U	1 U	1 U
SW8260B	1,3,5-Trimethylbenzene		ıg/L			5 U	5 U	5 U
SW8260B	1,3-Dichlorobenzene		ıg/L			5 U	5 U	5 U
SW8260B	1,3-Dichloropropane		ıg/L			1 U	1 U	1 U
SW8260B	1,4-Dichlorobenzene		ıg/L			5 U	5 U	5 U
SW8260B SW8260B	1-Chlorohexane 2,2-Dichloroproprame		ıg/L			5 U 1 U	5 U 1 U	5 U 1 U
SW8260B SW8260B	2-Butanone (MEK)		ıg/L ıg/L			10 U	10 U	10 U
SW8260B	2-Chloro-1,1,1-trifluoroethane		ıg/L ıg/L			5 U	5 U	5 U
SW8260B	2-Chloroethyl Vinyl Ether		ıg/L			10 U	10 U	10 U
SW8260B	2-Chlorotoluene		ıg/L			5 U	5 U	5 U
SW8260B	2-Hexanone		ıg/L			10 UJ	10 UJ	10 U
SW8260B	2-Phenylbutane		ıg/L			5 U	5 U	5 U
SW8260B	4-Chlorotoluene		ıg/L			5 U	5 U	5 U
SW8260B	4-Methyl-2-pentanone (MIBK)		ıg/L			10 UJ	10 UJ	10 U
SW8260B	Acetone		ıg/L			20 U	20 U	20 U
SW8260B SW8260B	Acrolein Acrylonitrile		ıg/L ıg/L			100 U 20 U	100 U 20 U	100 U 20 U
SW8260B	Benzene		ıg/L ıg/L			1 U	1 U	1 U
SW8260B	Bromobenzene		ıg/L ıg/L			5 U	5 U	5 U
SW8260B	Bromochloromethane		ıg/L			5 U	5 U	5 U
SW8260B	Bromodichloromethane		ıg/L			1 U	1 U	1 U
SW8260B	Bromoform	N u	ıg/L			4 U	4 U	4 U
SW8260B	Bromomethane		ıg/L			1 UJ	1 UJ	1 U
SW8260B	Carbon Disulfide		ıg/L			5 U	5 U	5 U
SW8260B	Carbon Tetrachloride		ıg/L			1 U	1 U	1 U
SW8260B	Chlorosthana		ıg/L			1 U	1 U	1 U 1 U
SW8260B SW8260B	Chloroethane Chloroform		ıg/L ıg/L			1 U 1 U	1 U 1 U	1 U
SW8260B	Chloromethane		ıg/L ıg/L			1 U	1 U	1 U
SW8260B	Chlorotrifluoroethylene		ıg/L ıg/L			5 U	5 U	5 U
SW8260B	cis-1,2-Dichloroethene		ıg/L			1 U	1 U	1 U
SW8260B	CIS-1,3-Dichloropropene		ıg/L			1 U	1 U	1 U
SW8260B	Cymene		ıg/L			5 U	5 U	5 U
SW8260B	Dibromochloromethane		ıg/L			1 U	1 U	1 U
SW8260B	Dibromomethane		ıg/L			1 U	1 U	1 U
SW8260B	Dichlorodifluoromethane		ıg/L			1 UJ	1 UJ	1 U
SW8260B SW8260B	Diisopropyl Ether Ethylbenzene		ıg/L ıg/L			1 U 1 U	1 U 1 U	1 U 1 U
SW8260B SW8260B	Hexachlorobutadiene		ig/L ig/L			5 U	5 U	5 U
SW8260B	Isopropylbenzene		ıg/L ıg/L			5 U	5 U	5 U
SW8260B	M,P-XYLENE		ıg/L ıg/L			1 U	1 U	1 U
SW8260B	Methyl Iodide		ıg/L			1 U	1 U	1 U
SW8260B	Methyl Tert-Butyl Ether		ıg/L	-		1 U	1 U	1 U
SW8260B	Methylene Chloride		ıg/L			4 U	4 U	4 U
SW8260B	n-Butylbenzene		ıg/L			5 U	5 U	5 U
SW8260B	n-Propylbenzene		ıg/L			5 U	5 U	5 U
SW8260B	o-Xylene		ıg/L			1 U	1 U	1 U
ICMON/OD		III III	ıg/L			5 U	5 U	5 U
SW8260B	Styrene Tert_Amyl_Methyl_Ether		ıa/I					
SW8260B	Tert-Amyl-Methyl-Ether	N u	ıg/L ıg/l			1 U 50 H	1 U 50 H	1 U 50 U
SW8260B SW8260B	Tert-Amyl-Methyl-Ether tert-Butyl Alcohol	N u	ıg/L			50 U	50 U	50 U
SW8260B	Tert-Amyl-Methyl-Ether	N u N u N u						

		Seep	Probe		SP-19B	SP-424A	SP-424A	SP-424B
				SP-	SP-	SP-	SP-	SP-
		Sample	Name	19A_041916_01_L	19B_041916_01_L	424A_041416_01_	424A_041416_36_	424B_041316_01_
		Sampl	e Data	4/19/2016	4/19/2016	4/14/2016	4/14/2016	4/13/2016
	_	Sample	е Туре	N	N	N	FD	N
SW8260B	Toluene	N	ug/L			1 U	1 U	1 U
SW8260B	trans-1,2-Dichloroethene	N	ug/L	1		1 U	1 U	1 U
SW8260B	trans-1,3-Dichloropropene	N	ug/L	1		1 U	1 U	1 U
SW8260B	Trichloroethene	N	ug/L	1		1 U	1 U	1 U
SW8260B	Trichlorofluoromethane	N	ug/L	1		1 U	1 U	1 U
SW8260B	Vinyl Acetate	N	ug/L	1		10 U	10 U	10 U
SW8260B	Vinyl Chloride	N	ug/L			1 U	1 U	1 U
SW8260B SIM	1,4-Dioxane	N	ug/L	0.4 U				

Notes:

N = Normal D = Dissolved

T = Total

ug/L = microgram per liter

mg/L = microgram per liter

TB = Trip Blank

U = Sample result is nondetect

UJ = Sample result is estimated nondetect

J = Sample result is estimated

R = Sample result is rejected FD = Field Duplicate

-- = Not analyzed

		Seep	Probe	SP-424C	SP-T02B	SP-T02C	SP-T02D	SP-T02D
		Sample	Name	SP- 424C_041316_01_	SP- T02B_041216_01	SP- T02C_041216_01	SP- T02D_040616_01	SP- T02D_040616_36
		Sample		4/13/2016	4/12/2016	4/12/2016	4/6/2016	4/6/2016
Mathad	Chamical Name	Sample		N	N Dogult	N Dogult	N Dogult	FD
Method E300.0	Chemical Name Fluoride		Unit mg/L	Result 2.5	Result	Result	Result	Result 
SW6010C	Aluminum		mg/L	0.4 U				
SW6010C	Aluminum		mg/L	0.4 U				
SW6010C	Antimony		mg/L	0.04 U				
SW6010C	Antimony		mg/L	0.04 U				
SW6010C	Arsonia		mg/L	0.04 U				
SW6010C SW6010C	Arsenic Barium		mg/L mg/L	0.04 U 0.0267				
SW6010C	Barium		mg/L	0.0274				
SW6010C	Beryllium		mg/L	0.01 U				
SW6010C	Beryllium		mg/L	0.01 U				
SW6010C	Boron		mg/L	0.0687 J				
SW6010C	Boron		mg/L	0.0769 J				
SW6010C SW6010C	Cadmium Cadmium		mg/L mg/L	0.01 U 0.01 U				
SW6010C	Calcium	' '	mg/L	76.3				
SW6010C	Calcium		mg/L	77.4				
SW6010C	Chromium	D I	mg/L	0.03 U				
SW6010C	Chromium	T I	mg/L	0.03 U				
SW6010C	Cobalt		mg/L	0.0046 J				
SW6010C	Conner		mg/L	0.0032 J				
SW6010C SW6010C	Copper Copper		mg/L mg/L	0.02 U 0.02 U				
SW6010C	Iron		mg/L	0.4 U				
SW6010C	Iron		mg/L	0.104 J				
SW6010C	Lead		mg/L	0.03 U				
SW6010C	Lead		mg/L	0.03 U				
SW6010C	Lithium		mg/L	0.0467				
SW6010C	Lithium		mg/L	0.0482				
SW6010C SW6010C	Magnesium Magnesium		mg/L mg/L	22.4 22.7				
SW6010C	Manganese	l'	mg/L	0.0597				
SW6010C	Manganese		mg/L	0.0612				
SW6010C	Molybdenum		mg/L	0.0022 J				
SW6010C	Molybdenum		mg/L	0.0028 J				
SW6010C	Nickel		mg/L	0.02 U				
SW6010C SW6010C	Nickel Phosphorus	l'	mg/L mg/L	0.02 U 0.2 U				
SW6010C	Phosphorus		mg/L	0.2 U				
SW6010C	Potassium		mg/L	3.1				
SW6010C	Potassium		mg/L	3.12				
SW6010C	Sodium		mg/L	90.2				
SW6010C	Sodium		mg/L	90.7				
SW6010C	Tin		mg/L	0.04 U				
SW6010C SW6010C	Tin Titanium	l'	mg/L mg/L	0.04 U 0.0037 J				
SW6010C	Titanium		mg/L	0.0037 J				
SW6010C	Vanadium	D I	mg/L	0.01 U				
SW6010C	Vanadium		mg/L	0.01 U				
SW6010C	Zinc		mg/L	0.04 U				
SW6010C	Zinc		mg/L	0.04 U				
SW6010C SW6010C	Zirconium Zirconium		mg/L mg/L	0.1 U 0.1 U				
SW6020A	Selenium		mg/L	0.004 U				
SW6020A	Selenium		mg/L	0.004 U				
SW6020A	Silver	D I	mg/L	0.001 U				
SW6020A	Silver		mg/L	0.001 U				
SW6020A	Strontium		mg/L	0.42 J				
SW6020A	Strontium		mg/L	0.418 J				
SW6020A SW6020A	Thallium Thallium		mg/L mg/L	0.001 U 0.001 U				
SW6850	Perchlorate		ing/L ug/L	1 U				
SW7470A	Mercury		mg/L	0.0002 U				
SW7470A	Mercury	T I	mg/L	0.0002 U				
SW8015B	Gasoline Range Organics (C5-C12)	N t	ug/L					
SW8260B	1,1,1,2-Tetrachloroethane		ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	1,1,1-Trichloroethane	N t	ug/L	1 U	1 U	1 U	0.5 U	0.5 U

Sample Name   442			Seep Probe		SP-T02B	SP-T02C	SP-T02D	SP-T02D
Sample Data			Sample Name	SP-	SP-	SP-	SP-	SP-
Section   No.			•					
SMSSEQRE   1,3,2,7 tichstoncolame   UaPA   10 U   10 U   2 U   2 U   3 U   3 U   5								
SMERZORD   1,12-Trishnoventheme   N   ug/h   1 U   1 U   1 U   0.5 U								
SM82608   1,1-Definerethere   N   ug/k   1 U   1 U   0,5 U								
SW82060   1,1-Dichtorophemen   N								
SWB2008   1,2,3-frichrobersone   N   ug/L   S U   S U   S U   S U   1 U   1 U   1 U   3 W   3 W   3 W   3 W   5 U   5 U   1 U   1 U   1 U   3 W   3 W   3 W   3 W   5 U   5 U   5 U   1 U   1 U   1 U   3 W   3								
SMB2008   1,2,3   Infertoprograme   N   Og/L   S U								
SMB260B   1.2.4. Inferior/percente   N								
SWB260B   1,2-4-Erimenthyberzene   N								
SWB206B   1,2-Distrono-Schlorogroupen   N								
SW2200B   1,2-Dichrobenzene   N   ug/L   5 U   5 U   5 U   1 U   1 U   5 U		, , , , , , , , , , , , , , , , , , , ,						
SW8260B   1,2 Olchroprospane   N   ug/L   1   U   1   U   0.5 U   0.5 U   0.5 U   SW8260B   1,3.5 Frimenhybenzene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   1,3.5 Frimenhybenzene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   1,3.5 Frimenhybenzene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   1,3.0 Christopropragene   N   ug/L   5   U   5   U   1   U   1   U   0.5   U   SW8260B   1,3 Olchristopropragene   N   ug/L   5   U   5   U   1   U   1   U   0.5   U   0.5   U   SW8260B   1,4 Olchristopropragene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   1,4 Olchristopropragene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   1,2 Olchristopropragene   N   ug/L   5   U   5   U   5   U   1   U   1   U   SW8260B   2,2 Olchristopropragene   N   ug/L   1   U   1   U   1   U   1   U   3	SW8260B	1,2-Dibromoethane			1 U		0.5 U	0.5 U
\$\text{SWB260B}\$ 1,2-Dehtoropropane   \text{Nu uyl, } 1 \text{ U } 1 \								
SWB260B   1,3.5-Timethylbenzene   N   ug/L   5 U   5 U   5 U   1 U   1 U   1 U   5 WB260B   1,3-Dichloropropane   N   ug/L   1 U   1 U   5 U   5 U   1 U   1 U   5 WB260B   1,3-Dichloropropane   N   ug/L   5 U   5 U   5 U   1 U   1 U   5 WB260B   1,4-Dichloropropane   N   ug/L   5 U   5 U   5 U   1 U   1 U   5 WB260B   1,4-Dichloropropane   N   ug/L   5 U   5 U   5 U   1 U   1 U   5 WB260B   2,2-Dichloropropane   N   ug/L   5 U   5 U   5 U   5 U   1 U   1 U   5 WB260B   2,2-Dichloropropane   N   ug/L   1 U   1 U   1 U   1 U   3								
\$\text{SWB260B}\$ 1.3-\text{Dichtorobenseme}\$ N\$  \text{us/L}\$ 5 \text{U}\$ 5 \text{U}\$ 5 \text{U}\$ 1 \text{U}\$ 1 \text{U}\$ 0.5 \text{U}\$ 0.5 \text{U}\$ \$\text{SWB260B}\$ 1.4-\text{Dichtorobenseme}\$ N\$  \text{us/L}\$ 5 \text{U}\$ 5 \text{U}\$ 5 \text{U}\$ 1 \text{U}\$ 1 \text{U}\$ 1 \text{U}\$ \$\text{SWB260B}\$ 1.4-\text{Dichtorobenseme}\$ N\$  \text{us/L}\$ 5 \text{U}\$ 5 \text{U}\$ 5 \text{U}\$ 1 \text{U}\$ 1 \text{U}\$ \$\text{U}\$ 1 \text{U}\$ \$\text{U}\$ \$\text{U}\$ 1 \text{U}\$ 1 \text{U}\$ \$\text{U}\$ \$\tex								
SWB260B								
SWB260B   1-Chlorohexane	SW8260B	1,3-Dichloropropane	N ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SWB260B   2.2-Dichroproprame   N   sup/L   1 U   1 U   1 U   0.5 U   0.5 U   3 U								
SMB260B   2-Plutanne (MEK)   N   ug/L   10 U   10 U   3 U   3 U   2 U								
SWB260B   2-Chloro-1,1,1-trifluoroethane   N   Ug/L   5 U   5 U   5 U   2 U   2 U   2 U   3 SWB260B   2-Chloroethy Wije (Eher   N   Ug/L   5 U   5 U   5 U   1 U   1 U   2 R   2 U   3 SWB260B   2-Eherotolune   N   Ug/L   5 U   5 U   5 U   5 U   1 U   1 U   1 U   3 U								
SWB260B   2.Chlorotethyl Vinyl Ether   N   Ug/L   10 R   10 U   10 U   2 R   2 U   2 WB260B   2.Chlorotethene   N   Ug/L   10 U   10 U   10 U   3 U								
SW8260B   2-Chiorotoluene   N   ug/L   5 U   5 U   5 U   1 U   1 U   1 U   3								
SWB260B   2-Phenylbutane	SW8260B		N ug/L	5 U	5 U	5 U	1 U	1 U
SWB260B   A-Chicrotoluene								
SWB260B   A-Methyl-2-pentanone (MIBK)   N   ug/L   10 U   10 U   10 U   3 U								
SW8260B   Acetone   N   Ug/L   20 U   20 U   20 U   6 U   6 U   6 U   3 W8260B   Acrolein   N   Ug/L   100 U   100 U   100 U   40 U   40 U   40 U   5 W8260B   Acrylonitrile   N   Ug/L   20 U   20 U   20 U   4 U   4 U   4 U   4 U   5 W8260B   Acrylonitrile   N   Ug/L   20 U   20 U   20 U   4 U   1								
SW8260B   Acrolein   N   ug/L   100 U   100 U   100 U   40 U   40 U   40 U   40 U   30 W8260B   Acrylonitrile   N   ug/L   20 U   20 U   20 U   20 U   4 U   4 U   4 U   30 W8260B   Bernzene   N   ug/L   5 U   5 U   5 U   5 U   1 U   1 U   1 U   5 W8260B   Bernzene   N   ug/L   5 U   5 U   5 U   5 U   1 U   1 U   1 U   5 W8260B   Bernzene   N   ug/L   5 U   5 U   5 U   5 U   1 U   1 U   1 U   5 W8260B   Bernzene   N   ug/L   5 U   5 U   5 U   5 U   1 U   1 U   1 U   5 W8260B   Bernzendichloromethane   N   ug/L   5 U								
SWB260B   Benzene   N   Ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Bromobenzene   N   Ug/L   5 U   5 U   5 U   5 U   1 U   1 U   SWB260B   Bromochloromethane   N   Ug/L   5 U   5 U   5 U   5 U   1 U   1 U   SWB260B   Bromochloromethane   N   Ug/L   5 U   5 U   5 U   5 U   5 U   0.5 U								
SWB260B   Bromobenzene   N   ug/L   S U   S U   S U   S U   1 U   1 U   SWB260B   Bromochioromethane   N   ug/L   S U   S U   S U   S U   S U   1 U   1 U   SWB260B   Bromochioromethane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Bromochioromethane   N   ug/L   4 U   4 U   4 U   4 U   0.5 U   0.5 U   0.5 U   SWB260B   Bromochiaromethane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Carbon Disulfide   N   ug/L   5 U   S U   S U   S U   1 U   1 U   1 U   0.5 U   0.5 U   SWB260B   Carbon Disulfide   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Carbon Disulfide   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Carbon Tetrachioride   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Chiorotehane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Chiorotehane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Chiorotehane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Chiorotehane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SWB260B   Chiorotehane   N   ug/L   5 U   5 U   5 U   5 U   2 U   2 U   SWB260B   Chiorotehane   N   ug/L   5 U   5 U   5 U   5 U   2 U   2 U   SWB260B   Chiorotehane   N   ug/L   5 U   5 U   5 U   5 U   0.5 U		-						
SW8260B   Bromochloromethane   N   ug/L   S U   S U   S U   1 U   1 U   SW8260B   Bromochloromethane   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Bromoform   N   ug/L   4 U   4 U   4 U   0.5 U   0.5 U   0.5 U   SW8260B   Bromomethane   N   ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Bromomethane   N   ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Carbon Disulfide   N   ug/L   5 U   5 U   5 U   1 U   1 U   1 U   SW8260B   Carbon Disulfide   N   ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Carbon Tetrachloride   N   ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chlorobenzene   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chlorobenzene   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   SW8260B   Chloroform   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   ug/L   5 U   5 U   5 U   2								
SWB260B   Bromofichtonemethane   N   Ug/L   1 U   1 U   1 U   0.5 U								
SW8260B   Bromoform   N   Ug/L   4 U   4 U   4 U   0.5 U   0.5 U   0.5 U   SW8260B   Bromomethane   N   Ug/L   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   0.5 U   SW8260B   Carbon Disulfide   N   Ug/L   1 U   1 U   1 U   1 U   0.5								
SW8260B   Carbon Disulfide   N   Ug/L   S U   S U   S U   S U   D U   U   U   U   SW8260B   Carbon Tetrachloride   N   Ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroberane   N   Ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroberane   N   Ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   Ug/L   1 U   1 U   1 U   1 U   0.5 U   0.5 U   0.5 U   0.5 U   SW8260B   Chloroform   N   Ug/L   1 U   1 U   1 U   1 U   0.5 U   0.								
SW8260B         Carbon Tetrachloride         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Chlorobenzene         N         ug/L         1 U         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloroform         N         ug/L         1 U         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Chloroform         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Chlorofithorethylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Chlorofithorethylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         2 U								
SW8260B         Chlorobenzene         N         ug/L         1 U         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Chlorofethane         N         ug/L         1 U         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloroform         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloroformehane         N         ug/L         5 U         5 U         5 U         2 U         2 U         2 U           SW8260B         Chloroftifluoroethylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U         2 U								
SW8260B         Chloroethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloroform         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloromethane         N         ug/L         1 U         1 U         1 U         0.5 U         2 U								
SW8260B         Chloroform         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         Chloromethane         N         ug/L         1 U         1 U         1 U         0.5 U         2		1						
SW8260B         Chlorotrifluoroethylene         N         ug/L         5 U         5 U         5 U         2 U         2 U         2 U           SW8260B         cis-1,2-Dichloroethene         N         ug/L         1 U         1 U         1 U         0.5 U								
SW8260B         cis-1,2-Dichloroethene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         CIS-1,3-Dichloropropene         N         ug/L         5 U         1 U         1 U         0.5 U <td>SW8260B</td> <td>ornor ornothario</td> <td></td> <td></td> <td>1 U</td> <td>1 U</td> <td>0.5 U</td> <td>0.5 U</td>	SW8260B	ornor ornothario			1 U	1 U	0.5 U	0.5 U
SW8260B         CIS-1,3-Dichloropropene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Cymene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         0.5 U		,						
SW8260B         Cymene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         Dibromochloromethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dibromomethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dichlorodifluoromethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dichlorodifluoromethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Disopropyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Ethylbenzene         N         ug/L         5 U         5 U         5 U         2 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         2 U         2 U         2 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         1 U <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
SW8260B         Dibromochloromethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dibromomethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dichlorodifluoromethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Diisopropyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Ethylbenzene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Hexachlorobutadiene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Mchyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>								
SW8260B         Dibromomethane         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Dichlorodifluoromethane         N         ug/L         1 U         1 U         1 U         0.5 UJ         0.5 UJ           SW8260B         Diisopropyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Ethylbenzene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Hexachlorobutadiene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Mchyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U		,						
SW8260B         Diisopropyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Ethylbenzene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Hexachlorobutadiene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         M.P-XYLENE         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methylene Chloride         N         ug/L         4 U         4 U         4 U         2 U         2 U	SW8260B	Dibromomethane	N ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B         Ethylbenzene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Hexachlorobutadiene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         0.5 U <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>								
SW8260B         Hexachlorobutadiene         N         ug/L         5 U         5 U         5 U         2 U         2 U           SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         0.5 U								
SW8260B         Isopropylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         M,P-XYLENE         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methylene Chloride         N         ug/L         4 U         4 U         4 U         2 U         2 U           SW8260B         n-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B<		,						
SW8260B         M,P-XYLENE         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Iodide         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methylene Chloride         N         ug/L         4 U         4 U         4 U         2 U         2 U           SW8260B         n-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         o-Xylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U           SW8260B         Tert-Amyl-Methyl-Ether         N         ug/L         1 U         1 U         1 U         0.5 U         5 U         5								
SW8260B         Methyl Tert-Butyl Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Methylene Chloride         N         ug/L         4 U         4 U         4 U         2 U         2 U           SW8260B         n-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         0.5 U <t< td=""><td></td><td></td><td>N ug/L</td><td>1 U</td><td></td><td>1 U</td><td></td><td></td></t<>			N ug/L	1 U		1 U		
SW8260B         Methylene Chloride         N         ug/L         4 U         4 U         4 U         2 U         2 U           SW8260B         n-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         5 U         5 U         5 U         0.5 U         0.5 U         0.5 U         5 U         5 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         1 U         0.5 U         5 U         5 U         5 U         5 U         5 U         5 U         0.5 U								
SW8260B         n-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U           SW8260B         o-Xylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         Tert-Amyl-Methyl-Ether         N         ug/L         1 U         1 U         1 U         0.5 U           SW8260B         tert-Butyl Alcohol         N         ug/L         50 U         50 U         50 U         5 U         5 U           SW8260B         tert-Butyl ethyl ether         N         ug/L         1 U         1 U         1 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U		, ,						
SW8260B         n-Propylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         o-Xylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         Tert-Amyl-Methyl-Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butyl Alcohol         N         ug/L         50 U         50 U         50 U         5 U         5 U         5 U           SW8260B         tert-Butyl ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U								
SW8260B         o-Xylene         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U           SW8260B         Tert-Amyl-Methyl-Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U         0.5 U           SW8260B         tert-Butyl Alcohol         N         ug/L         50 U         50 U         50 U         5 U         5 U         5 U           SW8260B         tert-Butyl ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U								
SW8260B         Styrene         N         ug/L         5 U         5 U         5 U         1 U         1 U           SW8260B         Tert-Amyl-Methyl-Ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butyl Alcohol         N         ug/L         50 U         50 U         50 U         5 U         5 U           SW8260B         tert-Butyl ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U								
SW8260B         tert-Butyl Alcohol         N         ug/L         50 U         50 U         50 U         5 U         5 U           SW8260B         tert-Butyl ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U		Styrene	N ug/L	5 U		5 U	1 U	
SW8260B         tert-Butyl ether         N         ug/L         1 U         1 U         1 U         0.5 U         0.5 U           SW8260B         tert-Butylbenzene         N         ug/L         5 U         5 U         5 U         1 U         1 U         1 U								
SW8260B tert-Butylbenzene N ug/L 5 U 5 U 1 U 1 U								
OVVOZODO ITORIGONOLOGICIO IN TRACELE LO EL EU EL EU EL USTU EL USTU.	SW8260B	Tetrachloroethene	N ug/L	1 U	1 U	1 U	0.5 U	0.5 U

		See	Probe	SP-424C	SP-T02B	SP-T02C	SP-T02D	SP-T02D
				SP-	SP-	SP-	SP-	SP-
		Samp	e Name	424C_041316_01_	T02B_041216_01	T02C_041216_01	T02D_040616_01	T02D_040616_36
		Sam	ole Data	4/13/2016	4/12/2016	4/12/2016	4/6/2016	4/6/2016
		Samp	le Type	N	N	N	N	FD
SW8260B	Toluene	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	trans-1,2-Dichloroethene	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	trans-1,3-Dichloropropene	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	Trichloroethene	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	Trichlorofluoromethane	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B	Vinyl Acetate	N	ug/L	10 U	10 U	10 U	2 U	2 U
SW8260B	Vinyl Chloride	N	ug/L	1 U	1 U	1 U	0.5 U	0.5 U
SW8260B SIM	1,4-Dioxane	N	ug/L	0.4 U				

Notes:

N = Normal

D = Dissolved

T = Total

ug/L = microgram per liter

mg/L = microgram per liter

TB = Trip Blank

U = Sample result is nondetect

UJ = Sample result is estimated nondetect

J = Sample result is estimated

R = Sample result is rejected FD = Field Duplicate

-- = Not analyzed

	Well Identifier:		SP	-19A			SP	-19B			SP	-424A	
	Sample Type:			N				N				N	
	Sample Name:			41916_01_L				41916_01_L				041416_01_L	-
	Lab Name:			ACE				ACE		PACE			
	Collection Date:		4/19	7/2016			4/19	7/2016			4/1	4/2016	
		Result	Final	Total		Result	Final	Total		Result	Final	Total	
Analyte	Method	(pCi/L)	Qualifier	Uncertainty	MDC	(pCi/L)		Uncertainty	MDC	(pCi/L)	Qualifier		MDC
Actinium-228	901.1	0	U	5.461	9.652	0	U	8.66	18.98	0	U	5.039	7.957
Americium-241	901.1	12.849	U	39.005	34.56	3.406	U	21.895	20.06	13.64	U	30.087	36.87
Antimony-125	901.1	1.935	U	5.256	5.841	-0.229	U	10.665	11.96	4.825	U	6.249	5.985
Barium-133	901.1	2.8	U	3.08	2.924	0.93	U	4.632	5.371	-0.449	U	2.565	2.858
Cesium-134	901.1	0.246	U	2.868	2.18	0.006	U	3.944	4.277	1.434	U	2.029	2.512
Cesium-137	901.1	1.306	U	2.29	2.368	0.207	U	4.328	4.699	0	U	0.869	2.269
Cobalt-57	901.1	0.594	U	3.062	2.746	0.144	U	5.277	4.774	0.678	U	2.292	2.754
Cobalt-60	901.1	0.568	U	3.735	2.688	0	U	2.832	5.971	0	U	2.106	2.951
Europium-152	901.1	0.451	U	6.478	7.8	-0.878	U	11.302	13.58	-0.594	U	6.619	7.973
Europium-154	901.1	1.837	U	6.073	5.405	-0.786	U	7.911	9.505	0	U	1.357	5.77
Europium-155	901.1	0.189	U	7.139	11.91	0	U	4.531	17.17	3.99	U	7.014	11.58
Gross Alpha	900	2.5	U	1.66	2.64	7.86		3.54	4.78	5.71		1.93	1.85
Gross Beta	900	2.43		1.05	1.63	10.6		3	3.72	5.98		1.41	1.39
Manganese-54	901.1	0	U	1.345	2.632	0	U	1.513	5.031	0	U	1.175	2.395
Potassium-40	901.1	2.955	U	37.535	28.61	56.992	U	68.542	61.09	0	U	23.98	27.16
Sodium-22	901.1	0.16	U	3.423	2.191	0	U	2.398	4.95	2.1		2.747	1.875
Strontium-90	ASTM D5811-95	0.114	U	0.227	0.421	-0.058	U	0.208	0.401	-0.115	U	0.21	0.41
Tritium	906	144	U	137	224	70.2	U	133	227	-61	U	107	190
Uranium-238	HASL 300	0.764		0.159	0.032	2.08		0.323	0.023	0.742		0.245	0.081
Uranium-233/234	HASL 300	1.91		0.33	0.041	3.1		0.467	0.023	1.09		0.313	0.096
Uranium-235	HASL 300	0.038		0.03	0.016	0.155		0.049	0.009	0.122		0.101	0.057

pCi/L = picocuries per liter
U = Non detect
MDC = minimal detectable concentration
N = normal sample
FD = field duplicate

	SP-	-424A	SP-424B					SP-424C					
	Sample Type:			N				N				N	
	Sample Name:			041416_36_L				041316_01_L		SF		11316_01_LN	IS
	Lab Name: Collection Date:			ACE 1/2016				ACE 3/2016		PACE 4/13/2016			
	Collection Date.		4/ 14	1/2010			4/1	5/2010			4/1.	3/2016	
		Result	Final	Total		Result	Final	Total		Result	Final	Total	l
Analyte	Method	(pCi/L)	Qualifier	Uncertainty	MDC	(pCi/L)	Qualifier	Uncertainty	MDC	,		_	MDC
Actinium-228	901.1	0	U	9.711	18.26	3.726	U	19.062	15.81	0	U	6.025	10.25
Americium-241	901.1	0	U	11.412	24.23	9.553	U	18.163	17.78	18.029	U	37.113	45.4
Antimony-125	901.1	3.959	U	14.932	13.61	3.584	U	12.662	10.45	0	U	1.628	7.879
Barium-133	901.1	0	U	2.488	6.336	0	U	2.007	4.874	0.788	U	3.094	3.438
Cesium-134	901.1	1.141	U	4.171	4.502	-0.671	U	3.686	3.996	2.01	U	2.361	3.32
Cesium-137	901.1	0	U	2.417	4.961	0	U	1.45	4.467	0	U	1.29	2.88
Cobalt-57	901.1	0.473	U	4.356	5.234	2.491	U	3.538	4.219	1.484	U	2.962	3.541
Cobalt-60	901.1	1.849	U	5.861	5.59	0.336	U	4.583	4.524	0	U	1.934	3.105
Europium-152	901.1	2.411	U	14.353	14.75	2.897	U	12.486	12.12	6.227	U	5.519	10.24
Europium-154	901.1	0	U	5.465	10.39	0.434	U	8.741	8.526	0	U	2.711	7.369
Europium-155	901.1	2.411	U	14.492	17.4	2.46	U	11.843	14.24	7.504	U	9.197	15.09
Gross Alpha	900	4.38		1.67	1.83	6.65		2.21	2.27	4.01		1.88	2.79
Gross Beta	900	6.7		1.5	1.23	5.71		1.43	1.56	4.44		1.26	1.61
Manganese-54	901.1	1.146	U	4.559	4.781	-4.635	U	4.687	4.811	0	U	0.978	2.776
Potassium-40	901.1	17.485	U	67.563	64.25	16.914	U	64.481	58.19	0	U	27.033	30.51
Sodium-22	901.1	0	U	1.286	5.304	0	U	0.651	4.294	0.074	U	3.631	2.799
Strontium-90	ASTM D5811-95	-0.125	U	0.212	0.412	-0.255	U	0.203	0.401	0.038	U	0.222	0.42
Tritium	906	-136	U	104	188	-164	U	103	188	-95.7	U	105	189
Uranium-238	HASL 300	0.885		0.254	0.089	0.858		0.293	0.161	0.559		0.191	0.096
Uranium-233/234	HASL 300	1.28		0.324	0.104	1.17		0.353	0.141	1.2		0.308	0.088
Uranium-235	HASL 300	0.083	U	0.078	0.087	0.196		0.144	0.126	0.058	U	0.065	0.086

pCi/L = picocuries per liter
U = Non detect
MDC = minimal detectable concentral
N = normal sample
FD = field duplicate

	Well Identifier:		SP	-T02B			SP	-T02C		SP-T02D				
	Sample Type:			N				N				FD		
	Sample Name:			041216_01_L		(		4122016_01_	L			040616_36_L		
	Lab Name:		=	ACE			-	ACE		PACE				
	Collection Date:		4/1:	2/2016 I			4/1:	2/2016			4/6	5/2016	1	
		Result	Final	Total		Result	Final	Total		Result	Final	Total		
Analyte	Method	(pCi/L)	Qualifier		MDC	(pCi/L)	Qualifier	Uncertainty	MDC	(pCi/L)	Qualifier	Uncertainty	MDC	
Actinium-228	901.1	4.786	U	10.345	9.134	17.816		19.775	16.37	0.347	U	26.294	25.43	
Americium-241	901.1	0	U	15.784	39.03	0.071	U	20.859	21.07	7.412	U	31.335	35.38	
Antimony-125	901.1	-1.252	U	5.76	6.442	0	U	5.107	12.69	10.726	U	19.543	19.68	
Barium-133	901.1	0.551	U	2.568	2.87	0.855	U	4.729	5.514	-0.668	U	7.348	8.514	
Cesium-134	901.1	0.566	U	3.08	2.4	1.915	U	5.511	4.37	0	U	2.527	6.812	
Cesium-137	901.1	-1.232	U	2.518	2.616	1.783	U	4.068	4.409	2.125	U	5.731	6.18	
Cobalt-57	901.1	0	U	1.611	2.712	-0.07	U	3.971	4.791	-0.819	U	6.258	7.507	
Cobalt-60	901.1	0	U	1.625	3.075	0	U	3.898	5.864	0	U	4.194	7.36	
Europium-152	901.1	0	U	3.707	7.91	-2.566	U	11.538	13.88	7.626	U	17.373	20.77	
Europium-154	901.1	-0.438	U	4.462	5.393	0	U	4.168	9.785	0	U	4.17	15.1	
Europium-155	901.1	-7.691	U	10.476	12.5	-2.664	U	13.862	16.68	-12.72	U	22.036	26.28	
Gross Alpha	900	0.073	U	0.53	1.43	0.309	U	0.875	2.1	14.8		3.73	2.61	
Gross Beta	900	0.222	U	0.74	1.75	0.034	U	0.676	1.66	9.15		1.93	1.15	
Manganese-54	901.1	-0.49	U	2.482	2.518	0	U	1.987	5.062	0.234	U	7.178	6.622	
Potassium-40	901.1													
Sodium-22	901.1													
Strontium-90	ASTM D5811-95	0.17	U	0.228	0.417	-0.029	U	0.213	0.409	-0.126	U	0.226	0.44	
Tritium	906	802		173	188	520		146	190	1219		218	187	
Uranium-238	HASL 300	0.384	J	0.203	0.23	0.442		0.109	0.048	4.83		0.869	0.113	
Uranium-233/234	HASL 300	0.578	J	0.237	0.197	0.611		0.135	0.043	4.9		0.88	0.137	
Uranium-235	HASL 300	0.055	UJ	0.103	0.161	0.125	U	0.057	0.039	0.298		0.144	0.103	

pCi/L = picocuries per liter
U = Non detect
MDC = minimal detectable concentral
N = normal sample
FD = field duplicate

	Well Identifier:	SP-T02D							
	Sample Type:		N						
	Sample Name:		SP-T02D_	.040616_01_L					
	Lab Name:		F	PACE					
	Collection Date:		4/6	6/2016					
		Result	Final	Total					
Analyte	Method	(pCi/L)	Qualifier	Uncertainty	MDC				
Actinium-228	901.1	2.562	U	3.506	10.33				
Americium-241	901.1	0	U	18.647	37.93				
Antimony-125	901.1	0.291	U	5.495	6.172				
Barium-133	901.1	1.183	U	2.021	2.903				
Cesium-134	901.1	0.038	U	3.011	2.455				
Cesium-137	901.1	1.498	U	1.267	1.595				
Cobalt-57	901.1	5.153	U	9.834	16.3				
Cobalt-60	901.1	0	U	1.529	3.323				
Europium-152	901.1	2.266	U	17.747	17.12				
Europium-154	901.1	1.788	U	2.888	5.139				
Europium-155	901.1	-0.365	U	10.527	12.73				
Gross Alpha	900	19.6		4.72	2.84				
Gross Beta	900	8.74		1.95	1.42				
Manganese-54	901.1	-0.524	U	2.516	2.552				
Potassium-40	901.1								
Sodium-22	901.1								
Strontium-90	ASTM D5811-95	0.081	U	0.201	0.376				
Tritium	906	1272		225	189				
Uranium-238	HASL 300	4.63		0.803	0.065				
Uranium-233/234	HASL 300	4.77		0.825	0.08				
Uranium-235	HASL 300	0.398		0.151	0.034				

pCi/L = picocuries per liter
U = Non detect
MDC = minimal detectable concentral
N = normal sample
FD = field duplicate

# Appendix A Data Validation Reports

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

June 27, 2016

Parameters:

Volatiles

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH267

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	8326728	Water	04/06/16
SP-T02D_040616_36_L	8326729	Water	04/06/16
TB-040616	8326730	Water	04/06/16
SP-T02D_040616_01_LMS	8326728MS	Water	04/06/16
SP-T02D_040616_01_LMSD	8326728MSD	Water	04/06/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
04/06/16	Dichlorodifluoromethane Bromomethane 4-Methyl-2-pentanone 2-Hexanone	23 23 30 30	All samples in SDG PH267	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	Α

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
04/19/16	4-Methyl-2-pentanone 2-Hexanone	32 34	All samples in SDG PH267	UJ (all non-detects) UJ (all non-detects)	А

All of the continuing calibration relative response factors (RRF) were within validation criteria.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB-040616 was identified as a trip blank. No contaminants were found.

#### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

# VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
SP-T02D_040616_01_LMS/MSD (SP-T02D_040616_01_L)	2-Chloroethylvinyl ether	0 (65-120)	0 (65-120)	R (all non-detects)	А

Relative percent differences (RPD) were within QC limits.

#### IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### X. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

### XII. Compound Quantitation

All compound quantitations met validation criteria.

#### XIII. Target Compound Identifications

All target compound identifications met validation criteria.

#### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to MS/MSD %R, data were rejected in one sample.

Due to ICV and continuing calibration %D, data were qualified as estimated in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be rejected (R) are unusable for all purposes. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Volatiles - Data Qualification Summary - SDG PH267

Sample	Compound	Flag	A or P	Reason (Code)
SP-T02D_040616_01_L SP-T02D_040616_36_L TB-040616	Dichlorodifluoromethane Bromomethane 4-Methyl-2-pentanone 2-Hexanone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	А	Initial calibration verification (%D) (C)
SP-T02D_040616_01_L SP-T02D_040616_36_L TB-040616	4-Methyl-2-pentanone 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	Α	Continuing calibration (%D) (C)
SP-T02D_040616_01_L	2-Chloroethylvinyl ether	R (all non-detects)	Α	Matrix spike/Matrix spike duplicate (%R) (Q)

Santa Susana Field Laboratory, GW Volatiles - Laboratory Blank Data Qualification Summary - SDG PH267

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Volatiles - Field Blank Data Qualification Summary - SDG PH267

No Sample Data Qualified in this SDG

SDG # .abora	:_ 36425B1a VALIDAT :_ PH267 atory: Eurofins IOD: GC/MS Volatiles (EPA SW 846 M	L	evel IV	ESS WORKSHEE		Date: 06/17 Page: lof Reviewer: 1/2 And Reviewer: 5/2
he sa	amples listed below were reviewed for tion findings worksheets.			alidation areas. Valida	ition findings	are noted in attache
·	Validation Area			Com	ments /	
<u></u> ].	Sample receipt/Technical holding times	A/A	····			
11.	GC/MS Instrument performance check	A			Š	
m.	Initial calibration/ICV	AISW	101	FL £15/30%	12	100 5 20 0
IV.	Continuing calibration	SW	Co	VC 206		
V.	Laboratory Blanks	A				
VI.	Field blanks	M	TB	= 3		,
VII.	Surrogate spikes	A	/ +==			
VIII.	Matrix spike/Matrix spike duplicates	SW			· · · · · · · · · · · · · · · · · · ·	
IX.	Laboratory control samples	A		US事		,, ··· ).
Х.	Field duplicates	LD	Ď	= 1/2		
XI.	Internal standards	A		<del></del>		
XII.	Compound quantitation RL/LOQ/LODs	<u> </u>				
XIII.	Target compound identification	Α Α				
XIV.	System performance	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
·		HA A				
XV.	N = Not provided/applicable R = 1	= No compounds Rinsate • Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTH	Source blank HER:
	Plient ID			Lab ID	Matrix	Date
<u>~</u> s	P-T02D_040616_01_L			8326728	Water	04/06/16
	P-T02D_040616_36_L			8326729	Water	04/06/16
_	B-040616			8326730	Water	04/06/16
	SP-T02D_040616_01_LMS			8326728MS	Water	04/06/16
s	SP-T02D_040616_01_LMSD			8326728MSD	Water	04/06/16
	TP-LAll					
		,				
otes:			···			
. V	BKU5					

LDC#: 369251

# **VALIDATION FINDINGS CHECKLIST**

Page: 1\_of\_2 Reviewer: JVG 2nd Reviewer: \_\_\_\_\_\_

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
lkatiechnical/holdingtimes*				
Were all technical holding times met?	1/			
Was cooler temperature criteria met?				
III. GG/MS institumentsperiormance check				
Were the BFB performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?			MING V 1570	
Wa. Un(tial) callbration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	/			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	_			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				:
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?				
IIII) Viritle realistration yer/iteation				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	The state of the s		WW. 1244	Provided with the substitute of the State of
IVA:Continuing callbration	1. 174		1. 1	
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?		<del>!</del>		1174
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?		/		
With Laborator Welanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
Mildred beings				
Were field blanks were identified In this SDG?				
Were target compounds detected in the field blanks?			_ ;	
WII Sunoratespikes				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?				

LDC#: 36427)

# VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \_\_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
MIII. Matrix spike/Matrix spike/duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	/			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
IX: Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		an raide sa		
83. Alekanoleates	4 3 40			
Were field duplicate pairs identified in this SDG?				
Were target compounds detected in the field duplicates?			_	
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?				
Were retention times within $\pm$ 30 seconds of the associated calibration standard?				
XII: Composinticus miliation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?		. :		
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIIII Transiscompound dentification	wi je			
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XIV. System penformance				
System performance was found to be acceptable.				
XV. Overelli essessimenti of élete		\$ (1.5) \$ (1.5)		
Overall assessment of data was found to be acceptable.				

# TARGET COMPOUND WORKSHEET

#### METHOD: VOA

			<del></del>	
A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1.' 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC: tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	Ii. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. isobutyi alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. lodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1, 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Aliyi chloride	U1. Nonanai
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY, tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC#: - - 425 B/a

# VALIDATION FINDINGS WORKSHEET Initial Calibration Verification

Page:	of/	
Reviewer:_	<u>JV</u> G	
2nd Reviewer:_	M	_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was an initial calibration verification standard analyzed after each ICAL for each instrument?

Y(N)N/A Were all %D within the validation criteria of ≤20 %D?

#_	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
_	04/06/16	la 06 vol	73	23	All (ND)	J/UJ /A (c)
_			В	23	1 1	1
			7	30		
			<u>'Z</u>	30		
						<del></del>
	1 : 1			<del> </del>		
_			<del></del>			<del></del>
						<del> </del>
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	<del>   </del>			<del> </del>	<del> </del>	
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	<del>   </del>		<del></del>	<del> </del>	<del></del>	
	<del>                                     </del>	<del></del>	<del></del>	<del> </del>	<del> </del>	
	<u> </u>			<u> </u>	<u></u>	

LDC#: 36425 Bla

# **VALIDATION FINDINGS WORKSHEET Continuing Calibration**

<u>l of /</u>
JVG
h

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? N/A A Y(N/N/A

Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF?

#	Date	Standard ID	Compound	Finding %D (Limit: <20.0%) うユ	Finding RRF (Limit: >0.05)	Associated Samples	Qualifications
	04 Kg /G	2 a 19 co1	7	32 34		AII (ND>	J/4J/A (c)
			Z Z	77		<del>                                     </del>	1
				-			
	1			· · · · · · · · · · · · · · · · · · ·			
			-				
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LDC #: 36425 BIA

# VALIDATION FINDINGS WORKSHEET <u>Matrix Spike/Matrix Spike Duplicates</u>

Page: \ of \ / OT \ / O

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an

associated MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#_	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	4/5	II	0 (65-120	) 0 (65-120)	( )	(M)	J/R/A (A)
			(	) ( )	( )		
			(	) ( )	( )		
			· (	( - )	( · · · )		
			(	) ( )	( )		
					(		
			(	) ( )	( )		
			(	) ( )	( )		
			(	) ()	(,)		
			(	) ( )	( )		
				) (	( )		
<u></u>			(	) ( )	( )		
	<u></u>		(	) ( )	( )		
			(	) ( )	( )		
			(	) ()	( )		
			(	) ( )	( )		
	1		(	) ( )	( )		
	l		(	) ( )	( )		
		Compoun	d	QC Limits (Soil)	RPD (Soi	l) QC Limits (W	ater) RPD (Water)

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
H.	1,1-Dichloroethene	59-172%	≤ 22%	61-145%	<u>&lt;</u> 14%
S.	Trichloroethene	62-137%	≤ 24%	71-120%	<u>&lt; 14%</u>
V.	Benzene	66-142%	<u>&lt; 21%</u>	76-127%	<u>&lt; 1</u> 1%
CC.	Toluene	59-139%	≤ 21%	76-125%	<u>&lt;</u> 13%
DD.	Chlorobenzene	60-133%	<u>≤ 21</u> %	75-130%	<u>&lt;</u> 13%

and preserved

LDC #: <u>36425B1a</u>

# **VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification**

Page:	<u>1</u> of	f <u>1</u>
Reviewer:	J١	/G
2nd Reviewer:	_\$2	

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_{is})/(A_{is})(C_x)$ 

 $A_x$  = Area of Compound

A<sub>is</sub> = Area of associated internal standard

average RRF = sum of the RRFs/number of standards  $C_x$  = Concentration of compound

C<sub>is</sub> = Concentration of internal standard

%RSD = 100 \* (S/X)

S= Standard deviation of the RRFs

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)		Reported RRF RRF 50 std)	Recalculated RRF (RRF 50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL	04/06/16	Carbon Disulfide (F	-BZ)	0.8289	0.8289	0.7901	0.7902	5	5
11	HP09915		Tetrachloroethene (	CBZ)	0.3801	0.3801	0.3616	0.3617	8	8
			1,1,2,2-TCA ([	DCB)	1.2036	1.2036	1.1241	1.1241	11	11

LDC # 36425B1a

# **VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification**

Reviewer: JVG 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

Where:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Cx = Concentration of compound,

Ais = Area of associated internal standard Cis = Concentration of internal standard

Ax = Area of compound,

						_
		Reported	Recalculated	Reported	Recalculated	1
İ	Average RRF	RRF	RRF	% D	%D	

-		Calibration		Average RRF	Reported RRF	Recalculated RRF	Reported % D	Recalculated %D
#	Standard ID	Date	Compound (IS)	(Initial)	(CC)	(CC)		<u> </u>
1	LA19C01	4/19/2016	Carbon Disulfide (FBZ)	0.7901	0.7949	0.7949	1	1
	HP09915		Tetrachloroethene (CBZ)	0.3616	0.3888	0.3888	8	8
			1,1,2,2-TCA (DCB)	1.1241	1.1119	1.1119	1	1

LDC#: 36 4 x \$1

# **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:_	_1_of_1_
Reviewer:_	JVG
2nd reviewer:_	Sur

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: # /

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	50,0	50.083	100	100	0
1,2-Dichloroethane-d4		51.125	102	162	
Toluene-d8		50,035	100	100	
Bromofluorobenzene	J.	48.848	98	98	1 }

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4				***	
Toluene-d8	•				
Bromofluorobenzene			<u>,</u>		<u> </u>

Sample ID:\_\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane >					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8				·····	
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene			<u> </u>		}

LDC#:\_36425 819

# **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1 Reviewer: 2nd Reviewer:\_\_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentration

RPD = I MSC - MSC I \* 2/(MSC + MSDC)

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD sample:

		ike	Sample	Spiked Sample		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
Сотроила	(149)	ded /レ)	Concentration (14)		Concentration (Mg(L)		Percent Recovery		Percent Recovery		RPD
	MS_	MSD		MS	MISD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	20.0	20.0	o	22,5	22,35	113	113	112	112	)	
Trichloroethene				22.7	23,01	119	114	115	115	1	1
Benzene				22,25	22.46	11#	117	112	112	1	1
Toluene				22,53	22.9	1/3	1/3	1/+	114	1	1
Chlorobenzene	l		l l	21-91	22.19	110	110.	11	" 111	1	1

Comments: R	Refer to Matrix Spike/Matrix Spike	<u>e Duplicates findings worksheet fo</u>	<u>or list of qualifications and associ</u>	ated samples when reported	results do not agree
within 10.0% o	of the recalculated results.				
<u> </u>	•		· · · · · · · · · · · · · · · · · · ·	<del></del>	

# **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page:_	1_of_1_
Reviewer:_	JVG
2nd Reviewer:_	

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = I LCSC - LCSDC I \* 2/(LCSC + LCSDC)

LCS ID: \_ US L 15

		Spike Spiked Sample LCS LCSD Added Concentration		Spiked Sample Concentration		L CS/L CSD				
Compound	( VA	1/4)	( No	1/4)	Percent	Recovery	Percent Recovery		RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20.0	NA	19.61	M	98	98				
Trichloroethene			20.67		103	103				
Benzene			20,13		101	301				
Toluene			20.67		163	103				
Chlorobenzene	<u></u>	}	20.15	<u> </u>	101	lo				<u> </u>

Comments: Refert	o Laboratory	<u>Control Sample fi</u>	ndings workshee	et for list of qualifi	cations and a	associated s	amples when	reported	results do	<u>not agree w</u>	<u>/ithin 10.0%</u>
of the recalculated	results.					_		_		_	
· · · · · · · · · · · · · · · · · · ·											

# **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	1_of_1_
Reviewer:_	<u>JV</u> G
2nd reviewer:_	SA

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

YN N/A

Were all reported results recalculated and verified for all level IV samples?
Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration = $\frac{(A_{\circ})(I_{\circ})(DF)}{(A_{\circ})(RRF)(V_{\circ})(\%S)}$	Example:
A <sub>x</sub> = Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. <u>ND</u> , <u>Bencene</u>
A <sub>is</sub> = Area of the characteristic ion (EICP) for the specific internal standard	
I, = Amount of internal standard added in nanograms (ng)	Conc. = (53 44 36)(50,0)()
RRF = Relative response factor of the calibration standard.	
V <sub>o</sub> = Volume or weight of sample pruged in milliliters (ml) or grams (g).	= 20.13 ug /L
Df = Dilution factor.	
%S = Percent solids, applicable to soils and solid matrices	

	only.	·					
#	Sample ID	Compound		Reported Concentration (火ル	Calculated Concentration ( )	Qualification	
 	LCS	Benzene		20./3			
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		· · · · · · · · · · · · · · · · · · ·				<del> </del>	
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						<u> </u>	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 29, 2016

Parameters:

Wet Chemistry

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH267

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
C08 040816 01 L	8326731	Water	04/08/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Total Dissolved Solids by Standard Method 2540C Total Suspended Solids by Standard Method 2540D

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration of each method were met.

#### III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met for each method when applicable.

#### IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

#### VII. Duplicates

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Sample Result Verification

All sample result verifications were acceptable.

#### XI. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Wet Chemistry - Data Qualification Summary - SDG PH267

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Wet Chemistry - Laboratory Blank Data Qualification Summary - SDG PH267

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Wet Chemistry - Field Blank Data Qualification Summary - SDG PH267

No Sample Data Qualified in this SDG

SDG#	t:36425B6 #:PH267 atory:_Eurofins	VALIDATIO		PLETENES: _evel IV	S WORKSHE	1	Date: 621 Page: 1 of 1 Reviewer: 32 Reviewer: 44
The sa	amples listed below were		·		ation areas. Valid	dation findings are	noted in attached
Valluai	tion findings worksheets.		<u> </u>	<u> </u>	***************************************		
\	Validation A	\rea	) :A	1	<u>Co</u>	mments	
l.	Sample receipt/Technical hole	ding times	A	418/10			
11	Initial calibration		1				
<u>III.</u>	Calibration verification		A	<u> </u>			
IV.	Laboratory Blanks		I A	<u> </u>			
V	Field blanks		15				
VI.	Matrix Spike/Matrix Spike Dur	olicates	$+\nu$	Not Ros	1		
VII.	Duplicate sample analysis		N	CS		<del></del>	
VIII.	Laboratory control samples			(CS/17)			
IX.	Field duplicates		<u> </u>				
X.	Sample result verification		$\perp A$				
<u>xı</u>	Overall assessment of data	<del></del>	<u>LA</u>	<u> </u>			
Note:	A = Acceptable N = Not provided/applicable SW = See worksheet	R = Ri	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment	OTHER:	rce blank
	Client ID				Lab ID	Matrix	Date
1 (	C08_040816_01_L				8326731	Water	04/08/16
2							
3							
4							
5			= = = =				
6			<del></del>				
7							
8							
9			<u></u>				
10				<del></del> .			
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14							
lotos:							

#### **VALIDATION FINDINGS CHECKLIST**

Page: \of\\_ Reviewer: \SS 2nd Reviewer: \SS

Method:Inorganics (EPA Method See Cross)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients > 0.995?	-			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	_			
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)	/			
III. Blanks				
Was a method blank associated with every sample in this SDG?	_			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		_		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			_	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			_	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.			_	
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	/			
Was an LCS analyzed per extraction batch?	_			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?				
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			_	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC#: 36425840

### **VALIDATION FINDINGS CHECKLIST**

Page: ZofZ Reviewer: SS 2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		\		
Target analytes were detected in the field duplicates.			/	
X. Field blanks				
Field blanks were identified in this SDG.		\		
Target analytes were detected in the field blanks.			/	

LDC#: BOYESPER

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: <u></u> _of_	7
Reviewer:	$\geq$
2nd Reviewer: 84	

		C	/ \
METHOD: Inorganics, I	Method	$\sim$	(mnc
me inorganics, i	IVICUIOU ,		<u> </u>

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = <u>Found</u> x 100 True Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{|S-D|} \times 100$ 

Where,

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS	Laboratory control sample	TOS	namaje	200 mg/c	90%R	90%R	7
2	Matrix spike sample		(SSR-SR)				
2	Duplicate sample						

Comments	<u>.</u>						
<u> </u>	-	 •	 	 •	 		_

LDC#: 30423850

# **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:_	of
Reviewer:	
2nd reviewer:	5/4

METHOD: Inorganics, Method	enec .
Please see qualifications below for all questions    Y   N   N/A	range of the instruments?
Compound (analyte) results for	reported with a positive detect were ation:
Concentration = W (- W Z	Recalculation: $0.1293511 - 0.1155911 = 0.0138911$
Wz=0,11293g/L	0.0138g(1x (000mg) = 13.8mg/L
3	

#	Sample ID	Analyte	Reported Concentration (WALL)	Calculated Concentration (いなし)	Acceptable (Y/N)
	(	TOS	442	442	7
		755	13.8	13.8	7
	<u> </u>				
ļ					
			'		
					<del></del>

Note:			

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 30, 2016

Parameters:

Volatiles

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH268

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02B_041216_01_L	8333540	Water	04/12/16
TB-041316	8333541	Water	04/13/16
SP-424B_041316_01_L	8333542	Water	04/13/16
SP-424C_041316_01_L	8333543	Water	04/13/16
SP-T02C_041216_01_L	8333547	Water	04/12/16
SP-424C_041316_01_LMS	8333544MS	Water	04/13/16
SP-424C_041316_01_LMSD	8333544MSD	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB-041316 was identified as a trip blank. No contaminants were found.

#### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
SP-424C_041316_01_LMS/MSD (SP-424C_041316_01_L)	2-Chloroethylvinyl ether	24 (65-120)	0 (65-120)	R (all non-detects)	А

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
SP-424C_041316_01_LMS/MSD (SP-424C_041316_01_L)	2-Chloroethylvinyl ether	200 (≤30)	NA	-

#### IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XII. Compound Quantitation

All compound quantitations met validation criteria.

#### XIII. Target Compound Identifications

All target compound identifications met validation criteria.

#### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

Due to MS/MSD %R, data were rejected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be rejected (R) are unusable for all purposes. Based upon the data validation all other results are considered valid and usable for all purposes.

# Santa Susana Field Laboratory, GW Volatiles - Data Qualification Summary - SDG PH268

Sample	Compound	Flag	AorP	Reason (Code)
SP-424C_041316_01_L	2-Chloroethylvinyl ether	R (all non-detects)	А	Matrix spike/Matrix spike duplicate (%R) (Q)

Santa Susana Field Laboratory, GW Volatiles - Laboratory Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Volatiles - Field Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

SDG # ₋abora	t: 36425C1a VALIDATION  #: PH268  atory: Eurofins  #OD: GC/MS Volatiles (EPA SW 846 M	L	evel IV	S WORKSH	EET	F Rev 2nd Rev	Date: 66/17 Page: 1 of iewer: 300 iewer: 500
	amples listed below were reviewed for e tion findings worksheets.	each of the fo	ollowing valid	ation areas. Va	alidation find	lings are not	ed in attache
	Validation Area				Comments		
l.	Sample receipt/Technical holding times	AIA					
II.	GC/MS Instrument performance check	A					
III.	Initial calibration/ICV	AIA	ICAL S	15/30 %	(2	10).	420%
IV.	Continuing calibration	A	ca s	15/30 %			
	Laboratory Blanks	A					
VI.	Field blanks	ND	TB =	2			
VII.	Surrogate spikes	A	<del></del>				
VIII.	Matrix spike/Matrix spike duplicates	SW					
IX.	Laboratory control samples	K	и	3 /0			<del>*****</del>
X.	Field duplicates	N.		<del>-</del>			
XI.	Internal standards	A			····		
	<del></del>	A		<del></del> _		<del>,</del>	
XII. XIII.	Compound quantitation RL/LOQ/LODs	TA I			· · · · · ·		
	Target compound identification	'.'					
XIV.	System performance	A					· · ·
XV.	Overall assessment of data	<u> </u>		****		<del></del>	
ote:	N = Not provided/applicable R = R	No compounds Rinsate Field blank	detected	D = Duplicate TB = Trip blan EB = Equipme		SB=Source b OTHER:	lank
	Client ID			Lab ID	Ma	trix	Date
-   s	SP-T02B_041216_01_L	·		8333540	Wa	ater	04/12/16
2 1	'B-041316			8333541	Wa	iter	04/13/16
<b>&gt;</b>	SP-424B_041316_01_L			8333542		ater	04/13/16
-	SP-424C_041316_01_L	-		8333543	Wa	nter	04/13/16
	SP-T02C_041216_01_L			8333547	Wa	iter	04/12/16
	SP-424C_041316_01_LMS			8333543MS	Wa	iter	04/13/16
	P-424C_041316_01_LMSD			8333542MSD	Wa	nter	04/13/16
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VBULY98

LDC#: 36 425 C/a

# **VALIDATION FINDINGS CHECKLIST**

Page: 1\_of\_2 Reviewer: \_\_JVG 2nd Reviewer: \_\_\_\_\_

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
istredifical/holdingitimes				
Were all technical holding times met?	_			
Was cooler temperature criteria met?				
IIRCCMS distruments enformence check				
Were the BFB performance results reviewed and found to be within the specified criteria?				'n
Were all samples analyzed within the 12 hour clock criteria?			Diction and	Security section (Security Security Sec
III.a Nattal calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?				
Were all percent relative standard deviations (%RSD) $\leq$ 30%/15% and relative response factors (RRF) $\geq$ 0.05?			- Lide and Alba	·
(Nbx)hitlalicalbration Verliteation				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		(C. 20) P. S. (C. 20)	SOUTH STATE OF THE	
IV. Continuing/calibration vi				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	•			
V. leboralos/Blanks	V			
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
MMHadiblante:				
Were field blanks were identified in this SDG?		-		
Were target compounds detected in the field blanks?			/	
Wil-Sunoceleadkes				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?				

LDC#: 36 425 CIR

#### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \_\_\_\_\_\_

Validation Area	Yes	No	NA	Findings/Comments
MIII. Matrix spike/Matrix spike dupileates.				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		/		
IX: Laboratory.conit.olysamples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?			038023TV	
XX. Fileloficial literatures				
Were field duplicate pairs identified in this SDG?		/		
Were target compounds detected in the field duplicates?			/	
XII-Interioal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?				
Were retention times within ± 30 seconds of the associated calibration standard?			- Inches	
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIIII Transiticompoundification		(1.50m)		
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?		contribution and a second		A POWER SANS SECOND STREET STR
XIV. System pentrimence				
System performance was found to be acceptable.				
XV. Overall essessment of date.		ri Kalendar		
Overall assessment of data was found to be acceptable.	/			

# **TARGET COMPOUND WORKSHEET**

# METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC: tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichlorcethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. lodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichioropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	.UUUU, Aliyi chloride	U1. Nonanal
V. Benzene	VV. isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1

LDC# 36425 C/a

# **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates

Page: 1 of Reviewer: JVG 2nd Reviewer:\_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an (Y) N N/A

associated MS/MSD. Soil / Water.

Was a MS/MSD analyzed every 20 samples of each matrix?

Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

#	MS/MSD	D Compound	MS %R (Limits)		MSD %R (Limits)	RPD (	Limits)	_Associated :	Samples	Qualifications
	6/7	II	24 (65-120	)	0 (65-120)	(	)	4 (1	ゆノ	J/R/A(6)
	17	IT	(	)	( )	200 (	30 )		<u> </u>	J dets/A
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			(	)	( )	(				
			(	)	( )	(	)			·
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			(	)	( )	(	)		_	
<u> </u>			(	)	( )	(	)			
			(	<u> </u>	( )	(	)	<u> </u>	<u> </u>	
			(	)	( )	(	)			
ļ			_ (	)	( )	(	)			
			(	)	( )	(	)			· -
			(	)	( )	(	)			
			(	)	( )	(	)			
			(	)	( )	(	)			
		Compour	nd		QC Limits (Soil)		RPD (Soil)		QC Limits (Water)	RPD (Water)
	Н. 1,	1-Dichloroethene			59-172%		< 22%		61-145%	< 14%

	Compound	QC Limits (Soil)	RPD (Soil)	QC Limits (Water)	RPD (Water)
<u></u> Н.	1,1-Dichloroethene	59-172%	<u>&lt;</u> 22%	61-145%	<u>&lt; 14%</u>
<b>S</b> .	Trichloroethene	62-137%	<u>&lt;</u> 24%	71-120%	<u>&lt;</u> 14%
V.	Benzene	66-142%	<u>&lt;</u> 21%	76-127%	<u>&lt;</u> 1 <u>1%</u>
CC.	Toluene	59-139%	≤ 21%	76-125%	<u>&lt;</u> 13%
DD.	Chlorobenzene	60-133%	< 21%	75-130%	< 13%

LDC #: <u>36425C1</u>

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_{is})/(A_{is})(C_x)$ 

 $A_x$  = Area of Compound

A<sub>is</sub> = Area of associated internal standard

average RRF = sum of the RRFs/number of standards

 $C_x$  = Concentration of compound

C<sub>is</sub> = Concentration of internal standard

%RSD = 100 \* (S/X)

S= Standard deviation of the RRFs

X = Mean of the RRFs

		Calibration		Reported RRF	Recalculated RRF	Reported Average RRF	Recalculated Average RRF	Reported %RSD	Recalculated %RSD
#	Standard ID	Date	Compound (IS)	(RRF 50 std)	(RRF 50 std)	(Initial)	(Initial)		
1	ICAL	04/25/16	Trichloroethene (FBZ)	0.2770	0.2770	0.2526	0.2526	12	12
	HP09355		Tetrachloroethene (CBZ)	0.3925	0.3925	0.3577	0.3577	12	12
			1,1,2,2-TCA (DCB)	0.9726	0.9726	0.9573	0.9573	5	5

LDC # <u>36425C1</u>

# VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Results Verification</u>

Page:_	<u>1_of_1_</u>
Reviewer:_	JVG
2nd Reviewer:	5m

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

Where:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound,

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (I	IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	YA26C01	4/26/2016	Trichloroethene (I	FBZ)	0.2526	0.2606	0.2606	3	3
ŀ	HP09355		Tetrachloroethene (	CBZ)	0.3577	0.3615	0.3615	1	1
			1,1,2,2-TCA (E	DCB)	0.9573	0.9656	0.9656	1	1

LDC #: 36425 912

# **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:_	_1_of_1_
Reviewer:	J/VG
2nd reviewer:_	Sn

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compound	unds identified below usina	i the following calculation
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% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: # /

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	50.0	47.372	95	95	
1,2-Dichloroethane-d4		50.942	102	187	
Toluene-d8		52.026	104	104	
Bromofluorobenzene	Y	49.603	19	99	1

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					<u> </u>
Bromofluorobenzene			*****		

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane :					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:\_\_\_\_

	Surrogate Spikeđ	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC#: 36425C/a

# **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page:	_1_of_1_
Reviewer:	JVG
2nd Reviewer:	82

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentration

RPD = I MSC - MSC I \* 2/(MSC + MSDC)

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD sample:

		ike	Sample	• .	Spiked Sample		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
Compound	(UE)	ded /L)	Concentration	1 .	Concentration (45 b)		Percent Recovery		Percent Recovery		RPD	
	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated	
1,1-Dichloroethene	20,0	20.0	Q	22,19	22,46	h	m	11-/	112	}	١	
Trichloroethene				23,64	23,33	1/8	ાહ	17	117	1	1	
Benzene				22,85	22,41	114	114	112	11~	~	~	
Toluene				23.34	23.7	117	17	116	116	[	1	
Chlorobenzene		1 }	8	22.45	22.32	117	112	117	112	1	1	

Comments:	Refer to Matrix	Spike/Matrix S	pike Duplicates	<u>findings worksh</u>	eet for list of qu	<u>lalifications and</u>	associated sam	<u>iples when re</u>	eported resu	ılts do not agree
within 10.0%	of the recalcula	ated results.								·
		······		•		-	· ·			

# **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page: 1 of 1 Reviewer: JVG 2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = ILCSC - LCSDC I \* 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

Compound	Ad	oike ded // )	Conce	Spiked Sample Concentration ( 1/2 /12		LCS Percent Recovery		I CSD Percent Recovery		LCS/I CSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated	
1,1-Dichloroethene	20,0	20,0	18.94	19.74	45	95	99	99	У	y	
Trichloroethene			20.25	20.94	101	101	105	165	ゔ	3	
Benzene			26.14	20,65	101	امر	(03	163	~	<b>A</b>	
Toluene			28.79	21,36	104	(84	187	167	3	_3	
Chlorobenzene	1	8	70,12	20.59	101	lo1	(01)	103	2	~	

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of qualifications and associated the control sample findings worksheet for list of the control sample findings worksheet f	<u>ciated samples when reported results do not agree within 10.0%</u>
of the recalculated results.	

# **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	1	of_	1
Reviewer:	J	IVG	}
2nd reviewer:			
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Υ_	N	<u>N/A</u>
$\overline{\mathbf{v}}$	'N	N/A

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concer	ntratio	$n = \frac{(A_s)(I_s)(DF)}{(A_s)(RRF)(V_s)(\%S)}$	Example:
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. ND, T.G.
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard	
l <sub>s</sub>	=	Amount of internal standard added in nanograms (ng)	Conc. = (108848) (50) () ()
RRF	=	Relative response factor of the calibration standard.	
V <sub>o</sub>	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).	= 20,245 hg/L
Df	=	Dilution factor.	
%S	=	Percent solids, applicable to soils and solid matrices only.	

,,	Only.	Commented	Reported Concentration ( Ug ( U)	Calculated Concentration	
#	Sample ID	Compound		( )	Qualification
	ics	TCE	26.25		
				<u></u>	
	<u> </u>				
					<u> </u>
					<u> </u>
					<u> </u>

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

1,4-Dioxane

Validation Level:

Level IV

Laboratory:

**Eurofins** 

Sample Delivery Group (SDG): PH268

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
TB-041316	8333541	Water	04/13/16
SP-424B_041316_01_L	8333542	Water	04/13/16
SP-424C_041316_01_L	8333543	Water	04/13/16
SP-424C_041316_01_LMS	8333543MS	Water	04/13/16
SP-424C_041316_01_LMSD	8333543MSD	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8260B in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB-041316 was identified as a trip blank. No contaminants were found.

#### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### X. Field Duplicates

No field duplicates were identified in this SDG.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XII. Compound Quantitation

All compound quantitations met validation criteria.

# XIII. Target Compound Identifications

All target compound identifications met validation criteria.

#### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW 1,4-Dioxane - Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Field Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

SDG # Labor	#: PH268 atory: <u>Eurofins</u>	L	evel IV	S WORKSHEE		Date: 06/17 Page: 1 of 1 Reviewer: WG Reviewer: 5
The sa	AOD: GC/MS 1,4-Dioxane (EPA SW 846 amples listed below were reviewed for eation findings worksheets.		·	ation areas. Valida	tion findings are	noted in attached
	Validation Area		,	Com	ments	
l	Sample receipt/Technical holding times	A/A				
II.	GC/MS Instrument performance check	A				151 650 7
III.	Initial calibration/ICV	A/A	ICAL	515%		101 = 20%
IV.	Continuing calibration	A	Cars	. 266		
V.	Laboratory Blanks	A				
VI.	Field blanks	MD	柩=	<u> </u>		
VII.	Surrogate spikes	K				
VIII.	Matrix spike/Matrix spike duplicates	A				
IX.	Laboratory control samples	4	LCS			
Χ.	Field duplicates	N				
XI.	Internal standards	[ A ]				
XII.	Compound quantitation RL/LOQ/LODs	A	-,,,-			-
XIII.	Target compound identification	A				
XIV.	System performance	A				
XV.	Overall assessment of data	A				
lote:	A = Acceptable ND = N N = Not provided/applicable R = Rin:	o compounds sate eld blank	detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER:	rce blank
	Client ID			Lab ID	Matrix	Date
1-1	ГВ-041316			8333541	Water	04/13/16
~	SP-424B_041316_01_L	1,000	···	8333542	Water	04/13/16
	SP-424C_041316_01_L			8333543	Water	04/13/16
	SP-424C_041316_01_LMS			8333543MS	Water	04/13/16
	SP-424C_041316_01_LMSD			8333543MSD	Water	04/13/16
6						
7						
8						
lotes:			1			
- \ V	BLKE33					
1	, ,				1 1	

# VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: 51

Method: Volatiles (EPA SW 846 Method 8260B-SIM)

Validation Area	Yes	No	NA	Findings/Comments
Li Technical holding times				
Were all technical holding times met?				<u> </u>
Was cooler temperature criteria met?		Sept and the rights	ovane reciet	NOTES SE SOUTH AND
II. GC/MS Instrument performance check (Not required)	VŽŠ∳. T	Se la la I		
Were the BFB performance results reviewed and found to be within the specified criteria?	/			
Were all samples analyzed within the 12 hour clock criteria?	est nicht na Maria	O DO GREAT	VALUE ON AND THE	Charles and Talke the shift departer a Charles was served for which the shift department of the same served and the same serve
Ilia\Initial calibration (大学)				
Did the laboratory perform a 5 point calibration prior to sample analysis?				,
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05??				
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			CONTROL CONTROL	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent difference (%D) ≤20% or percent recoveries (%R) 80-120%?		DALG SERVICE	220000000000000000000000000000000000000	NUTRACIA A A MAIO A PROGRATA DE ENGLIS MAIO MAIO MAIO MAIO MAIO MAIO MAIO MAIO
IV Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?			ESSE VICTOR STATE	ALL TARREST LOCAL DE COMPANION
V: Laboratory/Blanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?		-		
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
Vir Field blanks				
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?				
VII-Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?				
VIII <sup>®</sup> Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				

LDC#: 36425016

# VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \$\sqrt{1}\$

Validation Area	Yes	No	NA	Findings/Comments
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		1		
IX-Laboratory control samples * 1000 to 1000 t				Carrier Control
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
Xs Field duplicates	/			
Were field duplicate pairs identified in this SDG?		/		
Were target compounds detected in the field duplicates?				
XIInternal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	_			
Were retention times within + 30 seconds of the associated calibration standard?		CTI LECONOMIA	era es mêră	i lacionalisticato de de compositorio de la compositorio della compositorio de la compositorio de la compositorio della compositorio della compositorio della compositorio della composi
XII Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Target compound identification:				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XIV-System performance				
System performance was found to be acceptable.		•		
XVi Overall assessment of data later to the second of the				
Overall assessment of data was found to be acceptable.				

LDC # <u>36425C1b</u>

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = (Ax)(Cis)/(Ais)(Cx)

Ax = Area of Compound

Ais = Area of associated internal standard

average RRF = sum of the RRFs/number of standards %RSD = 100 \* (S/X)

Cx = Concentration of compound

Cis = Concentration of internal standard

S= Standard deviation of the RRFs

X = Mean of the RRFs

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%R\$D
#	Standard ID	Date	Compound (IS)	(RRF 10 std)	(RRF 10 std)	(Initial)	(Initial)		]
1	ICAL	3/11/16	1,4-Dioxane (1,4-D-d8)	1.2758	1.2758	1.2762	1.2762	4	4
	HP15648								<u>_</u> "

LDC # 36425C1b

# VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Calculation Verification</u>

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: F1

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SiM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

Where:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

		Calibration		CCV	Reported	Recalculated	Reported	Recalculated
#	Standard ID	Date	Compound (IS)	RRF	RRF	RRF	% D	%D
1	EA21C02	4/26/2016	1,4-Dioxane (1,4-D-d8)	1.2762	1.3178	1.3178	3	3
	HP15648							

LDC#: 36 425 CIB

# VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:_	_1_of_1_
Reviewer:_	JVG
2nd reviewer:	Sn

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the f	tollowing	calculation
--	-----------	-------------

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sample ID: # 1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane		·			-
1,2-Dichloroethane-d4	ļ				_
Toluene-d8	10.0	9 8,5	99	99	0
Bromofluorobenzene					

Sample ID:

				<del></del>	
	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene				,	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4	<u> </u>				
Toluene-d8					
Bromofluorobenzene	<u> </u>		·		

LDC#: 76425016

## **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1 Reviewer: JVG 2nd Reviewer:\_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentration

RPD = I MSC - MSC I \* 2/(MSC + MSDC)

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD sample:	4/5	
----------------	-----	--

Compound	Add	ike ded ル)	Sample Concentration (以 /L)		Sample ntration		Spike Recovery	Matrix Spik Percent F			/MSD
CELL	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,4-Dioxane	5,00	5,00	0	4.57	4.62	91	91	92	92		1
1,2,3-TCP			 			 				<u> </u>	ļ
		ļ									
			<u></u>			<u> </u>			-		<u> </u>

Comments: Refer to Matrix Spike/Matrix Spike Duplicate	s findings worksheet for list of qualificati	<u>ions and associated samples wh</u>	<u>en reported results do not agree</u>
within 10.0% of the recalculated results.			
."			

LDC#: 36425 C/b

# **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

	Page:_	1 of 1
Re	viewer:_	JVG
2nd Re	viewer:	67

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable	e) were
recalculated for the compounds identified below using the following calculation:	,

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = I LCSC - LCSDC I \* 2/(LCSC + LCSDC)

LCS ID: LCS E 33	
------------------	--

Compound	Spike Spiked Sample ICS Added Concentration (ルメル) (パッル Percent Recovery		Concentration		I.CSD. Percent Recovery		L CS/L CSD RPD			
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,4-Dioxane	5.00	NA	4.66	NA	93	93				<del> </del>
1,2,3-TCP										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and asset	ociated samples when reported results do not a	gree within 10.0%
of the recalculated results.		

LDC#: 36425C15

# **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page: 1 of 1 Reviewer: JVG 2nd reviewer:\_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

Y N N/A

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentrat	on = $(A_s)(I_s)(DF)$ $(A_{ts})(RRF)(V_o)(\%S)$	Example:
A <sub>x</sub> =	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. LCS ND 1.4-Dioxane
A <sub>is</sub> =	Area of the characteristic ion (EICP) for the specific internal standard	
i <sub>s</sub> =	Amount of internal standard added in nanograms (ng)	Conc. = $(9075)(10)(15267)(12767)(12$
RRF =	Relative response factor of the calibration standard.	_ ','
V <sub>0</sub> =	Volume or weight of sample pruged in milliliters (ml) or grams (g).	= 4.657 ng l/
Df =	Dilution factor.	
%S =	Percent solids, applicable to soils and solid matrices	

700	only.	ole to soils and solid matrices			·
#	Sample ID	Compound	Reported Concentration ( પતુ/ મ	Calculated Concentration ( )	Qualification
	LCS	1, 4. Dioxane	4.66		
<del></del>					
-					-
					†
					+
					<del></del>
	· · · · ·				<del>-  </del> -
	. <u>.</u>	· · · · · · · · · · · · · · · · · · ·			<del>-</del>
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	<del>_</del> _				
			<u></u>		1
					<del> </del>

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 29, 2016

Parameters:

Metals

Validation Level:

Level IV

Laboratory:

**Eurofins** 

Sample Delivery Group (SDG): PH268

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424B_041316_01_L	8333542	Water	04/13/16
SP-424C_041316_01_L	8333543	Water	04/13/16
SP-424C_041316_01_LMS	8333543MS	Water	04/13/16
SP-424C_041316_01_LMSD	8333543MSD	Water	04/13/16
SP-424C_041316_01_LDUP	8333543DUP	Water	04/13/16

### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	04/26/16 (09:59)	Strontium	68.0 (80-120)	All samples in SDG PH268	J (all detects)	P
ICSAB	04/26/16 (10:53)	Strontium	64.0 (80-120)	All samples in SDG PH268	J (all detects)	Р

## V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank (D	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Magnesium	117.760 ug/L 18.420 ug/L	SP-424B_041316_01_L
ICB/CCB	Aluminum Cadmium Calcium Chromium Cobalt Copper Magnesium	53.6 ug/L 0.37 ug/L 66.9 ug/L 0.97 ug/L 0.73 ug/L 2.1 ug/L 67.5 ug/L	SP-424B_041316_01_L

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium	42.640 ug/L	SP-424C_041316_01_L

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SP-424B_041316_01_L	Chromium	0.0021 mg/L	0.0021U mg/L
	Copper	0.0042 mg/L	0.0042U mg/L

#### VI. Field Blanks

No field blanks were identified in this SDG.

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For SP-424C\_041316\_01\_LMS/MSD, no data were qualified for Calcium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

### VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

### IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SP-424C_041316_01_L	Strontium	13 (≤10)	All samples in SDG PH268	J (all detects)	А

### X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

## XI. Field Duplicates

No field duplicates were identified in this SDG.

### XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

### XIII. Sample Result Verification

All sample result verifications were acceptable.

### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICS %R and serial dilution %D, data were qualified as estimated in two samples.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH268

Sample	Analyte	Flag	A or P	Reason (Code)
SP-424B_041316_01_L SP-424C_041316_01_L	Strontium	J (all detects)	Р	ICP interference check sample analysis (%R) (I)
SP-424B_041316_01_L SP-424C_041316_01_L	Strontium	J (all detects)	А	Serial dilution (%D) (A)

# Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH268

Sample	Analyte	Modified Final Concentration	A or P	Code	
SP-424B_041316_01_L	Chromium Copper	0.0021U mg/L 0.0042U mg/L	А	В	

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

LDC #:_	36425C4a	VALIDATION COMPLETENESS WORKSHEET
SDG#:_	PH268	Level IV

Date:	<u>4/28/14</u>
Page:_	<u>\</u> of_\_
Reviewer:	S
2nd Reviewer:	SM

METHOD: Metals (EPA SW 846 Method 6010C/6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Sample receipt/Technical holding times	A	4113/16
II.	ICP/MS Tune	Á	
111.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	SW	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	2	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSD=(3,4)= Ca74x * Selaw
VIII.	Duplicate sample analysis	Ĺ	DUP = 52-424A_041416-36-L (506: PHZEA)
IX.	Serial Dilution	3	SER= SD-424A_041416-36-L(SD6:PHZE9)
X.	Laboratory control samples	Á	LCS
XI.	Field Duplicates	2	
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	
XIV	Overall Assessment of Data	A	

Note:

A = Acceptable

Laboratory: Eurofins

N = Not provided/applicable

SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

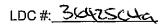
TB = Trip blank EB = Equipment blank SB=Source blank OTHER:

Date Client ID Lab<sub>ID</sub> Matrix Water 04/13/16 SP-424B\_041316\_01\_L 8333542 2 SP-424C\_041316\_01\_L 8333543 Water 04/13/16 Water 3 SP-424C\_041316\_01\_LMS 8333543MS 04/13/16 SP-424C\_041316\_01\_LMSD 8333543MSD Water 04/13/16 04/13/16 5 SP-424C\_041316\_01\_LDUP 8333543DUP Water 6 8 9 10 11 Notes:

Page: 1of Z Reviewer: 250 2nd Reviewer: 74

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	-			
Cooler temperature criteria was met.				
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	_			
Were %RSD of isotopes in the tuning solution ≤5%?	_			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	_			
Were the proper number of standards used?	_			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients ≥ 0.995?	/			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
V. ICP Interference Check Sample			<del></del>	
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.	/			
VII. Laboratory control samples				
Was an LCS anayized for this SDG?	_			
Was an LCS analyzed per extraction batch?	_			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			



### **VALIDATION FINDINGS CHECKLIST**

Page: 2of 2 Reviewer: 35 2nd Reviewer: 50

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	1			
If the %Rs were outside the criteria, was a reanalysis performed?	_			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/			
Were all percent differences (%Ds) < 10%?		/		
Was there evidence of negative interference? If yes, professional judgement will bused to qualify the data.	•	/		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		1		
Target analytes were detected in the field duplicates.			/	
XIII. Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	

LDC#: 36425C4a

# VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

All circled elements are applicable to each sample.

Sample ID	<u>Matrix</u>	Target Analyte List (TAL)
1-2	W	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti V Zn, Mo, B, Sn, Ti (C)
- "	_	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
QC-3-5	2	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, TWVZn, Mo, B, Sn, Ti) (C)
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
-	——	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
***		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Analysis Method  Analysis Method  Analysis Method
;P		Al Sb(As)(Ba)(Be)(Cd) Ca) Cr)(Co)(Cu)(Fe)(Pb)(Mg)(Mn) Hg,(N)(K)Se, Ag,(Na) TI(V,(Zn)(Mo)(B,(Sn)(Ti)(Li)(P)(Z
FAA	——	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,  Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti

ELEMENTS.wpd

LDC #: 36425C4a

# VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample

Page:_	<u>\</u> of_	_\
Reviewer:_	2	<u>&gt;</u>
2nd Reviewer:_	5	_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

I	∂te	ase se	e qualifications	below for all	questions answered '	'N". Not	applicable of	uestions	are identified as "N	V/A".
- 7	/ ·~		- 400000000000000		9400000000		. applicable c	1000000000	aro raorranoa ao 1	*** * * *

Were ICP interference check samples performed as required?

Y/N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120%?

LEVEL IV ONLY:

Y/N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	<u>Date</u>	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	04/26/16	ICSAB (9:59)	Sr	68.0	All	J/UJ/P (det) (I)
		Ì				
	04/26/16	ICSAB (10:53)	Sr	64.0	All	J/UJ/P (det) (I)
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Comments:			
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# VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
Reviewer: JD
2nd Reviewer:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)
Sample Concentration units, unless otherwise noted:

42.640

Soil preparation factor applied:\_

mg/L Associated Samples: 1 (8

(8)

							ജന്നദിചി	lentification		· · · · · · · · · · · · · · · · · · ·	
Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/L)	Maximum ICB/CCB* (ug/L)		1						
Al			53.6	_0.268000							
Cd			0.37	0.001850							
Са		117.760	66.9	0.588800							
Cr			0.97	0.004850	0.0021						
Со		!	0.73	0.003650							
Cu			2.1	0.010500	0.0042						
Mg		18.420	67.5	0.337500							

8 **Associated Samples:** Sample Concentration units, unless otherwise noted: mg/L Analyte Maximum Maximun Maximum Blank No Qual. PB\* PB<sup>a</sup> ICB/CCB<sup>a</sup> Action Limit (mg/Kg) (ug/L) (ug/L) (mg/L)

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

0.213200

LDC #: 36425C4a

# VALIDATION FINDINGS WORKSHEET ICP Serial Dilution

Page:_	<u>\</u> of_\
Reviewer:	20
2nd Reviewer:_	Sm

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

Place see qualifications below for all questions answered "N". Not applicable questions	uestions are identified as "N/A"
---	----------------------------------

YN N/A If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?

Y/N/N/A Were ICP serial dilution percent differences (%D) <10%?

Y N/A Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LEVEL IV ONLY:

YN N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

<b>"</b>	Diluted Sample ID	Matrix	Analyte	%D (Limits)	Associated Samples	Qualifications
	2	W	Sr	13	All	J/UJ/A (det) (A)
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Comments:				
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LDC#: 3642564q

# VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification

Page:_	<u>\</u> of_\_
Reviewer:	
2nd Reviewer:	74

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found\_</u> x 100 True Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
10) 20)	ICP (Initial calibration)	As	Saougic	600 رواله	98.3%R	98.3%.	7
7548 9:48	ICP/MS (Initial calibration)	Se	50.12 vg/L	Sough	100/2%2	100-2%R	
37	CVAA (Initial calibration)	Ha	2.48 ugic	2.5 vg/	99.2%R	99.2%R	
670	ICP (Continuing calibration)	Be	490 vgl	500 uglc	980%E	98.0%R	
(CC) (O:04	ICP/MS (Continuing calibration)	AS	25.67 mg/	25 vg/L	10278R	102778-	
2:08	CVAA (Contining calibration)	Ha	0.96001	1 41	96.0%	96.0 %R	$oxed{oxed}$
	GFAA (Initial calibration)	· 		)			
	GFAA (Continuing calibation)						

Comments:		 	 	 	 	

LDC #: 333125CU

## **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page:_	<u> </u>
Reviewer:	20
2nd Reviewer:	gr_

**METHOD:** Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found_x 100$ True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample concentration

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = [I-SDR] x 100

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 929	ICP interference check	Sc	3.4 vg/c	Syl	68.0%	68.0%	1 2
1021	Laboratory control sample	77	2.127 yoll	Zugl	106%R	106%R	
MS 6:42	Matrix spike	Pb	(SSR-SR) 149.80g1	150 ug/L	100%8	100%R	
DUP 6:39	Duplicate	Ba	0.02751 mg/c	11pm04550.0	0%890	0%RPO	
SER 6248	ICP serial dilution	Mr	0.06135mg/	0.06122 mg/L	0%0	0% 🗸	+

Comments: _		
•		

LDC#: 36425/49

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	<u>\</u> of_\
Reviewer:_	70
2nd reviewer:_	3/2

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

MN	ase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  N N/A Have results been reported and calculated correctly?  N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?  N N/A Are all detection limits below the CRDL?									
Detec equati	ted analyte results f ion:	for (Z)	Sc		were recalcu	lated and verified	using the following			
Concen	$     \text{tration} = \frac{(RD)(FV)(E)}{(In. Vol.)} $	Dil)	Recal	culation:						
RD FV In. Vol. Dil	, , , , , , , , , , , , , , , , , , ,	oncentration se (ml) se (ml) or weight (G) tor	E0=40.9	quyle?	× Ing	50.418 mg	7/~			
#	Sample ID		Analyte		Reported Concentration (mg)	Calculated Concentration (WA(C.)	Acceptable (Y/N)			
	1		Ba		8240.0	0.0428	~			
	2		Sr		84.0	0.418	7			
<u> </u>										
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-				<u></u>						
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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 29, 2016

Parameters:

Fluoride

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH268

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424B_041316_01_L	8333542	Water	04/13/16
SP-424C_041316_01_L	8333543	Water	04/13/16
SP-424C_041316_01_LMS	8333543MS	Water	04/13/16
SP-424C_041316_01_LDUP	8333543DUP	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Fluoride by Environmental Protection Agency (EPA) Method 300.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

### II. Initial Calibration

All criteria for the initial calibration were met.

### III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

### IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

### V. Field Blanks

No field blanks were identified in this SDG.

### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

### VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

### VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

### X. Sample Result Verification

All sample result verifications were acceptable.

### XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Fluoride - Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Laboratory Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Field Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

SDG#	#:36425C6 <b>VALIDATIO</b> #:PH268 atory:_ <u>Eurofins</u>		PLETENES: Level IV	S WORKSHEET		Date: 6/28/\(\)Page: \_of\_\Reviewer: \_\\\
METH	IOD: (Analyte) Fluoride (EPA Method 3	300.0)				_
	amples listed below were reviewed for ea tion findings worksheets.	ach of the f	following valida	ation areas. Validatio	on findings are	e noted in attached
	Validation Area			Comm	ents	
l	Sample receipt/Technical holding times	A	4/13/16			
II	Initial calibration	A				
111.	Calibration verification	A				
١٧	Laboratory Blanks	A				
V	Field blanks	2				-
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS= (3)	)		
VII.	Duplicate sample analysis	A	Drs	-		
VIII.	Laboratory control samples	A	لدح			
IX.	Field duplicates	2				
Х.	Sample result verification	A				
XI.	Overall assessment of data	A				
Note:	A = Acceptable ND = No N = Not provided/applicable R = Ring	o compound: sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blan	OTHER	urce blank :
	Client ID			Lab ID	Matrix	Date
1 8				8333542	Water	04/13/16
	SP-424C_041316_01_L			8333543	Water	04/13/16
	SP-424C_041316_01_LMS			8333543MS	Water	04/13/16
	SP-424C_041316_01_LM3B- 'ZO			8333543MSD	Water	04/13/16
	SP-424C_041316_01_LDUP			8333543DUP	Water	04/13/16
6					1111111	5,110,10
7						
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12						
13	A-75-					
· <u>~</u>						

Notes:

LDC#: 36425C6

### **VALIDATION FINDINGS CHECKLIST**

Page: \of \( \frac{2}{2} \)
Reviewer: \( \frac{2}{2} \)
2nd Reviewer: \( \frac{2}{2} \)

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.	/			
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?	_			
Were all initial calibration correlation coefficients ≥ 0.995?	_			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				
Were titrant checks performed as required? (Level IV only)				
Were balance checks performed as required? (Level IV only)	<u> </u>		_	
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	_			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	_			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/			
V. Laboratory control samples				
Was an LCS anayized for this SDG?	/			
Was an LCS analyzed per extraction batch?		·		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			_	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 3642506

### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: SS
2nd Reviewer: SM

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	1			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		\		
Target analytes were detected in the field duplicates.			/	
X. Field blanks				
Field blanks were identified in this SDG.		1		
Target analytes were detected in the field blanks.			/	

LDC #: 36425640

# Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page: <u></u>
Reviewer:
2nd Reviewer: >>

Method: Inorganics, Meth	od <u>See Cover</u>	
The correlation coefficient (r) fo	or the calibration of _ <del>- </del>	was recalculated.Calibration date: 4/2/16
An initial or continuing calibrat	ion verification percent	recovery (%R) was recalculated for each type of analysis using the following formula:
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution
True		True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	r or r <sup>2</sup>	r or r²	(Y/N)
Initial calibration		s1	0.0	0			
		s2s2	0.1	0.0684	0.998465	0.998918	
		s3	0.4	0.14			4
	F	s4	1	0.3054		:	)
	i	s5_	2	0.601			
		s6	3	0.9124			
IW (7:35		Found	D. 75 maje		252		\
Calibration verification		0-736mg/	0.52 mil		981/2	NR	Ü
CO 14:10 Calibration verification	J	0.781 majl	1 ports. 0		1048.8	NB	7
					-		
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

\*Rounding

LDC#: 3642500

## **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page: <u> </u> of <u> </u>	
Reviewer:	
2nd Reviewer: 54	

				$\wedge$
METHOD:	Inorganics	Method	See	(mer
	morganico,	MICHIGA _		

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found_x 100$ True

Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{IS-DI} \times 100$ 

Where,

S =

Original sample concentration

(S+D)/2 D =

Duplicate sample concentration

					Recalculated	Reported	
Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	%R / RPD	%R / RPD	Acceptable (Y/N)
LCS 13:40	Laboratory control sample	F	0.753 mg/L	0.75mg/c	100%2	100%	3
MS 16:54	Matrix spike sample		(SSR-SR) S.29 mg/L	5mg/c	1067.R	105%2	S*
DUR 16:24	Duplicate sample	7	2.46brgl	2.517 mg/c	S 4.850	2%.RRD	3

Comments:	* Pounding		_			
		-			•	

LDC #: 36485C4

## **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page:_	( of )
Reviewer:	<u> </u>
2nd reviewer:	3

METHOD: Inorganics, Meti	hod <u>See</u> Cover	
Y N N/A Have result Are results	elow for all questions answered "N". Not applicable its been reported and calculated correctly? within the calibrated range of the instruments? ection limits below the CRQL?	e questions are identified as "N/A".
Compound (analyte) results recalculated and verified us		reported with a positive detect were
Concentration = $A - 0.0$	Recalculation: 0.160 - 0.	$\frac{3}{32}$ $\times S = 2.3 \text{ mg/c}$
D:1=5 A=0.100		· <del></del>

#	Sample ID	Analyte	Reported Concentration (wg\/)	Calculated Concentration ( WQ( U)	Acceptable (Y/N)
	\	F	2-3	2.3	3
	2	7	2.5	2.5	7
				<u> </u>	
				· !	
	<u></u> .				
				- <u></u>	

Note:_				
_	•	 	 	
· · · · · · · · · · · · · · · · · · ·				 

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Perchlorate

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH268

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424B_041316_01_L	8333542	Water	04/13/16
SP-424C_041316_01_L	8333543	Water	04/13/16
SP-424C_041316_01_LMS	8333543MS	Water	04/13/16
SP-424C_041316_01_LMSD	8333543MSD	Water	04/13/16

### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

### II. LC/MS Instrument Performance Check

Instrument performance check was performed prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r²) was greater than or equal to 0.990.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

### VI. Field Blanks

No field blanks were identified in this SDG.

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

### VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Compound Quantitation

All compound quantitations were within validation criteria.

#### XII. Target Compound Identifications

All target compound identifications were within validation criteria.

#### XIII. System Performance

The system performance was acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Perchlorate - Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Laboratory Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Field Blank Data Qualification Summary - SDG PH268

No Sample Data Qualified in this SDG

SDG : Labor	#:36425C87	L	.evel IV	S WORKSHEE		Date: 06/17 Page:of Reviewer: Reviewer:
Γhe s	amples listed below were reviewed for eation findings worksheets.		•	ation areas. Validat	lion findings are	noted in attached
	Validation Area			Com	ments	
<u>l.</u>	Sample receipt/Technical holding times	A/A				
IJ.	<b>☆</b> C/MS Instrument performance check	A	FEE			
III.	Initial calibration/ICV	AIA	r٧		1	0 × 15%
IV.	Continuing calibration	À	CONS	15 %	L	ODV = 30%
V.	Laboratory Blanks	T A				
VI.	Field blanks	$ \lambda $				
VII.	Surrogate spikes	T N	NXT	repl .		
VIII.	Matrix spike/Matrix spike duplicates	A				***
IX.	Laboratory control samples	A	u	<b>9</b>		
X.	Field duplicates					
XI.	Internal standards	<i>k</i>			<del></del>	
XII.	Compound quantitation RL/LOQ/LODs	1 4			<del>*</del>	
XIII.	Target compound identification	T_A				
XIV.	System performance	Ä				
XV.	Overall assessment of data	A			. 4	<del></del>
lote:	N = Not provided/applicable R = Rin	No compounds nsate field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER:	irce blank
	Client ID			Lab ID	Matrix	Date
1 5	SP-424B_041316_01_L		•	8333542	Water	04/13/16
2 5	SP-424C_041316_01_L			8333543	Water	04/13/16
3 5	SP-424C_041316_01_LMS			8333543MS	Water	04/13/16
1 5	SP-424C_041316_01_LMSD			8333543MSD	Water	04/13/16
5						
3						
7						
<u> </u>						
<u> </u>						
otes: ↓	BIK 25112		T			
+	DOC 25 11 Y	-818-100-	++-		+	

36	4	U	C8	7
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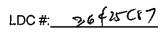
LDC #:\_\_\_\_

V	ΔΙ	IDA	$\Delta TIC$	١N	FIND	INGS	CHEC	:KI	IST
v	$\sim$ L	-11/	<b>~ 1 I</b> I		IND	114 (3.3	CILL	J [ ]	

Page:_	1_of_2_
Reviewer:	JVG
2nd Reviewer:	5~

Method: Perchlorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?		Elevaira	Die Steiner	SECTION CONTROL CONTRO
Was cooler temperature criteria met?				
II. LC/MS instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?				
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?				
Illa: Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?		'	<u> </u>	
Were all percent relative standard deviations (%RSD) ≤ 20%?	<u>                                     </u>	<u> </u>		
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?		<u> </u>	<u> </u>	
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?			1	
IIIb Initial Calibration Verification			<u> </u>	
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?			<u> </u>	
Were all percent differences (%D) ≤ 15%?	I I	A TO STANK COLUMN	Total Single	
IV. Continuing calibration			Harry Later	
Was a continuing calibration analyzed daily?		<u> '</u>	<u>  '</u>	
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?		!	<u>  '</u>	
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?		<u> </u>	<u>                                     </u>	
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?	100 5	- and the first of	क्या <u>कास</u> ्त	
V. Laboratory Blanks		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Was a laboratory blank associated with every sample in this SDG?		<u>                                     </u>	<u>                                     </u>	
Was a laboratory blank analyzed for each matrix and concentration?		<u> </u>	$\bigsqcup$	
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	- Annual (A)		Manager 1, 19	A Marie Constant Cons
VI: Field blanks			15 A.A.	
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?				
VIII. Matrix spike/Matrix spike duplicates	Mary Mary			
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				



#### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \_\_\_\_\_\_

Validation Area	Yes	No	NA.	Findings/Comments
IX. Laboratory control samples	1.40	<u>1 140</u> 影為是	1114	j Findings/Comments
		45.50	Adjust to the least	。 
Was an LCS analyzed for this SDG?	1		┼	
Was an LCS analyzed per extraction batch?		<del> </del> -	<del>                                     </del>	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
X Field duplicates	e prigite		r T	
Were field duplicate pairs identified in this SDG?				
Were target compounds detected in the field duplicates?.				
XI. Internal standards	1			
Were internal standard area counts within <u>+</u> 50% of the associated calibration standard?	/		i 	
Were retention times of m/z 89 (Cl <sup>18</sup> O <sub>3</sub> ) within 0.2 minutes of m/z 83 (ClO <sub>3</sub> )?				
Were retention times of m/z 89 (Cl <sup>18</sup> O <sub>3</sub> ) within 0.2 minutes of m/z 83 (ClO <sub>3</sub> )? XII: Compound quantitation	ر ا			を通り、 ・
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Target compound identification	有新			
Were relative retention times (RRT's) within 0.98 to 1.02?	_			
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?				
XIV- System performance				
System performance was found to be acceptable.				
XIII: Overall assessment of data 1	學數			er te o propins protest verificações en objecto. La companio de la co
Overall assessment of data was found to be acceptable.				

LDC # 36425C87

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

METHOD:

LCMS Perchlorate (EPA SW 846 Method 6850)

Parameter:

<u>Perchlorate</u>

Order of regression:

Linear

Date	Instrument	Compound	Points	y Response ratio	x Conc ratio
26-Apr-16 MS5P11616 Perchlora	Perchlorate	Point 1	0.1386	0.040	
			Point 2	0.3517	0.100
			Point 3	0.7130	0.200
			Point 4	1.4656	0.400
			Point 5	3.9184	1.000
			Point 6	10.7827	2.500

Regress	sion Output: Regression Output:		Reported	
Constant	c=	-0.17043	= C	-0.0604
Std Err of Y Est		0.04		
R Squared	r^2 =	0.99869	r^2 =	0.99666
No. of Observations		6.00		
Degrees of Freedom		5.00		
X Coefficient(s)	m =	0.23023	m =	0.41820
Std Err of Coef.	0.01			

LDC#: 36425C87

# VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Calculation Verification</u>

Page:	<u>1</u> of <u>1</u>
Reviewer:	VGلو
2nd Reviewer	

Method: LCMS Perchlorate (EPA SW 846 Method 6850)

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

#### Where:

Percent difference (%D) = 100 \* (N - C)/N

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	ms5P11616032 lodv	4/26/2016	Perchlorate	0.40	0.50	0.50	25.00	25.00

### **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1\_of\_1 Reviewer: JVG 2nd Reviewer:

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850/6860)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

RPD = IMS - MSDI\*2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples:

Compound	S Ac ( US)	pike Ided // )	Sample Concentration ( \( \( \( \) \( \) \( \)	Spiked S Concent (	ample ration )	Matrix Percent F		Matrix Spik		-	/MSD_
	MS	MSD		Ms	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Perchlorate	5.00	5,00	Ò	5.18	5.23	104	104	105	105	t	1
						<u> </u>	<del></del>	† 			<u>.</u>
									<u> </u>		
<u> </u>		1									
					<u> </u>	}	1				<u></u>
						-					

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

### **VALIDATION FINDINGS WORKSHEET**

### Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page:_	<u>1_</u> of_1_
Reviewer:_	J <u>V</u> G
2nd Reviewer:	- 8 2

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850/6860)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = ILCS - LCSD I \* 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: Lcs 25112

Percent Recovery  Recalc	RPD Reported Recalc
	<del> </del>

Comments: Refer to Laboratory Control Sample/Laboratory	Control Sample Duplicates findings worksheet for lis	st of qualifications and associated samples when reported
results do not agree within 10.0% of the recalculated result	),	

LDC #:\_ 36 425 C87

### **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	_1_of1_
Reviewer:_	JVG
2nd reviewer:	_\$~~ <sup></sup>

METHOD: LCMS Perchlorate (EPA SW 846 Method 6850/6860)

$\left(\begin{array}{c} Y \\ Y \\ N \end{array}\right)$	N/A N/A	Were all reported results recalculated and Were all recalculated results for detected t	verified for all level IV samples? arget compounds agree within 10.0% of the reported results?
Cond	entratio	$n = (A_{i})(I_{*})(V_{i})(DF)(2.0)$ $(A_{is})(RRF)(V_{o})(V_{i})(%S)$	Example:
$A_x$	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. N), Cloq
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard	No. 11 Control of the
l <sub>s</sub>	=	Amount of internal standard added in nanograms (ng)	Conc. (98462) 7 _ Go. 0604)
V <sub>o</sub>	=	Volume or weight of sample extract in milliliters (ml) or grams (g).	(6,4182)
Vt	=	Volume of extract injected in microliters (ul)	= 5.39 48 ug/L
V,	=	Volume of the concentrated extract in microliters (ul)	1 198 49 14

Percent solids, applicable to soil and solid matrices only.

Factor of 2 to account for GPC cleanup

Dilution Factor.

Df

%S

2.0

Example:
Sample I.D. M, CLO.4
Conc. (98462) 7 _ Co.0604)
(6,4187)
= 5.39 48 ug/L

#	Sample ID	Compound	Reported Concentration ( ) ()	Calculated Concentration ( )	Qualification
	LCS	CL04	0 <del>-50</del> 5,39		
				-	
					····
ļ					
					<u>.</u>
<b></b>					
$\vdash$					
		· · · · · · · · · · · · · · · · · · ·		<u>-</u>	
<b> </b>					

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: July 20, 2016

Parameters: Volatiles

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH269

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8337439	Water	04/14/16
SP-424A_041416_36_L	8337440	Water	04/14/16
TB-041416	8337441	Water	04/14/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for each individual compound and less than or equal to 30.0% for calibration check compounds (CCCs).

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r²) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
04/06/16	Dichlorodifluoromethane Bromomethane 4-Methyl-2-pentanone 2-Hexanone	23 23 30 30	All samples in SDG PH269	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	Α

### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Compound	%D	Associated Samples	Flag	A or P
04/19/16	4-Methyl-2-pentanone 2-Hexanone	32 34	All samples in SDG PH269	UJ (all non-detects) UJ (all non-detects)	A

All of the continuing calibration relative response factors (RRF) were within validation criteria.

### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB-041416 was identified as a trip blank. No contaminants were found.

### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

### VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were not within QC limits. No data were qualified since there were no associated samples in this SDG. Relative percent differences (RPD) were within QC limits.

### IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### X. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XII. Compound Quantitation

All compound quantitations met validation criteria.

#### XIII. Target Compound Identifications

All target compound identifications met validation criteria.

### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to ICV and continuing calibration %D, data were qualified as estimated in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

### Santa Susana Field Laboratory, GW Volatiles - Data Qualification Summary - SDG PH269

Sample	Compound	Flag	A or P	Reason (Code)
SP-424A_041416_01_L SP-424A_041416_36_L TB-041416	Dichlorodifluoromethane Bromomethane 4-Methyl-2-pentanone 2-Hexanone	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	А	Initial calibration verification (%D) (C)
SP-424A_041416_01_L SP-424A_041416_36_L TB-041416	4-Methyl-2-pentanone 2-Hexanone	UJ (all non-detects) UJ (all non-detects)	А	Continuing calibration (%D) (C)

Santa Susana Field Laboratory, GW Volatiles - Laboratory Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Volatiles - Field Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

SDG#	#:36425D1aVALIDATION COMPLETENESS WORKSHEET Date:_06/17/ is #:PH269						Page: 1 of 1
METH	IOD: GC/MS Volatiles (E	EPA SW 846	Method 8260B	)		2ng	Reviewer: YV
	amples listed below were tion findings worksheets		r each of the fo	llowing v	alidation areas. Valida	ation findings are	e noted in attached
	Validation	Area			Com	nments	
i.	Sample receipt/Technical ho	olding times	AIA				
11.	GC/MS Instrument performa	ance check	A				
111.	Initial calibration/ICV		AISN	) (	CAV £ 15/30 % N = 20%	r~	101 = 202
IV.	Continuing calibration		SW	c	7 = 202		
V.	Laboratory Blanks		A			, ,	
VI.	Field blanks		Mo		TB = 3		
VII.	Surrogate spikes		A				
VIII.	Matrix spike/Matrix spike du	plicates	SW	2	P-TOZD=040616_0	TL (No as	54d sample, Na
IX.	Laboratory control samples		A		LOS ED	<u> </u>	
X.	Field duplicates		dN	Ď	= 1/2		
XI.	Internal standards		¥		, .	<del></del>	
XII.	Compound quantitation RL/I	OO/LODs	A		<del> </del>		
XIII.	Target compound identificat		Ā				
XIV.	System performance	1011	A				
			A A				
XV.   Overall assessment of data							
0	Client ID				Lab ID	Matrix	Date
_	SP-424A_041416_01_L				8337439	Water	04/14/16
	SP-424A 041416 36 L		<del>""</del>		8337440	Water	04/14/16
	TB-041416				8337441	Water	04/14/16
4							
5							
6	-						****
7							
8							
9							
10							
Notes:							
\\	VBLK LIS				7 11.		

LDC#:\_\_\_364 & DI~

### **VALIDATION FINDINGS CHECKLIST**

Page: 1\_of 2 Reviewer: JVG 2nd Reviewer: 5/1

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
Izaredinilealiholding times				
Were all technical holding times met?				:
Was cooler temperature criteria met?	APPLIES ASSOCIA	in very	PARTITION TO SERVICE	
III.COMS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?				•
Were all samples analyzed within the 12 hour clock criteria?		Earl Advers		ELTENTIAL PROGRAMMAN AND PARAMENTAL AND SANGOLD BOTTON AND SANGOLD BOT
illa. Initiaticalibration		jų.		
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?				
Was a curve fit used for evaluation? If yes, dld the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	/			
Were all percent relative standard deviations (%RSD) $\leq$ 30%/15% and relative response factors (RRF) $\geq$ 0.05?				
IIIbalintalicalistatione/editication				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		/		
IV: Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				• :
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	_			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	denim é de			
W. Labo etois liBlanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
MATATORIO BOLES				
Were field blanks were identified in this SDG?				5. The state of th
Were target compounds detected in the field blanks?				
VIII. Sunoralospikes				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?				

LDC#: 364x ble

### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer:

Validation Area	Yes	No	NA	Findings/Comments
XIII. Matrix spike/Matrix spike duplicates.	F			
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
IX Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per analytical batch?	/			***
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		- CHOCKET	vicanodo:	AND AND THE PROPERTY OF THE PR
XX. (Filed Industries				
Were field duplicate pairs identified in this SDG?			_	
Were target compounds detected in the field duplicates?				
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	/			
Were retention times within ± 30 seconds of the associated calibration standard?				
XII. Compound cumille than	i C			
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XIII. Translat compound (dentification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XIV. System periomence				
System performance was found to be acceptable.				
XV. Overelli assessmenti of deta				
Overall assessment of data was found to be acceptable.	/			

### TARGET COMPOUND WORKSHEET

### METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chiorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC: tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. isobutyi alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodiffuoromethane	JJJ 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. lodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Aliyi chloride	U1. Nonanal
V. Benzene	W. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC#: 56 \$2- DIA

### **VALIDATION FINDINGS WORKSHEET Initial Calibration Verification**

Page:	lof_ <i>_</i>
Reviewe	r:JVG
2nd Reviewei	r <u>?\</u>

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was an initial calibration verification standard analyzed after each ICAL for each instrument?

_		-
Y N N/A	Were all %D within the validation criteria of ≤20 %	6D?

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Associated Samples	Qualifications
	04 106/10	1006VOI	JJ	23	All	J/45/A (C)
		A0.00 40 1	В	23	, , , , , , , , , , , , , , , , , , , ,	
			7	36		
			Z	30		
		***				
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						<u> </u>
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	<u> </u>					
					-0.000 PV-10.00 A	
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			<u> </u>			<u> </u>

LDC#: 36425 D19

### **VALIDATION FINDINGS WORKSHEET Continuing Calibration**

Page:_	_1_of
Reviewer:	JVG
2nd Reviewer:	6

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A". Was a continuing calibration standard analyzed at least once every 12 hours for each instrument.

Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?

Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's? YN N/A

Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF? Y (N) N/A

#		Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	04/9/16	·la 19001	Y	32		All	Qualifications  J/NJ/A/C)
			Z	34		1	1 703 7
					, , <u>, , , , , , , , , , , , , , , , , </u>		
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LDC #: 36425D1a

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

 $RRF = (A_x)(C_{is})/(A_{is})(C_x)$ 

 $A_x$  = Area of Compound

A<sub>is</sub> = Area of associated internal standard

average RRF = sum of the RRFs/number of standards

C<sub>x</sub> = Concentration of compound

Cis = Concentration of internal standard

%RSD = 100 \* (S/X)

S= Standard deviation of the RRFs

X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (IS)	Reported RRF (RRF 50 std)	Recalculated RRF (RRF 50 std)	Reported Average RRF (Initial)	Recalculated Average RRF (Initial)	Reported %RSD	Recalculated %RSD
1	ICAL		Carbon Disulfide (FBZ)	0.8289	0.8289	0.7901	0.7902	5	5
	HP09915		Tetrachloroethene (CBZ) 1,1,2,2-TCA (DCB)	0.3801 1.2036	0.3801 1.2036	0.3616 1.1241	0.3617 1.1241	8 11	8 11

LDC # 36425D1a

# VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Results Verification</u>

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: Y

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

Where:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

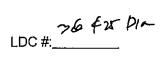
RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF Ax = Area of compound, Cx = Concentration of compound,

Ais = Area of associated internal standard Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported % D	Recalculated %D
1	LA19C01	4/19/2016	Carbon Disulfide (FBZ)	0.7901	0.7949	0.7949	1	1
	HP09915		Tetrachloroethene (CBZ)	0.3616	0.3888	0.3888	8	8
ĺ			1 1 2 2-TCA (DCB)	1 1241	1 1119	1.1119	1	1



### VALIDATION FINDINGS WORKSHEET Surrogate Results Verification

Page:_	_1_of_1_
Reviewer:_	JVG
2nd reviewer:_	Can

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: 4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	50.0	48,872	98	98	0,
1,2-Dichloroethane-d4		49,930	00	(60)	
Toluene-d8		50,658	10/	10 /	
Bromofluorobenzene		49-707	99	11	P

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene			<u></u>		

Sample ID:\_\_\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4		· · · · · · · · · · · · · · · · · · ·			<u> </u>
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene			<del></del>		

36425 DI~

### **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page: 1 of 1 Reviewer: JVG 2nd Reviewer:\_\_\_

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratoy control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = I LCSC - LCSDC I \* 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS LIS LCS ID:

Compound	Ac	oike Ided ル)	Concer	Sample ntration /L)	L CS Percent Recovery		LCSD. Percent Recovery		I CS/I CSD	
English Control of the Control of th	LCS	LCSD	LCS	LCSD		Recalc.				
	LCS	LCSD	100	LCSD	Reported	Recaic.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	20.0	W/A	19.61	14	98	98				
Trichloroethene	į.	\	20.67		103	103				
Benzene			20.13		ы	101				
Toluene			20,67		103	103				
Chlorobenzene	}		20.5		15 ]	101				

Comments: Refer	to Laboratory Control S	ample findings workshee	t for list of qualificatio	ns and associated s	amples when report	<u>ed results do not :</u>	agree within 10.0%
of the recalculated	results.	· · · · · · · · · · · · · · · · · · ·			·	·	

LDC#: 364 25 DIA

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: 1 of 1

Reviewer: JVG

2nd reviewer: \_\_\_\_\_\_\_\_

Percent solids, applicable to soils and solid matrices

Y N N/A Y N N/A

%S

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concer	tration	$A_{i} = \frac{(A_{i})(I_{i})(DF)}{(A_{i})(RRF)(V_{o})(\%S)}$	Example:
A <sub>x</sub>	=	Area of the characteristic ion (EICP) for the compound to be measured	Sample I.D. <u>ND</u> , <u>TUE</u>
$A_{is}$	=	Area of the characteristic ion (EICP) for the specific internal standard	
l <sub>s</sub>	=	Amount of internal standard added in nanograms (ng)	Conc. = (157074) (50.0) (1207597) (0.2148)
RRF	=	Relative response factor of the calibration standard.	
V <sub>o</sub>	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).	= 70.68
Df	=	Dilution factor.	2,21 45 /L

#	only. Sample ID	Compound	Reported Concentration	Calculated Concentration ( )	Qualification
	VS	TIE	2)		
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			<u> </u>		

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

1,4-Dioxane

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH269

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8337439	Water	04/14/16
SP-424A_041416_36_L	8337440	Water	04/14/16
TB-041416	8337441	Water	04/14/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8260B in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB-041416 was identified as a trip blank. No contaminants were found.

#### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

### VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

### IX. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

### X. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

### XII. Compound Quantitation

All compound quantitations met validation criteria.

#### XIII. Target Compound Identifications

All target compound identifications met validation criteria.

#### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW 1,4-Dioxane - Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Field Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

SDG#	#:36425D1b VALIDATIO #:PH269 atory:_Eurofins		PLETENES Level IV	S WORKSHEE		Date: 6 6 /17/ Page: of Reviewer: \(\frac{1}{4}\) Reviewer:
METH	IOD: GC/MS 1,4-Dioxane (EPA SW 846	Method 82	60B-SIM)		ZIIQ	reviewer. YA
	amples listed below were reviewed for eation findings worksheets.	ach of the fo	ollowing valida	ation areas. Validat	ion findings are	noted in attached
	Validation Area			Com	nents	
1	Sample receipt/Technical holding times	AIA			,	
II.	GC/MS Instrument performance check	A				
111.	Initial calibration/ICV	AA	1941	£ 152		10 = 20%
IV.	Continuing calibration	A		£ 20 B		
V.	Laboratory Blanks	A				
VI.	Field blanks	[2]	TE =	3		
VII.	Surrogate spikes	Á				
VIII.	Matrix spike/Matrix spike duplicates	12	CS		······	
IX.	Laboratory control samples	Α	L	<i>ठ</i>		
Х.	Field duplicates	25	D	= 1/2		
XI.	Internal standards	A				<del></del>
XII.	Compound quantitation RL/LOQ/LODs	4		· ',,		
XIII.	Target compound identification	A				
XIV.	System performance	A				
XV.	Overall assessment of data	A			· ·	
ote:	A = Acceptable ND = N N = Not provided/applicable R = Rin	lo compounds sate ield blank	detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	rce blank
	Client ID			Lab ID	Matrix	Date
- <b>가</b>	SP-424A_041416_01_L			8337439	Water	04/14/16
- 11	SP-424A_041416_36_L			8337440	Water	04/14/16
	ГВ-041416			8337441	Water	04/14/16
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7	VBUC E38		1 1			

LDC #: 36 4 15 DIB VALIDATION FINDINGS CHECKLIST

Page: 1\_of\_2 Reviewer: JVG 2nd Reviewer: \_\_\_\_\_

Method: Volatiles (EPA SW 846 Method 8260B-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	12.00			
Were all technical holding times met?	/	1000 FICE	S SASA PRIENTS	A CONTROL OF THE CONT
Was cooler temperature criteria met?	/			
II. GC/MS instrument performance check (Not required)				
Were the BFB performance results reviewed and found to be within the specified criteria?		_	T SPRINGERS AND ADDRESS OF	
Were all samples analyzed within the 12 hour clock criteria?				
Ilia initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05??				
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			/	
IIIb: Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent difference (%D) ≤20% or percent recoveries (%R) 80-120%?		on Later have		
IV-Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?				
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		_		
VI: Frield/blanks				
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?		4		
VII: Surrogate spikes:				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			/	
VIII. Matrix spike/Matrix spike duplicates			90. 5 8 9	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			1	
Was a MS/MSD analyzed every 20 samples of each matrix?				

LDC#: 364750山

### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \$\sqrt{1}\$

Validation Area	Yes	No	NA	Findings/Comments
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				
IX* Laboratory control samples ≯ 5.50 to 1.50	44		Carta	
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	/			
X*Field:duplicates 4.75				
Were field duplicate pairs identified in this SDG?	/			
Were target compounds detected in the field duplicates?	<u> </u>	/		
XI Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?				
Were retention times within ± 30 seconds of the associated calibration standard?		Ellerador.	****	
XII. Compound quantitation		i i		
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?				
XIV System performance.				
System performance was found to be acceptable.				
XV: Overall assessment of data				
Overall assessment of data was found to be acceptable.				

LDC # <u>36425D1b</u>

# VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JVG
2nd Reviewer: F2

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = (Ax)(Cis)/(Ais)(Cx)

%RSD = 100 \* (S/X)

Ax = Area of Compound

Ais = Area of associated internal standard

average RRF = sum of the RRFs/number of standards

Cx = Concentration of compound

Cis = Concentration of internal standard

S= Standard deviation of the RRFs

X = Mean of the RRFs

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
		Calibration		RRF	RRF	Average RRF	Average RRF	%RSD	%RSD
#	Standard ID	Date	Compound (IS)	(RRF 10 std)	(RRF 10 std)	(Initial)	(Initial)		
1	ICAL	3/11/16	1,4-Dioxane (1,4-D-d8)	1.2758	1.2758	1.2762	1.2762	4	4
ll	HP15648								

LDC # <u>36425D1</u>b

# VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Calculation Verification</u>

Page: ַ	<u>1</u> of <u>1</u>
Reviewer:	JVG
2nd Reviewer:	- 5m

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

Where:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF

RRF = (Ax)(Cis)/(Ais)(Cx)

ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

Ax = Area of compound

Cx = Concentration of compound,

Ais = Area of associated internal standard

Cis = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (IS)	CCV RRF	Reported RRF	Recalculated RRF	Reported % D	Recalculated %D
1	EA21C05 HP15648	4/21/2016	1,4-Dioxane (1,4-D-d8)	1.2762	1.2125	1.2125	5	5
2	EA25C01 HP15648	4/25/2016	1,4-Dioxane (1,4-D-d8)	1.2762	1.3781	1.3781	8	8

LDC# 76425 DH

# VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:	_1_of_1_
Reviewer:	JVG
2nd reviewer:	5~

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below u	na the	ne following	a calculation
--	--------	--------------	---------------

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found SS = Surrogate Spiked

Sam	ple	iD:	#	ı
valii	$\sim$	10,		

	Surrogate Spiked	Percent Percent Surrogate Recovery Recovery Found Reported Recalculated		Percent Difference	
Dibromofluoromethane	***				
1,2-Dichloroethane-d4					
Toluene-d8	10,0	9.847	98	98	9
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8	· ***			_	
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene				<u> </u>	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					<u></u>

Sample ID:\_\_\_\_\_

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4		<del></del>			
Toluene-d8					<u></u>
Bromofluorobenzene				_	

LDC#: 36425 D16

# **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page:_	<u>1_of_1_</u>
Reviewer:_	JVG
2nd Reviewer:	FZ

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = I LCSC - LCSDC | \* 2/(LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: \_\_\_\_

Compound	Spike Added ( Lag /L )		Spiked Sample Concentration ( И分 / し			Recovery		Recovery		/I.CSD
		LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,4-Dioxane	500	NA	4.97	NA	99	49				
1,2,3-TCP										
		ļ								
				<u></u>			ļ		ļ	
		<u> </u>								

Comments: Refer to Laboratory Control Sample findings worksheet for list of quali	<u>fications and associated samples when reported results do not agree within 10.0% </u>
of the recalculated results.	<u> </u>

LDC#: 36425 DB

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: 1 of 1

Reviewer: JVG

2nd reviewer: %\(\frac{1}{2}\)

METHOD: GC/MS VOA (EPA SW 846 Method 8260B-SIM)

(<u>Y) N N/A</u> Y N N/A Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Concentration =  $(A_i)(I_i)(DF)$ (A<sub>is</sub>)(RRF)(V<sub>o</sub>)(%S) Area of the characteristic ion (EICP) for the compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) RRF Relative response factor of the calibration standard. V, Volume or weight of sample pruged in milliliters (ml) or grams (g). Dilution factor. Df %S Percent solids, applicable to soils and solid matrices Example: Sample I.D. ND, 1.4-Dioxane CSE34Conc. = (9645)(10)(1.276x)(1

#	Sample ID	Compound	Reported Concentration (VG/L)	Calculated Concentration ( )	Qualification
	KZ.	Compound 1,4-Dioxane	4.97		
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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

June 29, 2016

Parameters:

Metals

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH269

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8337439	Water	04/14/16
SP-424A_041416_36_L	8337440	Water	04/14/16
SP-424A_041416_36_LMS	8337440MS	Water	04/14/16
SP-424A_041416_36_LMSD	8337440MSD	Water	04/14/16
SP-424A_041416_36_LDUP	8337440DUP	Water	04/14/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

#### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	04/26/16 (09:59)	Strontium	68.0 (80-120)	All samples in SDG PH269	J (all detects)	P
ICSAB	04/26/16 (10:53)	Strontium	64.0 (80-120)	All samples in SDG PH269	J (all detects)	Р

# V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Magnesium	117.760 ug/L 18.420 ug/L	All samples in SDG PH269
ICB/CCB	Aluminum Cadmium Calcium Chromium Cobalt Copper Magnesium Titanium	53.6 ug/L 0.37 ug/L 66.9 ug/L 0.97 ug/L 0.73 ug/L 2.1 ug/L 67.5 ug/L 0.21 ug/L	All samples in SDG PH269

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SP-424A_041416_01_L	Chromium	0.0023 mg/L	0.0023U mg/L
	Copper	0.0033 mg/L	0.0033U mg/L
SP-424A_041416_36_L	Aluminum	0.113 mg/L	0.113U mg/L
	Chromium	0.0025 mg/L	0.0025U mg/L

#### VI. Field Blanks

No field blanks were identified in this SDG.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For SP-424A\_041416\_36\_LMS/MSD, no data were qualified for Calcium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

#### VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met with the following exceptions:

Diluted Sample	Analyte	%D (Limits)	Associated Samples	Flag	A or P
SP-424C_041316_01_L	Strontium	13 (≤10)	All samples in SDG PH269	J (all detects)	А

### X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

# XI. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentration (mg/L)				
Analyte	SP-424A_041416_01_L	SP-424A_041416_36_L	RPD (Limits)	Flag	A or P
Aluminum	0.400U	0.113	112 (≤35)	NQ	-
Barium	0.0319	0.0336	5 (≤35)	-	_
Boron	0.0627	0.0756	19 (≤35)	-	-
Calcium	82.6	82.7	0 (≤35)	-	-
Chromium	0.0023	0.0025	8 (≤35)	-	-
Copper	0.0033	0.0200U	143 (≤35)	NQ	-
Iron	0.0717	0.0456	45 (≤35)	NQ	-
Lithium	0.0510	0.0532	4 (≤35)	-	-
Magnesium	23.7	24.7	4 (≤35)	-	-
Manganese	0.230	0.242	5 (≤35)	_	-
Molybdenum	0.0022	0.0200U	160 (≤35)	NQ	-
Potassium	3.25	3.36	3 (≤35)	-	-
Sodium	80.5	82.7	3 (≤35)	-	-
Titanium	0.0058	0.0059	2 (≤35)	-	-
Strontium	0.419	0.410	2 (≤35)	-	-

NQ = One or both results were less than 5X the reporting limit, therefore no data were qualified.

# XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

#### XIII. Sample Result Verification

All sample result verifications were acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICS %R and serial dilution %D, data were qualified as estimated in two samples.

Due to laboratory blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

# Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH269

Sample	Analyte	Flag	A or P	Reason (Code)
SP-424A_041416_01_L SP-424A_041416_36_L	Strontium	J (all detects)	Р	ICP interference check sample analysis (%R) (I)
SP-424A_041416_01_L SP-424A_041416_36_L	Strontium	J (all detects)	А	Serial dilution (%D) (A)

# Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH269

Sample	Analyte	Modified Final Concentration	A or P	Code
SP-424A_041416_01_L	Chromium Copper	0.0023U mg/L 0.0033U mg/L	Α	В
SP-424A_041416_36_L	Aluminum Chromium	0.113U mg/L 0.0025U mg/L	А	В

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

LDC #: 36425D4a	VALIDATION COMPLETENESS WORKSHEET
SDG #: PH269	Level IV
Laboratory: Eurofins	

Date: 6(28)10
Page: <u> </u> of <u> </u>
Reviewer:
2nd Reviewer: 500

METHOD: Metals (EPA SW 846 Method 6010C/6020A/7470A)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
1.	Sample receipt/Technical holding times	A	414/10
11.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	SW	
V.	Laboratory Blanks	Su	
VI.	Field Blanks	2	
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSO = (3,4) = (2,74x *8500) DD = SP-424C = 041316-01-L (576: PHZE) SER = SP-424C = 041316-01-L (576: PHZE)
VIII.	Duplicate sample analysis	A	DD=58-424 -041316-01-LDA (506-774) 3
ix.	Serial Dilution	SW	SER = SR-424C - 041316-01-L (SQG: PHZB)
X.	Laboratory control samples	A	ics
XI.	Field Duplicates	SW	FD= (1,2)
XII.	Internal Standard (ICP-MS)	A	
XIII.	Sample Result Verification	A	
XIV	Overall Assessment of Data	A	

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

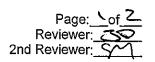
D = Duplicate

TB = Trip blank

EB = Equipment blank

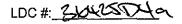
SB=Source blank OTHER:

	Client ID		Lab ID	Matrix	Date
1	SP-424A_041416_01_L		8337439	Water	04/14/16
2	SP-424A_041416_36_L		8337440	Water	04/14/16
3	SP-424A_041416_36_LMS	6010	8337440MS	Water	04/14/16
4	SP-424A_041416_36_LMSD		8337440MSD	Water	04/14/16
5	SP-424A_041416_36_LDUP	4	8337440DUP	Water	04/14/16
6					
7					
8					
9					
10					
11					
12			1		



Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		<u></u>	J	
All technical holding times were met.	-			
Cooler temperature criteria was met.	_			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?				
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	1			
Were all initial calibration correlation coefficients > 0.995?				
IV. Blanks				·
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates			··	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.	/			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?		<b>  </b>		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?				



# VALIDATION FINDINGS CHECKLIST

Page: 2 of 2 Reviewer: 352 2nd Reviewer: 54

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?				
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	1			
Were all percent differences (%Ds) < 10%?				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.	_			
Target analytes were detected in the field duplicates.				
XIII. Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.	$\bigcap$			

LDC#: 36425742

# VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: \\_\of\_\\_\
Reviewer: \\_\O\_\
2nd reviewer: \\_\O\_\

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-2	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
20:3-5	$\omega$	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn) Hg, Ni, K) Se, Ag, Na, Ti(V, Zn, Mo, B, Sn, Ti) Li) P(Zi
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
	·	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
	··	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Analysis Method
CP	——	ANSD/As) Ba) Ba) Cd/Ca/Cr/Co/Cu)/Fe/PD/Md/Mi), Hg, Ni) K) Se, Ag(Na, TV V/Zi)/Mg/B)Si)/Ti)(C) (P)(Z
P-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se Ag, Na/Tl, V, Zn, Mo, B, Sn, Ti,

Comments: Mercury by CVAA if performed

LDC #: 36425D4a

# **VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample**

Page: <u> </u> _of <u> </u> `	_
Reviewer: 25	2
2nd Reviewer:	_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Please see qualification	s below for all au	ections answered "N"	Not applicable	quaetione ara idant	ified as "NI/A"
rigase see qualification	is delow tol all da	estions answered in	. Not applicable	questions are ident	illed as IN/A .

/Y/N N/A

Were ICP interference check samples performed as required?

Were the AB solution percent recoveries (%R) within the control limits of 80-120%? Ý/ Ŋ<sup>2</sup>N/A

LEVEL IV ONLY:

/2N N/A

Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#_	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
	04/26/16	ICSAB (9:59)	Sr	68.0	All	J/UJ/P (det) (I)
	04/26/16	ICSAB (10:53)	Sr	64.0	Ali	J/UJ/P (det) (I)
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Comments:_			
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LDC #: 36425D4a

# VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied:\_

Sample Concentration units, unless otherwise noted: mg/L Associated Samples: All (B)

Sample Concentration units, unless otherwise noted.					mgr. Associated delriptes. All (b)								
							ടിന്നില്	lantification					
Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB² (ug/L)	Maximum ICB/CCB <sup>2</sup> (ug/L)		1	2							
AI			53.6	0.268000		0.113							
Cd		i	0.37	0.001850							 		
Са		117.760	66.9	0.588800									
Cr			0.97	0.004850	0.0023	0.0025							
Со			0.73	0.003650									
Cu			2.1	0.010500	0.0033								
Mg		18.420	67.5	0.337500									
Ti			0.21	0.001050									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36425D4a

# **VALIDATION FINDINGS WORKSHEET ICP Serial Dilution**

	Page:_	<u>\</u> of_	/
F	Reviewer:	3	$\geq$
2nd F	Reviewer:	Sa	

METHOD: Trace Metals (EPA SW 846 Method 6010C/6020A/7471B)

_	<i>-</i>		[a = 1 = E = = = 1]	questions answered	II N P11	NIAL AMERICA				IIN I / A II
_	16266 666 (	manncanons.	DEIOW TOT SIL	anesiions answeren.		INOT ADDIT	anie di	IESTIONS 2	ire identitied s	16IVI\V
	ACCION C	444111104110110								

Ý)<u>n, n/a</u> If analyte concentrations were > 50X the MDL (ICP) ,or >100X the MDL (ICP/MS), was a serial dilution analyzed?

N/N/A Were ICP serial dilution percent differences (%D) ≤10%? / /N/ N/A

Is there evidence of negative interference? If yes, professional judgement will be used to qualify the data.

LÉVEL IV ONLY:

<u>Ý⁄N N/A</u> Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

	Dil. 4 - 1 C 1 - 1 D			0/5/11/2/	····	
#		<u>Matrix</u>	Analyte	%D (Limits)	Associated Samples	Qualifications
	SP-424C_041316_01_L (SDG: PH268)	W	Sr	13	All	J/UJ/A (det) (A)
	,					
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#### LDC#: 36425D4a

## **VALIDATION FINDINGS WORKSHEET** Field Duplicates

2nd Reviewer:

METHOD: Metals (EPA Method 6010B/7000)

Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentr	ation (mg/L)		
Analyte	1	2	RPD (≤35)	Qual. (Parent Only)
Aluminum	0.400U	0.113	112	NQ
Barium	0.0319	0.0336	5	
Boron	0.0627	0.0756	19	
Calcium	82.6	82.7	0	
Chromium	0.0023	0.0025	8	
Copper	0.0033	0.0200U	143	NQ
Iron	0.0717	0.0456	45	NQ
Lithium	0.0510	0.0532	4	
Magnesium	23.7	24.7	4	
Manganese	0.230	0.242	5	
Molybdenum	0.0022	0.0200U	160	NQ
Potassium	3,25	3.36	3	
Sodium	80.5	82.7	3	
Titanjum	0.0058	0.0059	2	
Strontium	0.419	0.410	2	

NQ = No qual. because one or both results < 5X RL

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD\_inorganic\36425D4a.wpd

LDC#:3642SV

# **VALIDATION FINDINGS WORKSHEET** Initial and Continuing Calibration Calculation Verification

Page:_	<u></u> of_	7
Reviewer:_	32	$\sum_{i}$
2nd Reviewer:	N	$\overline{}$

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found</u> x 100 True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

		"			Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
JCV 11:13	ICP (Initial calibration)	て	608 vall	6000g(1	101.3%	101.39.2	7)
5CV 9:48	ICP/MS (Initial calibration)	S	49.56yl	)	99.18c	99.188	
7517 5:17	CVAA (Initial calibration)	Ha	2.48 mg/c		99.295	99.2%R	
CCV 11:34	ICP (Continuing calibration)	<b>V</b>	505.3 cg/c	500 410	101.19.8	101,10,12	
10204 CCV	ICP/MS (Continuing calibration)	17	25.9491	7	103.8%	103.8%R	
CCV 9132	CVAA (Contining calibration)	Ha	0.950glc	lugic	95%R	95%R	4
	GFAA (Initial calibration)			<del>-</del> '			
	GFAA (Continuing calibation)						

Comments:		
<del></del>		
		<del></del>

LDC#: 3642504a

# **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

2nd Reviewer

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = [S-D] \times 100$ (S+D)/2

Where, S = Original sample concentration

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

 $%D = |I-SDR| \times 100$ 

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB	ICP interference check	کت	466 291	500 ugil	93.2%.R	93.2%R	2
105 9120	Laboratory control sample	Hq	1.06 vg/	1091	106%	106%	
MS 11:59	Matrix spike	PO	(SSR-SR) 153.20g/C	150-g/C	1027/8	102%	
11:20 DS	Duplicate	K	3.40 mg/L	3.36 mg/	1%270	1%80	
SER- 12:07	ICP serial dilution	Na	78.48mg/L	8269mg/	5%D	220	4

Comments:	 	 	<u> </u>	 		

LDC#: 3/0425049

# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: of Reviewer: 2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

			,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		,			
Please Y N Y N Y N	N/A N/A	Have results Are results w	been reported a	nd calculated ad range of t	d correctly?	icable questions ar s and within the line		
	ted anal	yte results for _		Ca		were recalcu	llated and verified	using the following
Concen	tration =	(RD)(FV)(Dil) (In. Vol.)		F	Recalculation:			
RD FV In. Vol. Dil	= = = =	Raw data conce Final volume (m Initial volume (n Dilution factor	nl)	RD	= 82.67	5 mg/c 2	827 male	_
#	S	ample ID		Analyte		Reported Concentration ((vg/L)	Calculated Concentration (Wa()	Acceptable (Y/N)
		\		Ca		82.6	827	٧.*
		2		Sr		0.410	0,4,0	3
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Vote:_								

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 29, 2016

Parameters:

Fluoride

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH269

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8337439	Water	04/14/16
SP-424A_041416_36_L	8337440	Water	04/14/16
SP-424A_041416_01_LDUP	8337439DUP	Water	04/14/16
SP-424A_041416_01_LMS	8337439MS	Water	04/14/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Fluoride by Environmental Protection Agency (EPA) Method 300.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

## III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

#### IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

## VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### IX. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentrat	ion (mg/L)			
Analyte	SP-424A_041416_01_L	SP-424A_041416_36_L	RPD (Limits)	Flag	A or P
Fluoride	1.9	2.0	5 (≤35)	-	-

# X. Sample Result Verification

All sample result verifications were acceptable.

#### XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

# Santa Susana Field Laboratory, GW Fluoride - Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Laboratory Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Field Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

	#: <u>36425D6</u> <b>VALIDATIO</b> 6#: PH269		PLETENESS Level IV	S WORKSHEET		Date: 62
	pratory: <u>Eurofins</u>	•	LEVELIV		i	Page: \of \ Reviewer: \square
	, <del></del>				2nd I	Reviewer: 514
MET	HOD: (Analyte) Fluoride (EPA Method	1 300.0)				,
	samples listed below were reviewed for e ation findings worksheets.	each of the f	ollowing valida	ation areas. Validation	n findings are	noted in attached
	Validation Area			Comme	ents	
<u> </u>	Sample receipt/Technical holding times	A	4/14/16			
	Initial calibration	A				
111.	Calibration verification	A				
IV	Laboratory Blanks	A				
v	Field blanks					
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS=(4)	)		
VII.	Duplicate sample analysis	A	DV8	,	<u>.</u>	
VIII	. Laboratory control samples	A	LCS			
IX.	Field duplicates	SW	FD= (1	(2)		
<u>x.</u>	Sample result verification	A	1			
XL	Overall assessment of data					
Note:	N = Not provided/applicable R = R	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	SB=Sour OTHER:	
	Client ID			Lab ID	Matrix	Date
1	SP-424A_041416_01_L			8337439	Water	04/14/16
2	SP-424A_041416_36_L			8337440	Water	04/14/16
3	SP-424A_041416_01_LDUP			8337439DUP	Water	04/14/16
4	#1 MS					
5		····				
6						
7						
8						
9						
10						
11						
12						

Notes:\_

### VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: 222 2nd Reviewer: 222

Method: Inorganics (EPA Method See Cover)

modification (2) / modificacy				<del></del>
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
Cooler temperature criteria was met.				
II. Calibration				
Were all instruments calibrated daily, each set-up time?				
Were the proper number of standards used?				
Were all initial calibration correlation coefficients ≥ 0.995?				
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?				
Were titrant checks performed as required? (Level IV only)			/	
Were balance checks performed as required? (Level IV only)		<u></u>	_	
III. Blanks				
Was a method blank associated with every sample in this SDG?				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/			
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.				
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	-			
Was an LCS analyzed per extraction batch?	_			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?			/	

LDC #: 3642506

## VALIDATION FINDINGS CHECKLIST

Page: Zof Z Reviewer: ZSD 2nd Reviewer: Y

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
Were detection limits < RL?	/			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.	1			
Target analytes were detected in the field duplicates.				
X. Field blanks				
Field blanks were identified in this SDG.		1		
Target analytes were detected in the field blanks.			/	

LDC#: 36425D6

# VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: \\_of\\_ Reviewer: \\_\_\_\_\_ 2nd Reviewer: \\_\_\_\_\_\_

Inorganics, Method See Cover

	Concentrati			
Analyte	1	2	RPD (≤35)	Qualification (Parent only)
Fluoride	1.9	2.0	5	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD\_inorganic\36425D6.wpd

LDC #: 3612570

# Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page:_	<u> </u>	<u> </u>
Reviewe	er: <u> </u>	<u>~</u>
nd Revi	ewer:_	54

Method: Inorganics, Method	See Cover	<u> </u>
The correlation coefficient (r) for the	ne calibration of	was recalculated.Calibration date: <u>4\2\\\</u>
An initial or continuing calibration	verification percent	recovery (%R) was recalculated for each type of analysis using the following formula:
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte <u>measured</u> in the analysis of the ICV or CCV solution
True		True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyte	Standard	Conc. (mg/L)	Area	r or r <sup>2</sup>	r or r <sup>2</sup>	(Y/N)
Initial calibration		s1	0.0	0			
		s2	0.1	0.0205	0.999925	0.999929	
	E	s3	0.4	0.0735	_		<b>4</b> *
	Γ	<u>s4</u>	11	0.18			7
	1	s5	2	0.3534			
		s6	3	0.5352			
JCW 1727 Calibration verification		5.774 mgh	The 0.75mg/L		103%R	44	. 3
CCV (3:57) Calibration verification	7	0.718 mg/c	0.75mg/		96%R	78	1
Calibration verification			)				

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within
10.0% of the recalculated results.

\* Rounding

LDC#: 3642504

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

	Page:∑	of	7
	Reviewer:_	25	<b>⊋</b>
2nd	Reviewer:_	_{	

		<b>a</b>	(
METHOD: Inorganics,	Method	_ <i></i>	Grec

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found \times 100$ True

Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ 

Where,

S =

Original sample concentration

+D)/2 D =

(S+D)/2

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
11:110	Laboratory control sample	F,	0.689 mg/c	0.75mg/c	92%	9192	37
MS 15:19	Matrix spike sample		(SSR-SR) S-198mg/L	Smgl	1048R	1043E	3)
DUP 14:52	Duplicate sample	J	1949 mgs	1,921mgic	1%890	2%R90	Y-*

Comments: _	* Boundina				
		\		 	

LDC#: 36425504

# **VALIDATION FINDINGS WORKSHEET**

Sample Calculation Verification

Page: \_of\_	_
Reviewer:	
2nd reviewer:	_

METHOD: Ino	rganics, Method <u>Se</u>	a Cover		
M\N N/A Y\N N/A Y\N N/A	Have results been re Are results within the Are all detection limit	ported and calculated co calibrated range of the s below the CRQL?		lentified as "N/A".
Compound (an recalculated ar	nalyte) results for( and verified using the fo	llowing equation:	reporte	d with a positive detect were
Concentration =	500.0-A	Recalculation:	Zx ( 500,0-50.0)	= 1.9 mg/c
A= (	=2 ).0J			

#	Sample ID	Analyte	Reported Concentration	Calculated Concentration (wg()	Acceptable (Y/N)
		F	1,24	1,3	7
	2	7	2.0	ZJ	7*
					-
					<del></del> i
-					
	•				

Note:_	*Pounding			 

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Perchlorate

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH269

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8337439	Water	04/14/16
SP-424A_041416_36_L	8337440	Water	04/14/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. LC/MS Instrument Performance Check

Instrument performance check was performed prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r²) was greater than or equal to 0.990.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

## IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

## V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

No field blanks were identified in this SDG.

## VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

## VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

## IX. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

## XI. Compound Quantitation

All compound quantitations were within validation criteria.

## XII. Target Compound Identifications

All target compound identifications were within validation criteria.

## XIII. System Performance

The system performance was acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Perchlorate - Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Laboratory Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Field Blank Data Qualification Summary - SDG PH269

No Sample Data Qualified in this SDG

LDC #	#:_ 36425D87 <b>VALIDA</b>	ATION COMP	LETENES	S WORKSHEI	ET	Date: 66/17
SDG#	#: PH269	L	_evel IV			Page: \_of \frac{1}{V} Reviewer: \_\V'
Labora	atory: <u>Eurofins</u>				Om al	Reviewer:_ <u></u>
METH	IOD: LC/MS Perchlorate (EPA SW8	346 Method 6850	<b>)</b> )		∠ng i	Reviewer:
	amples listed below were reviewed for tion findings worksheets.	or each of the fo	llowing valid	ation areas. Valid	ation findings are	noted in attache
	Validation Area			Cor	mments	
i.	Sample receipt/Technical holding times	AA				
11.	GC/MS Instrument performance check					
Ш.	Initial calibration/ICV	A, A	۲,	·		1W & 15 3
IV.	Continuing calibration	A	cay &	15 6	Lo	10V £ 30 l.
V.	Laboratory Blanks	A				
VI.	Field blanks	N				
VII.	Surrogate spikes	N				
VIII.	Matrix spike/Matrix spike duplicates	WA	OS,	SP-424C_00	41316-01-L	
IX.	Laboratory control samples	A		VS		
X.	Field duplicates	IND	D :	= 1/2		
XI.	Internal standards	A				-
XII.	Compound quantitation RL/LOQ/LODs	Ä				
XIII.	Target compound identification	A				
XIV.	System performance	A				
XV.	Overall assessment of data	A				·
lote:	A = Acceptable N N = Not provided/applicable R	ID = No compounds t = Rinsate B = Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment b	OTHER:	rce blank
	Client ID			Lab ID	Matrix	Date
1- 5	SP-424A_041416_01_L			8337439	Water	04/14/16
	SP-424A_041416_36_L			8337440	Water	04/14/16
3						
4						
5						
6		Tirdle				
7		· · · · · · · · · · · · · · · · ·				
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	PBLK25112					
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LDC#: 36425787

## **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2
Reviewer: JVG
2nd Reviewer: \_\_\_\_\_\_

Method: Perchlorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I: Technical holding times	物形	t kirki Tir	排[in] 记	
Were all technical holding times met?				
Was cooler temperature criteria met?			<u> </u>	
II/ LC/MS Instrument performance check	S. S.	62		
Were the instrument performance reviewed and found to be within the specified criteria?				
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?		2 10 10		
IIIa. Initial calibration		数据的 的 人	権が終っ	
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) ≤ 20%?	W		•	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of $\geq$ 0.990?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?		_		The second secon
IIIb. Initial Calibration Verification		<u> </u>		
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 15%?		- Newton for vegan	100	The state of the s
IV. Continuing calibration				
Was a continuing calibration analyzed daily?				· · · · · · · · · · · · · · · · · · ·
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?				
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?				AND THE COLORS OF THE COLORS O
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	TOAの WING   出海協会			
VI. Field blanks				
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?				
VIII.:Matrix spike/Matrix spike duplicates			1.00	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.				
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				

LDC#: 36425 D87

## VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: JVG
2nd Reviewer: \_\_\_\_\_\_

Validation Area	Vac		NI A	Findings/Comments
	Yes	No	NA	Findings/Comments
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?				
Was an LCS analyzed per extraction batch?	Ļ,			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
X. Field duplicates:				The state of the s
Were field duplicate pairs identified in this SDG?				
Were target compounds detected in the field duplicates?.				
XI. Internal standards 1.4				
Were internal standard area counts within $\pm$ 50% of the associated calibration standard?				
Were retention times of m/z 89 (Cl <sup>18</sup> O <sub>3</sub> ) within 0.2 minutes of m/z 83 (ClO <sub>3</sub> )?				
XIII Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	/			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII. Target compound identification	a de Emira			
Were relative retention times (RRT's) within 0.98 to 1.02?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?				
XIV. System performance.				
System performance was found to be acceptable.				
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	~			

LDC #\_36425D87

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

METHOD:

LCMS Perchlorate (EPA SW 846 Method 6850)

Parameter:

<u>Perchlorate</u>

Order of regression:

Linear

Date	Instrument	Compound	Points	y Response ratio	x Conc ratio
26-Apr-16	MS5P11616	Perchlorate	Point 1	0.1386	0.040
			Point 2	0.3517	0.100
			Point 3	0.7130	0.200
			Point 4	1.4656	0.400
		Ī	Point 5	3.9184	1.000
			Point 6	10.7827	2.500
		Ī			

Regress	sion Output: Regression Output:		Reported	
Constant	c =	-0.17043	c =	-0.0604
Std Err of Y Est		0.04		
R Squared	r^2 =	0.99869	r^2 =	0.99666
No. of Observations		6.00		
Degrees of Freedom		5.00		
X Coefficient(s)	m =	0.23023	m =	0.41820
Std Err of Coef.	0.01			

LDC#: 36425D87

## VALIDATION FINDINGS WORKSHEET <u>Continuing Calibration Calculation Verification</u>

Page: 1\_of\_1 Reviewer: JVG 2nd Reviewer:

Method: LCMS Perchlorate (EPA SW 846 Method 6850)

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration percent difference (%D) values were recalculated for the compounds identified below using the following calculation:

#### Where:

Percent difference (%D) = 100 \* (N - C)/N

N = Initial Calibration Factor or Nominal Amount

C = Calibration Factor from Continuing Calibration Standard or Calculated Amount

#	Standard ID	Calibration Date	Compound	CCV Conc	Reported Conc	Recalculated Conc	Reported % D	Recalculated %D
1	ms5P11616032	4/26/2016	Perchlorate	0.40	0.50	0.50	25.00	25.00
	lodv						- · · · · · · · · · · · · · · · · · · ·	

LDC#: 36425 D87

## **VALIDATION FINDINGS WORKSHEET**

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page:_	<u>1_ot_1_</u>
Reviewer:_	_JVG
2nd Reviewer	7

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850/6860)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = ILCS - LCSD | \* 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: \_\_\_\_

Compound	Spike Added ( りん)		Spike Concentration ( 以 /L)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	1 CSD	LLCS	L CSD	Reported	Recalc	Reported Recalc		Reported Recalc	
Perchlorate	5.00	NA-	5,39	NA-	Jo &	108				
				_						<u>,                                    </u>
						-				
										_ <del>_</del>
	_								-	

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and as	sociated samples when reported
results do not agree within 10.0% of the recalculated results.	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Gross Alpha & Beta

Validation Level: Level IV

Laboratory: Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30179860

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	30179860001	Water	04/06/16
SP-T02D_040616_36_L	30179860002	Water	04/06/16
SP-T02B_041216_01_L	30179860003	Water	04/12/16
SP-T02C 04122016 01 L	30179860004	Water	04/12/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gross Alpha and Beta by Environmental Protection Agency (EPA) Method 900.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

## III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

## VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

## VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Activity	/ (pCi/L)			
Isotope	SP-T02D_040616_01_L	SP-T02D_040616_36_L	RPD (Limits)	Flag	A or P
Gross alpha	19.6	14.8	28 (≤35)	3	-
Gross beta	8.74	9.15	5 (≤35)	-	-

## X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XI. Sample Result Verification

All sample result verifications were acceptable.

## XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Laboratory Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Field Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

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pratory: Pace Analytical Services, Inc.				2nd	Page: cof Reviewer: Reviewer:
samples listed below were reviewed for elation findings worksheets.	ach of the fo	ollowing valida	ation areas. Valida	ition findings are	noted in attache
Validation Area			Com	ments	
Sample receipt/Technical holding times	AIA	<u> </u>			
Initial calibration	$\perp A$				
Calibration verification	14		<u>,</u>		
Laboratory Blanks	<u> </u>				
Field blanks	<u> </u>				
Matrix Spike/Matrix Spike Duplicates	<u> </u>				<del></del>
. Duplicates		(()			
. Laboratory control samples	1/+	12 XX			
Field duplicates	DW.	( <u>) را کا</u>			
Minimum detectable activity (MDA)	<del>\</del>				
Sample result verification	1 #		·····		
Overall assessment of data		<u> </u>			
N = Not provided/applicable R = R	Rinsate	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER:	irce blank :
Client ID			Lab ID	Matrix	Date
SP-T02D_040616_01_L			30179860001	Water	04/06/16
SP-T02D_040616_36_L			30179860002	Water	04/06/16
SP-T02B_041216_01_L			30179860003	Water	04/12/16
SP-T02C_04122016_01_L			30179860004	Water	04/12/16
	#: 30179860 pratory: Pace Analytical Services, Inc.  HOD: Gross Alpha & Beta (EPA SW846) samples listed below were reviewed for elation findings worksheets.  Validation Area  Sample receipt/Technical holding times Initial calibration Calibration verification Laboratory Blanks Field blanks Matrix Spike/Matrix Spike Duplicates Duplicates Laboratory control samples Field duplicates Minimum detectable activity (MDA) Sample result verification Overall assessment of data  A = Acceptable N = Not provided/applicable SW = See worksheet  Ctient ID  SP-T02D_040616_01_L  SP-T02B_041216_01_L	pratory: Pace Analytical Services, Inc.  PHOD: Gross Alpha & Beta (EPA SW846 Method 900 Samples listed below were reviewed for each of the fration findings worksheets.  Validation Area  Sample receipt/Technical holding times Initial calibration Calibration verification Laboratory Blanks Field blanks  Matrix Spike/Matrix Spike Duplicates Duplicates Laboratory control samples Field duplicates Minimum detectable activity (MDA) Sample result verification Coverall assessment of data  A = Acceptable N = Not provided/applicable SW = See worksheet  Client ID  SP-T02D_040616_01_L SP-T02B_041216_01_L	##: 30179860 Level IV  pratory: Pace Analytical Services, Inc.  ##OD: Gross Alpha & Beta (EPA SW846 Method 900.0)  samples listed below were reviewed for each of the following validation findings worksheets.    Validation Area	Level IV  THOD: Gross Alpha & Beta (EPA SW846 Method 900.0)  samples listed below were reviewed for each of the following validation areas. Validation findings worksheets.  Validation Area  Sample receipt/Technical holding times  Initial calibration  Calibration verification  Laboratory Blanks  Field blanks  Matrix Spike/Matrix Spike Duplicates  Duplicates  Minimum detectable activity (MDA)  Sample result verification  A = Acceptable N = Not provided/applicable SW = See worksheet  N = Field blank  D = No compounds detected R = Rinsate FB = Field blank  D = Duplicate TB = Trip blank EB = Equipment bl  Client ID  Lab ID  SP-T02D_040616_01_L  SP-T02D_040616_01_L  30179860001	# 30179860  Pratory: Pace Analytical Services, Inc.  PHOD: Gross Alpha & Beta (EPA SW846 Method 900.0)  ### Samples listed below were reviewed for each of the following validation areas. Validation findings are ation findings worksheets.    Validation Area

Notes:

LDC#: 36423702

Page: 1 of 2 Reviewer: 02 2nd Reviewer: 52

Method: Radiochemistry

Method: Radiochemistry								
Validation Area	Yes	No	NA	Findings/Comments				
I. Technical holding times	<b>_</b>							
All technical holding times were met.			<u> </u>					
II. Calibration								
Were all instruments and detectors calibration as required?								
Were NIST traceable standards used for all calibrations?								
Was the check source identified by activity and radionuclide?								
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	/		   					
III. Blanks	- <del></del> -	, <u> </u>	·					
Were blank analyses performed as required?								
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		/						
IV. Matrix spikes and Duplicates	c							
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.		 						
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.								
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?								
Were all duplicate sample duplicate error rations (DER) <1.42?.								
V. Laboratory control samples	<del>/</del> -							
Was an LCS analyzed per analytical batch?	/							
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%								
VI. Sample Chemical/Carrier Recovery		···		····				
Was a tracer/carrier added to each sample?								
Were tracer/carrier recoveries within the QC limits?								
VII. Regional Quality Assurance and Quality Control	<del>,                                    </del>							
Were performance evaluation (PE) samples performed?		/		/				
Were the performance evaluation (PE) samples within the acceptance limits?								
VIII. Sample Result Verification			<b>,</b>					
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		, 						
Were the Minimum Detectable Activities (MDA) < RL?								

LDC#: 36425F27

## **VALIDATION FINDINGS CHECKLIST**

Page: Of Z Reviewer: O1 2nd Reviewer. S

Validation Area	Yes	No	NA_	Findings/Comments
IX. Overall assessment of data				·
Overall assessment of data was found to be acceptable.				
X. Field duplicates			س.	/
Field duplicate pairs were identified in this SDG.		X	7	
Target analytes were detected in the field duplicates.			Ø	
XI. Field blanks				
Field blanks were identified in this SDG.				·
Target analytes were detected in the field blanks.				

LDC#<u>36425F22</u>

## **VALIDATION FINDINGS WORKSHEET**

## Field Duplicates

Page: of of Page: 2nd Reviewer: 2nd Reviewer

Radiochemistry, Method\_see cover\_

	Activity (pCi/L)  1 2			
Isotope			RPD (≤35)	Qual (Parent Only)
Gross Alpha	19.6	14.8	28	
Gross Beta	8.74	9.15	5	

\\LDCFILESERVER\\Validation\FIELD DUPLICATES\FD\_inorganic\36425F22.wpd

## **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

	Page:_	of
F	Reviewer:	00
2nd F	Reviewer:	02

METHOD: Radiochemistry (Method: Secover )
---

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalluculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{[S-D]} \times 100$ 

Where, S = Original sample activity

(S+D)/2

D = Duplicate sample activity

0					Recalculated	Reported	Acceptable
Sample ID	Type of Analysis  Laboratory control sample	Analyte G (0550)	Found/S (units)	15,865	71,16	71-16	(Y/N)
N	Matrix spike sample						
N	Duplicate RPD	·					
V	Chemical recovery						

Comments:	Refer to appropriate	worksheet for lis	st of qualificati	ons and associat	ed samples whe	n reported results	s do not agree with	n 10.0% of the	recalculated resu	<u>lts.</u>
	····		<u> </u>			<del></del>				
				<u></u>				· · · · · · · · · · · · · · · · · · ·		

LDC#: 36425 FTV

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of/
Reviewer:_	a
nd reviewer:	500

METH	HOD: Radiochemistry (	Method: See aver		2na re	eviewer: <del>\$\frac{1}{2}</del>
	N/A Have results	ow for all questions answered "N". Not a been reported and calculated correctly within the calibrated range of the instrum	?	e identified as "N//	<b>4</b> ".
Analyl using	te results forthe following equation:	605t r	eported with a positive	detect were recald	culated and verified
Concen	atration =	Recalculation:			
2.22 > E = Cou SA = Se	- background)  CE x SA x Vol  unter Efficiency elf-absorbance factor olume of sample	0.505-0.061	<del>(0,0448}0</del> .	= 17a 111) = 19	- 163011
		12.22	<u>-(0.12031)(U, (</u>	3897)	1.6 3611
#	Sample ID	Analyte	Reported Concentration (女げん)	Calculated Concentration	Acceptable (Y/N)
	\	GOSSA	19.6	19,6	7
	2	T. T.	14,8	14.8	Ŷ
	3	Gross B			
	4	Ja			
				ļ	
			<u> </u>	<u> </u>	
			-		
			<u> </u>		
·				<u></u>	
Vote:_					

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Tritium

Validation Level: Level IV

**Laboratory:** Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30179860

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	30179860001	Water	04/06/16
SP-T02D_040616_36_L	30179860002	Water	04/06/16
SP-T02B_041216_01_L	30179860003	Water	04/12/16
SP-T02C_04122016_01_L	30179860004	Water	04/12/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Tritium by Environmental Protection Agency (EPA) Method 906.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

Quench curves were generated for each sample when applicable.

## III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

## VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

## VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

## IX. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Activity	/ (pCi/L)			
Isotope	SP-T02D_040616_01_L	SP-T02D_040616_36_L	RPD (Limits)	Flag	A or P
Tritium	1272	1219	4 (≤35)	-	-

## X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XI. Sample Result Verification

All sample result verifications were acceptable.

## XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Tritium - Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Laboratory Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Field Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

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				S WORKSHEET		Date: <u>6/6/</u>
SDG Labor	#: 30179860	la t	Level IV		E	Page:of <u>}_</u> Reviewer:
Lapo	#: 30179860 ratory: Tost America, Inc. Pace Analy: Services	The. m			2nd R	Reviewer:
METI	HOD: Tritium (EPA Method 906.0)					, ,
The s	samples listed below were reviewed for e	each of the f	ollowing valida	ation areas. Validation	ı findinas are ı	noted in attached
	ation findings worksheets.		• · · · · · · · · · · · · · · · · · · ·		· ····	
<u> </u>	V-11-1-A	<u> </u>		0	<u> </u>	··
<u> </u>	Validation Area	1 A , A	<u> </u>	Comme	nts	· · · · · · · · · · · · · · · · · · ·
<del>  !:</del> -	Sample receipt/Technical holding times	AIA				
11.	Initial calibration	A			Ovench a	
111.	Calibration verification	A			VVENCTLE	
<u>IV.</u>	Laboratory Blanks	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
V.	Field blanks	N	NOTIGU	· ~		
VI.	Matrix Spike/Matrix Spike Duplicates	<del>  /v  </del>	MAILEN			
VII.	Duplicates  Laboratory control samples	<u> </u>	10010	)		
VIII.	Laboratory control samples	15w	112	<b>,</b>		-
IX.	Field duplicates  Minimum detectable activity (MDA)	+ <del>}</del>	1000	··· · · · · · · · · · · · · · · · · ·		
X.	Minimum detectable activity (MDA)	<del>                                     </del>				
XI. XII	Sample result verification  Overall assessment of data	<del>                                      </del>	<u> </u>			
Note:	A = Acceptable ND = N = Not provided/applicable R = R	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	SB=Sourd OTHER:	e blank
	Client ID			Lab ID	Matrix	Date
1	SP-T02D_040616_01_L			30179860001	Water	04/06/16
2	SP-T02D_040616_36_L			30179860002	Water	04/06/16
3	SP-T02B_041216_01_L			30179860003	Water	04/12/16
4	SP-T02C_04122016_01_L			30179860004	Water	04/12/16
5					-	
6		******				
7				<b>3.7</b> 4		
8						
9						
10				<u> </u>		<u> </u>
11						
12		<del></del>				
13						

Notes:\_

LDC# 36425 F34

Page: U of Z Reviewer: OZ 2nd Reviewer: Sx

Method: Radiochemistry

Yes	No	NA	Findings/Comments				
I. Technical holding times							
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/							
	Yes	Yes No	Yes No NA				

LDC#\_ 36425 F34

## **VALIDATION FINDINGS CHECKLIST**

Page: Of Z Reviewer: O1 2nd Reviewer: S0

Validation Area	Yes No NA	Findings/Comments
IX. Overall assessment of data		
Overall assessment of data was found to be acceptable.		
X. Field duplicates		
Field duplicate pairs were identified in this SDG.		
Target analytes were detected in the field duplicates.	. /	
XI. Field blanks		
Field blanks were identified in this SDG.		,
Target analytes were detected in the field blanks.		

## LDC#<u>36425F34</u>

## VALIDATION FINDINGS WORKSHEET Field Duplicates

Page: of Reviewer: 2nd Reviewer:

Radiochemistry, Method see cover

	Activity			
Isotope	1	2	RPD (≤35)	Qual (Parent Only)
Tritium	1272	1219	4	

 $\verb|\LDCFILESERVER|\Validation|\FIELD DUPLICATES|\FD_inorganic|\36425F34.wpd|$ 

## **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page: <u> </u> of <u> </u>	_
Reviewer: CY	
2nd Reviewer: A	_
_ ,	

METHOD: Radiochemistry (Method: Secret

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = <u>Found</u> x 100 True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

					Recalculated	Reported	Acceptable
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	%R or RPD	(Y/N)
LCS	Laboratory control sample	H-3	2235.11	2375.81	94.08	94.08	4
N	Matrix spike sample						
N	Duplicate RPD						
<b>N</b>	Chemical recovery						

Comments: _	Refer to appropris	ate worksheet for	list of qualification	ons and associa	ated samples wh	<u>nen reported resi</u>	ults do not agree v	<u>vithin 10.0% of t</u>	he recalculated results.
				_					

LDC #: 36425 F34

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:_	a
2nd reviewer:_	Sh

MET	HOD: Radiochemistry (	Method: See aver )			
<u>/У\и</u>	N/A Have results	low for all questions answered "N". Not ap s been reported and calculated correctly? within the calibrated range of the instrume		e identified as "N//	<b>4"</b> .
using	te results for the following equation:	rep	ported with a positive	detect were recald	culated and verifie
(cpm 2.22 : E = Co SA = S	n - background) x E x SA x Vol  unter Efficiency elf-absorbance factor folume of sample	481 = 6.6-2.2/ $(2.22(0.164)($	(001)(0.9967)	16.963)=	1272.3pC
#	Sample ID	Analyte	Reported Concentration ( 🍎 , ( 4)	Calculated Concentration ( pc, lL)	Acceptable (Y/N)
		H-3	1272	1272	Y
	2		1219	1219	
<b> </b>	3		807	804	<del></del>
<b> </b>	4	1	570	520	
<u> </u>	· · · · · · · · · · · · · · · · · · ·				
			<u> </u>		· · · · · · · · · · · · · · · · · · ·
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<u> </u>					· · · · · · · · · · · · · · · · · · ·
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Note:	 ····	 
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	 <del></del>	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

Gamma Spectroscopy

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30179860

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	30179860001	Water	04/06/16
SP-T02D_040616_36_L	30179860002	Water	04/06/16
SP-T02B_041216_01_L	30179860003	Water	04/12/16
SP-T02C_04122016_01_L	30179860004	Water	04/12/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gamma Spectroscopy by Environmental Protection Agency (EPA) Method 901.1

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

## III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicates (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

## VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

## IX. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples.

## X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GWs Gamma Spectroscopy - Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Laboratory Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Field Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

SDG Labo <b>MET</b> The :	#:36425F35 VALIDATIC #:30179860 reatory:Pace Analytical Services, Inc.  HOD: Gamma Spectroscopy (EPA Methosamples listed below were reviewed for eation findings worksheets.	l od 901.1)	_evel IV		2nd	Date: 6/16/16 Page:of\ Reviewer: Reviewer:
	Validation Area			Com	ments	
<u>Г</u> .	Sample receipt/Technical holding times	AIA				
11.	Initial calibration	<i>\</i>				
101.	Calibration verification	Α				
IV.	Laboratory Blanks	A				
V.	Field blanks	$\mathcal{N}$				
VI.	Matrix Spike/Matrix Spike Duplicates	N	not rea	ineb		
VII.	Duplicates	\ \	<b>上</b>			
VIII	Laboratory control samples	ļ.A	LCS/O			
IX.	Field duplicates	N()	(1,2)			
X.	Minimum detectable activity (MDA)	A				
XI.	Sample result verification	A				
اللا	Overall assessment of data	H				
Note:	N = Not provided/applicable R = Rir	No compounds nsate ield blank	s detected	D = Duplicate TB = Trip blank EB = Equipment b	OTHER	irce blank :
	Client ID			Lab ID	Matrix	Date
1	SP-T02D_040616_01_L			30179860001	Water	04/06/16
2	SP-T02D_040616_36_L		<u> </u>	30179860002	Water	04/06/16
3	SP-T02B_041216_01_L			30179860003	Water	04/12/16
4	SP-T02C_04122016_01_L			30179860004	Water	04/12/16
5						
6			-			
7						
8						
ı. I						1 1

Page: Lof Z Reviewer: OZ 2nd Reviewer: Sm

Method: Radiochemistry

Wethod: Radiochemistry								
Validation Area	Yes	No	NA	Findings/Comments				
Technical holding times	,	<del>,</del>						
All technical holding times were met.	/							
II. Calibration								
Were all instruments and detectors calibration as required?								
Were NIST traceable standards used for all calibrations?	/							
Was the check source identified by activity and radionuclide?			,					
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?								
III. Blanks	<del></del>							
Were blank analyses performed as required?	/							
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.			·					
IV. Matrix spikes and Duplicates				,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			_					
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.								
Was a duplicate sample anayized at the required frequency of 5% in this SDG?								
Were all duplicate sample duplicate error rations (DER) ≤1.42?.								
V. Laboratory control samples	,	·						
Was an LCS analyzed per analytical batch?			<u>.</u> .					
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%								
VI. Sample Chemical/Carrier Recovery								
Was a tracer/carrier added to each sample?								
Were tracer/carrier recoveries within the QC limits?								
VII. Regional Quality Assurance and Quality Control				<u> </u>				
Were performance evaluation (PE) samples performed?								
Were the performance evaluation (PE) samples within the acceptance limits?				<u></u>				
VIII. Sample Result Verification	r			<del>,</del> ,,				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?								
Were the Minimum Detectable Activities (MDA) < RL?								

LDC#: 36425 P35

## **VALIDATION FINDINGS CHECKLIST**

Page: Of 2 Reviewer: Otal

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XI. Field blanks				
Field blanks were identified in this SDG.		1		
Target analytes were detected in the field blanks.				

LDC #: 36425F35

## VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: <u> </u>	_of <u>/</u>
Reviewer: C	2
2nd Reviewer:	3

METHOD: Radiochemistry (Method: Secrover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = <u>Found</u> x 100

Where, Found = activity of each analyte measured in the analysis of the sample.

True

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D| \times 100$ (S+D)/2 Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated.  %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	S-137		85,365		1059	7
N	Matrix spike sample						
N	Duplicate RPD						
N	Chemical recovery						

Comments:	Refer to appropriate	worksheet for I	ist of qualifications	and associated sai	mples when repor	ted results do not a	agree within 10.	0% of the recald	ulated results.
				<u>.</u>					<del></del>
			-						

LDC#: 36125735

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of	
Reviewer:_	a.	
2nd reviewer:_	SM	

MET	HOD: Radiochemistry (	(Method: See over)		2nd re	eviewer: _ <del>\</del>
	e see qualifications be N/A Have results	low for all questions answered "N". Not a s been reported and calculated correctly? within the calibrated range of the instrum	pplicable questions ar ents?	e identified as "N//	<b>A"</b> .
Analy using	te results for the following equation:	re	ported with a positive	detect were recald	culated and verified
Conce	ntration =	Recalculation:			
2.22 E = Co SA = S	n - background) x E x SA x Vol unter Efficiency elf-absorbance factor olume of sample	all			
#_	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
<u> </u>					
<u> </u>					
			· · · · · · · · · · · · · · · · · · ·		
	·				
····					
·l lote:_				<u> </u>	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

Isotopic Uranium

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30179860

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	30179860001	Water	04/06/16
SP-T02D_040616_36_L	30179860002	Water	04/06/16
SP-T02B_041216_01_L	30179860003	Water	04/12/16
SP-T02C_04122016_01_L	30179860004	Water	04/12/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Isotopic Uranium by the Health and Safety Laboratory (HASL) Method 300

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### **III. Continuing Calibration**

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA) with the following exceptions:

Blank ID	Isotope	Activity	Associated Samples
PB (prep blank)	Uranium-233/234 Uranium-235 Uranium-238	0.101 pCi/L 0.058 pCi/L 0.075 pCi/L	All samples in SDG 30179860

Sample activities were compared to activities detected in the laboratory blanks. The sample activities were either not detected or were significantly greater (>5X blank activity) than the activities found in the associated laboratory blanks with the following exceptions:

Sample	Isotope	Reported Activity	Modified Final Activity
SP-T02C_04122016_01_L	Uranium-235	0.125 pCi/L	0.125U pCi/L

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Activity	y (pCi/L)			
Isotope	SP-T02D_040616_01_L	SP-T02D_040616_36_L	RPD (Limits)	Flag	A or P
Uranium-233/234	4.77	4.90	3 (≤35)	-	•
Uranium-235	0.398	0.298	29 (≤35)	-	-
Uranium-238	4.63	4.83	4 (≤35)	-	<u>.</u>

#### X. Tracer Recovery

All tracer recoveries were within validation criteria with the following exceptions:

Sample ID	Tracer Isotope	%R (Limits)	Affected Isotope	Flag	A or P
SP-T02B_041216_01_L	Uranium-232	23.94 (30-110)	All isotopic uranium	J (all detects) UJ (all non-detects)	Þ

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to tracer recovery %R, data were qualified as estimated in one sample.

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Isotopic Uranium - Data Qualification Summary - SDG 30179860

Sample	Isotope	Flag	A or P	Reason (Code)
SP-T02B_041216_01_L	All isotopic uranium	J (all detects) UJ (all non-detects)	Р	Tracer recovery (%R) (*X)

## Santa Susana Field Laboratory, GW Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG 30179860

Sample	Isotope	Modified Final Activity	A or P	Code
SP-T02C_04122016_01_L	Uranium-235	0.125U pCi/L	Α	В

Santa Susana Field Laboratory, GW Isotopic Uranium - Field Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

LDC #: 36425F59	_ VALIDATION COMPLETENESS WORKSHEET
SDG #: 30179860	Level IV
Laboratory: Pace Analytical:	Services, Inc.

2nd Reviewer

METHOD: Isotopic Uranium (HASL-300)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
l.	Sample receipt/Technical holding times	A, A	
11.	Initial calibration	A	
III.	Calibration verification	A	
IV.	Laboratory Blanks	SW	
V.	Field blanks	N	
VI.	Matrix Spike/Matrix Spike Duplicates	N	not required
VII.	Duplicates	<b> </b>	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	SW	C1,2)
X.	Tracer Recovery	SW	
XI.	Minimum detectable activity (MDA)	A	
XII.	Sample result verification	A	
וווא	Overall assessment of data	1	

Note:

A = Acceptable

N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank
EB = Equipment blank

SB=Source blank

OTHER:

	Client ID	Lab ID	Matrix	Date
1	SP-T02D_040616_01_L	30179860001	Water	04/06/16
2	SP-T02D_040616_36_L	30179860002	Water	04/06/16
3	SP-T02B_041216_01_L	30179860003	Water	04/12/16
4	SP-T02C_04122016_01_L	30179860004	Water	04/12/16
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15_				

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times		<del></del>		
All technical holding times were met.		L		
II. Calibration		r		
Were all instruments and detectors calibration as required?		<u>-</u>		
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?	/			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks	<b>_</b>			
Were blank analyses performed as required?	/			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.	/			
IV. Matrix spikes and Duplicates	,			
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		 	/	
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) ≤1.42?.			/	
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery				
Was a tracer/carrier added to each sample?				
Were tracer/carrier recoveries within the QC limits?		/		
VII. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?		L	/	
VIII. Sample Result Verification	<del>,</del>	<del></del>	<del>,</del>	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		/		
Were the Minimum Detectable Activities (MDA) < RL?				

LDC#: 36425F59

## VALIDATION FINDINGS CHECKLIST

Page: Of Z Reviewer: O1 2nd Reviewer: V

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XI. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.			/	

LDC #: 36425F59

## VALIDATION FINDINGS WORKSHEET Blanks

Page:of	
Reviewer:C	
2nd Reviewer: F2	

METHOD: Radiochemistry, Method See Cover

Conc. units	s: <u>pCi/L</u>		<u>_</u>		Ass	ociated Sar	nples:	All (R	<u>eason: B)                                    </u>	 	 
Isotope	Blank ID			Sample Identification							
	PB	Action Limit	4								
U-233/234	0.101	0.505									
U-235	0.058	0.29	0.125								
U-238	0.075	0.375									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#<u>36425F59</u>

## VALIDATION FINDINGS WORKSHEET

## Field Duplicates

Page: of Of Reviewer: Of Reviewer:

Radiochemistry, Method\_see cover\_

	Activity (pCi/L)			
Isotope	1	2	RPD (≤35)	Qual (Parent Only)
U-233/234	4.77	4.90	3	
U-235	0.398	0.298	29	
U-238	4.63	4.83	4	

\LDCFILESERVER\Validation\FIELD DUPLICATES\FD\_inorganic\36425F59.wpd

LDC#: 36475F59

## VALIDATION FINDINGS WORKSHEET Sample Chemical Recovery

Page: <u> </u>
Reviewer: OU
2nd Reviewer:

METHOD: Rad	iochemistry (Method: See cover )
Please see qua	lifications below for all questions answered "N". Not applicable questions are identified as "N/A".  Was a tracer/carrier added to each sample?  Were tracer/carrier recoveries within the control limits?  Y:
FÉAET IA ONF	Y:
Y) N N/A	Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

<b>4</b>	Trace//Carrier	%R (limits)	Associated Isotopes	Associated Samples	Qualifications
	U-23Z	23.94 (30-110)	Allisotpicu	3	J/vJ/P (Det/NO)
		<u> </u>		<del> </del>	
	<u></u>				
	_				
<u> </u>				_	
	_			_	
		<u> </u>		<u> </u>	
		<u> </u>		<u> </u>	
<b> </b>			<u> </u>		

Comments:	_		 			
		* .				
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## **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

	Page:	of
R	eviewer: (	20
2nd Re	eviewer:_	82

METHOD: Radiochemistry (Method: Secover

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	U-23H	9,06	8.781	103.18	103.18	4
N	Matrix spike sample				·		
V	Duplicate RPD						
l	Chemical recovery	U-232	4,9127	10.4419	47.05	47.05	7

Comments:	Refer to appropriate	worksheet for lis	t of qualifications	and associated s	samples when rep	orted results do n	ot agree within	10.0% of the rec	alculated results.
			<del> </del>			·			

LDC #: 3642SFS9

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:	of
Reviewer:_	a
2nd reviewer:_	50

METHOD: Radiochemistry (N	Method: See aver)		2114 16	eviewer: - 7 V
YN N/A Have results	ow for all questions answered "N". Not appl been reported and calculated correctly? vithin the calibrated range of the instrument	·	e identified as "N/	<b>4"</b> .
Analyte results forusing the following equation:	U-233/234 repo	rted with a positive	detect were recald	culated and verified
Concentration =	Recalculation:			,
(cpm - background) 2.22 x E x SA x Vol  E = Counter Efficiency SA = Self-absorbance factor Vol = Volume of sample	1= 0.683/ 1= 12.22(0.4705)(	(0.2723\c).	503H) = <u>L</u> (	.77 pCi/L
# Sample ID	Analyte	Reported Concentration ( $ otag{\mathcal{C}_1} $   $ otag{L}_1 $	Calculated Concentration	Acceptable (Y/N)
	U-233/234	4.77	14,77	Ÿ
2	<del>U-Z98</del> U-235	0,298	0,298	
3	U-23K	0.384	0.384	
Ÿ	U-235	0.125	0.125	V
		<del> </del>	<del> </del>	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

Strontium-90

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30179860

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-T02D_040616_01_L	30179860001	Water	04/06/16
SP-T02D_040616_36_L	30179860002	Water	04/06/16
SP-T02B_041216_01_L	30179860003	Water	04/12/16
SP-T02C_04122016_01_L	30179860004	Water	04/12/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Strontium-90 by American Society for Testing and Material (ASTM) D5811-95

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP-T02D\_040616\_01\_L and SP-T02D\_040616\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### X. Carrier Recovery

All carrier recoveries were within validation criteria.

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Strontium-90 - Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Laboratory Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Field Blank Data Qualification Summary - SDG 30179860

No Sample Data Qualified in this SDG

DG #	:36425F61VALIDATI t:30179860 atory:Pace Analytical Services, Inc.		Level IV	S WORKSHEE	: <b>I</b> 2nd	Date 16 Page: of Reviewer: S Reviewer: S
ЕТН	OD: Strontium-90 (ASTM D5811-95)				ZIIU	rtevieweiy
	amples listed below were reviewed for e	each of the f	ollowing valida	ation areas. Valida	tion findings are	noted in attac
alidat	ion findings worksheets.			· · · · · · · · · · · · · · · · · · ·		<u> </u>
	Validation Area			Com	ments	
l	Sample receipt/Technical holding times	AIA				
IJ.	Initial calibration	A				
III.	Calibration verification	A				
IV.	Laboratory Blanks	A				
V.	Field blanks	N.				
VI.	Matrix Spike/Matrix Spike Duplicates	I N	notregi	indo		
VII.	Duplicates	<u>'\</u>	,			
/111.	Laboratory control samples	H	LCS/1	<u> </u>		
IX.	Field duplicates	M	(1,2)			
X.	Carrier recovery	A	1 7			
XI.	Minimum detectable activity (MDA)	A				
XII.	Sample result verification	I A				
(III	Overall assessment of data	A				
e:	N = Not provided/applicable R = R	No compound Rinsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	irce blank :
C	Client ID			Lab ID	Matrix	Date
s	P-T02D_040616_01_L			30179860001	Water	04/06/16
s	P-T02D_040616_36_L			30179860002	Water	04/06/16
s	P-T02B_041216_01_L			30179860003	Water	04/12/16
_ s	P-T02C_04122016_01_L			30179860004	Water	04/12/16

13

Notes:\_

#### **VALIDATION FINDINGS CHECKLIST**

Page: U of Z Reviewer: OT 2nd Reviewer: Sth

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
II. Calibration		·		
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?	/		<u> </u>	
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks				
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates			г	
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) ≤1.42?.				(
V. Laboratory control samples	<u></u>		,	
Was an LCS analyzed per analytical batch?		! <u></u>		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery			···	
Was a tracer/carrier added to each sample?	1	-		
Were tracer/carrier recoveries within the QC limits?	/			
VII. Regional Quality Assurance and Quality Control	<del></del>		,	
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?			/	 
VIII. Sample Result Verification	<del> 1</del>		· <del></del>	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1			
Were the Minimum Detectable Activities (MDA) < RL?				

LDC#: 36425F61

#### **VALIDATION FINDINGS CHECKLIST**

Page: 2 of 2 Reviewer: 01 2nd Reviewer: 50

Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	
Field duplicate pairs were identified in this SDG.	at a
Target analytes were detected in the field duplicates.	1 / July
XI. Field blanks	
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

## **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page: <u></u> of <u>/</u>
Reviewer:
2nd Reviewer: 53

METHOD: Radiochemistry (Method: Secover

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = activity of each analyte <u>measured</u> in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = [S-D]_{\perp} \times 100$ (\$+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample			109,99	109,99	4	
V	Matrix spike sample				·		
(/	Duplicate RPD						
	Chemical recovery	Sr	11.5	12.22	94.11	94.11	4

Comments:	Refer to appropriate	worksheet for li	ist of gualifications a	and associated s	samples when re	eported results do	not agree within	10.0% of the rec	alculated results.
						<del>_</del>		,	
							<del>-</del>		

LDC #: 36425 F61

Vol = Volume of sample

## **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	of/
Reviewer:_	a
2nd reviewer:	SM

IV)

IE <b>THOD:</b> Radiochemistry (Method:_	See aver)

P	ease see	qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
<u> Y</u>	<u> </u>	Have results been reported and calculated correctly?
Υ	N N/A N N/A	Are results within the calibrated range of the instruments?
$\overline{}$		·

Analyte results forusing the following equation:	reported with a positive detect were recalculated and verified
Concentration =	Recalculation:
(cpm - background) 2.22 x E x SA x Vol	ALLNO
E = Counter Efficiency SA = Self-absorbance factor	

#_	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
	-				
			<u></u>		
				<u></u>	
	,				

Note:	 	 <del></del>	



## LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

CDM June 29, 2016

555 17th Street, Suite 1100 Denver, CO 80202

ATTN: Mrs. Cherie Zakowski

SUBJECT: Santa Susana Field Laboratory, GW, Data Validation

Dear Mrs. Zakowski,

Enclosed is the final validation report for the fractions listed below. This SDG was received on June 1, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

### LDC Project #36433:

SDG #	<u>Fraction</u>
PH270	1,4-Dioxane, Metals, Fluoride, TPH as Gasoline, Perchlorate

The data validation was performed under Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1, December 2010
- USEPA Contract Laboratory Program National Functional Guidelines, CLPNFG, for Superfund Organic Data Review, June 2008
- USEPA Contract Laboratory Program National Functional Guidelines, CLPNFG, for Inorganic Superfund Data Review, January 2010
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar

Project Manager/Chemist

	497 pages-CD												At	ach	men	t 1																				
	Level IV EDD	LDC #36433 (CDM Federal Programs-Chantilly VA / Santa Susana Field Laboratory, GW)																																		
LDC	SDG#	DATE REC'D	(4) DATE DUE	Dio	,4- xane 0C-S)	SW	846	(801	B)		) (3		_																							
Matrix	: Water/Soil			w	s	w	s	w	s	w :	s w	s	W	s	w	s	w	s	w	s	w s	s v	N S	i v	/ s	W	s	w	s	w	s	W	s	W	s	w
A	PH270	06/01/16	06/29/16	3	0	2	0	3	0	2	0 2	0																								
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# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: 1,4-Dioxane

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH270

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8344299	Water	04/19/16
SP-19B_041916_01_L	8344300	Water	04/19/16
TB_041916	8344301	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

1,4-Dioxane by Environmental Protection Agency (EPA) SW 846 Method 8260B in Selected Ion Monitoring (SIM) mode

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0%.

Average relative response factors (RRF) were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

Sample TB\_041916 was identified as a trip blank. No contaminants were found.

#### VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VIII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### IX. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

### X. Field Duplicates

No field duplicates were identified in this SDG.

#### XI. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XII. Compound Quantitation

All compound quantitations met validation criteria.

#### XIII. Target Compound Identifications

All target compound identifications met validation criteria.

#### XIV. System Performance

The system performance was acceptable.

#### XV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW 1,4-Dioxane - Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Laboratory Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW 1,4-Dioxane - Field Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

SDG#	:36433A1b		<b>LETENES</b> .evel IV	S WORKSHEET	2nd	Date: 6/2 Page: /of / Reviewer: / Reviewer:
WETH	OD: GC/MS 1,4-Dioxane (EPA SW 84	16 Method 826	60B-SIM)		2110	i veviewei
	amples listed below were reviewed for ion findings worksheets.	each of the fo	ollowing valid	dation areas. Validatio	on findings are	noted in attache
	Validation Area			Comm	ents	
<u>I.</u>	Sample receipt/Technical holding times	A /A				
11.	GC/MS Instrument performance check					
111.	Initial calibration/ICV	AIA	%	PSD 515	101 ±	20
IV.	Continuing calibration	<u> </u>			cal £	20
V.	Laboratory Blanks	_A:				
VI.	Field blanks	ND	TB=	- 3		
VII.	Surrogate spikes	Δ				
VIII.	Matrix spike/Matrix spike duplicates	N	05			
IX.	Laboratory control samples	A	yes 11	P		
X.	Field duplicates	$ \mathcal{N} $				
XI.	Internal standards	4				
XII.	Compound quantitation RL/LOQ/LODs	4				****
XIII.	Target compound identification	Δ				
XIV.	System performance	4				
XV.	Overall assessment of data	A				
ote:	A = Acceptable ND = N = Not provided/applicable R = I	No compounds Rinsate Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment blant	OTHER	irce blank
c	lient ID			Lab ID	Matrix	Date
1 S	SP-19A_041916_01_L			8344299	Water	04/19/16
-   s	P-19B_041916_01_L			8344300	Water	04/19/16
	B_041916			8344301	Water	04/19/16
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LDC#: 364 33A1b

## VALIDATION FINDINGS CHECKLIST

	Page:_	_/of_	2
F	Reviewer:_	F	7
2nd F	Reviewer:_	\$	
		•	_

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
Is rechnical holding/times				
Were all technical holding times met?				
Was cooler temperature criteria met?	200.00000	of increase in the latter	<b>PERCYSS</b> 's	representations through the self-left-stands also defined through super-sections as a pro-
Ils GC/MS/Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?				
Were all samples analyzed within the 12 hour clock criteria?		er aderion	Stanowski	
Illas Initial calibration en				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			_	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?		/		
Were all percent relative standard deviations (%RSD) ≤ 30%/15% and relative response factors (RRF) ≥ 0.05?				·
IIIbr nitial Calibration Verifications				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		districts colored	e antinio	oz. ni Abe vz ponstoj podanje na prijakljoski benjanje
IV. Continuing calibration:				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?				
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?			\	
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	Vitario (na.)	500755/803	ing care	
VirLabolatory Blanks			46	
Was a laboratory blank associated with every sample in this SDG?		- 		
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?		<b></b> .		
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		-		Chairm St. (No. 1941) St. (No. 1941)
VIERIEIO bianks				
Were field blanks were identified in this SDG?		•		
Were target compounds detected in the field blanks?				•
VII Suπogaterspikes (* 1919)				
Were all surrogate percent recovery (%R) within QC limits?				
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a			/	

LDC#: 36433A1b

## VALIDATION FINDINGS CHECKLIST

Page: 2of 2
Reviewer: 52
2nd Reviewer: 7

Validation Area	Yes	No	NA	Findings/Comments
VIII Matrix spike/Matrix spike duplicates			en ser Ekskel	
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			_	
Was a MS/MSD analyzed every 20 samples of each matrix?		_		
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			/	
IX Laboratory control samples				
Was an LCS analyzed for this SDG?		-		
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		·		
Xe. Field duplicates to the second se				
Were field duplicate pairs identified in this SDG?		_	-	
Were target compounds detected in the field duplicates?				
XII Internalistandards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?				
Were retention times within + 30 seconds of the associated calibration standard?		and the second	*************	STATE ASSESSMENT OF THE STATE O
XII Compound quantitation.				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		,		
XIII: parget compound deen inication with the second compound of the second compound compound of the second compou				
Were relative retention times (RRT's) within + 0.06 RRT units of the standard?				
Did compound spectra meet specified EPA "Functional Guidelines" criteria?				
Were chromatogram peaks verified and accounted for?		_		·
XIV. System репоглался				
System performance was found to be acceptable.				
XV/ Overall assessment of data.				
Overall assessment of data was found to be acceptable.				

## TARGET COMPOUND WORKSHEET

## METHOD: VOA

METHOD: VOA				
A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB, tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	illi. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodiftuoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	Li. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene .	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. lodomethane	N1. 2-Methylpentane
O. Carbon tetrachtoride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	0000.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR, Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Aliyi chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY, tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 36433A16

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page:	of	
Reviewer:	FT	
2nd Reviewer:	Fin_	

METHOD: GCMS 8260/3

The calibration factors (RRFF), average RRFF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

RRF = (Ax)(Cis)/(Ais)(Cx)

Where:

Ax = Area of compound

average RRF = sum of the RRFs/number of standards

Cx = Concentration of compound

%RSD = 100 \* (S/X)

S = Standard deviation of the RRFs

X = Mean of the RRFs

Ais = Area of associated internal standard Cis = Concentration of internal Standard

		<u> </u>		Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
1	] ]	Calibration			'	AverageRRF	Average RRF	%RSD	%RSD
#	Standard ID	Date	Compound	(RRF 10 std)	(RRF 10 std)	(Initial)	(Initial)		
	ICAL	3/11/2016	1,4 Dioxane	1.2758	1.2758	1.2762	1.2762	4.0	4.0

LDC#: 36433A16

## VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page:_	1	_of_ <u>1_</u>
Reviewer:_		FT
2nd Reviewer:_		7
	•	~ "

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF RRF =  $(A_x)(C_{1x})/(A_{1x})(C_{1y})$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

A<sub>x</sub> = Area of compound, C<sub>x</sub> = Concentration of compound,

A<sub>is</sub> = Area of associated internal standard C<sub>is</sub> = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	ccv	3/4/16 57	1,4- Dioxane (ISI)	1.2762	1.3640	1.3640	7	7
	21:17	4/25/16	(182)					
	•		(153)					
			(IS4)					
	<del></del>		(IS5)					
2			(151)					
			(IS2)					
			(183)					
			(IS4)					
			(185)					
3								
4								

LDC#: 36 433A/b

## VALIDATION FINDINGS WORKSHEET **Surrogate Results Verification**

Page:_	_1_of_1_
Reviewer:_	FT
2nd reviewer:_	-

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The p	ercent recoveries (	%R	of surro	gates were	recalculated	for the com	pounds iden	itified b	elow usin	g the following	g calculation
-------	---------------------	----	----------	------------	--------------	-------------	-------------	-----------	-----------	-----------------	---------------

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID: #

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8	10.0	9.785	98	98	0
Bromofluorobenzene	<u> </u>				

Dibromofluoromethane  1,2-Dichloroethane-d4		Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
1,2-Dichlorgethane-d4	Dibromofluoromethane					
	1,2-Dichloroethane-d4			<del></del>		
	Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4			<del></del>		<u> </u>
Toluene-d8		) 			<del> </del>
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					<u> </u>
Bromofluorobenzene				<u> </u>	

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane			· · · · · · · · · · · · · · · · · · ·		
1,2-Dichloroethane-d4			<del></del>		
Toluene-d8					<b></b>
Bromofluorobenzene	<u> </u>				<u></u>

LDC#:\_ 364 33A16

## **VALIDATION FINDINGS WORKSHEET Laboratory Control Sample Results Verification**

Page: <u>_1</u>	of_1_
Reviewer:_	_FT
2nd Reviewer:_	Fr

METHOD: GC/MS VOA (EPA Method 8260B)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate (if applicable) were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* SSC/SA

Where: SSC = Spiked sample concentration

SA = Spike added

RPD = I LCSC - LCSDC I \* 2/(LCSC + LCSDC)

LCS/D F39 LCS ID:

		oike		i Sample		CS	Lo	SD	LCs	/LCSD
Compound	( ug	ded ( )	I E	entration (S/4)	Percent	Recovery	Percent	Recovery	F	RPD
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,4- Dioxane -1,1-Dichloroethene	5.0	5.0	4.78	5.09	96	96	102_	102	6	6
Trichloroethene										
Benzene										
Toluene				<u> </u>	<u> </u>	<del></del>				·
Chlerobenzene										

Comments: Refer to Laboratory Control Sample findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0%
of the recalculated results.

LDC#\_36433A16

## VALIDATION FINDINGS WORKSHEET **Sample Calculation Verification**

Page: <u>1</u> of <u>1</u>	
Reviewer:FT	
2nd reviewer:	

METHOD: GC/MS VOA (E	EPA SW 8	846 Method	8260B)
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Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

(A,)(L)(DF) Concentration = (A<sub>s</sub>)(RRF)(V<sub>s</sub>)(%S) Area of the characteristic ion (EICP) for the Ą compound to be measured Area of the characteristic ion (EICP) for the specific internal standard Amount of internal standard added in nanograms (ng) RRF Relative response factor of the calibration standard. Volume or weight of sample pruged in milliliters (ml) v, 4.78 ug/L or grams (g). Dilution factor. Df = Percent solids, applicable to soils and solid matrices %S

Example:	
Sample I.D	105F39 1,4-DiOX9 1C
	(8468)(10)
<b>=</b>	(13885) (1.2762)

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
<u> </u>					
<u> </u>	<u> </u>				
					<u> </u>
<b> </b>		,			
<b></b>					
1				·	
$\vdash \vdash \vdash$				•	
					<del></del>

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

**LDC Report Date:** June 27, 2016

Parameters: Metals

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH270

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8344299	Water	04/19/16
SP-19B_041916_01_L	8344300	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A

Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	04/26/16 (09:59)	Strontium	68.0 (80-120)	All samples in SDG PH270	J (all detects)	Р
ICSAB	04/26/16 (10:53)	Strontium	64.0 (80-120)	All samples in SDG PH270	J (all detects)	Р

## V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Magnesium	117.760 ug/L 18.420 ug/L	All samples in SDG PH270
ICB/CCB	Aluminum Chromium Cobalt Copper Titanium	53.6 ug/L 1.1 ug/L 0.73 ug/L 1.7 ug/L 0.21 ug/L	All samples in SDG PH270

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
SP-19A_041916_01_L	Chromium Cobalt Copper	0.0048 mg/L 0.00095 mg/L 0.0079 mg/L	0.0048U mg/L 0.00095U mg/L 0.0079U mg/L
SP-19B_041916_01_L	Chromium	0.0024 mg/L	0.0024U mg/L

## VI. Field Blanks

No field blanks were identified in this SDG.

### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### VIII. Duplicate Sample Analysis

The laboratory has indicated that there were no duplicate (DUP) analyses specified for the samples in this SDG, and therefore duplicate analyses were not performed for this SDG.

#### IX. Serial Dilution

Serial dilution was not performed for this SDG.

## X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

## XI. Field Duplicates

No field duplicates were identified in this SDG.

#### XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

## XIII. Sample Result Verification

All sample result verifications were acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICP %R, data were qualified as estimated in two samples.

Due to laboratory blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH270

Sample	Analyte	Flag	A or P	Reason (Code)
SP-19A_041916_01_L SP-19B_041916_01_L	Strontium	J (all detects)	Ρ	ICP interference check sample (%R) (I)

## Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH270

Sample	Analyte	Modified Final Concentration	A or P	Code
SP-19A_041916_01_L	Chromium Cobalt Copper	0.0048U mg/L 0.00095U mg/L 0.0079U mg/L	Α	В
SP-19B_041916_01_L	Chromium	0.0024U mg/L	Α	В

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH270

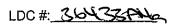
No Sample Data Qualified in this SDG

				SS WORKSHE		Date: <u>6</u> 2
	:PH270	[	_evel IV			Page: 1 of 1 Reviewer: 5
abora	atory: Eurofins	2nd	Reviewer: SY			
he sa	OD: Metals (EPA SW 846 Method 601 amples listed below were reviewed for each findings worksheets.		·	idation areas. Vali		·
	Validation Area			Co	omments	
 I.	Sample receipt/Technical holding times	$\overline{A}$	4/19/	10		
II.	ICP/MS Tune	A		( <del>V</del>		
III.	Instrument Calibration	A				• •
IV.	ICP Interference Check Sample (ICS) Analysis	s SW				
٧.	Laboratory Blanks	SW				
VI.	Field Blanks	$\overline{N}$				
VII.	Matrix Spike/Matrix Spike Duplicates	N	CS			
VIII.	Duplicate sample analysis	N				
IX.	Serial Dilution	N	No+	Reforme		
Χ.	Laboratory control samples	A	حعا			
XI.	Field Duplicates	N	ļ			
XII.	Internal Standard (ICP-MS)	IA				
XIII.	Sample Result Verification	<u> </u>				
ΧIV	Overall Assessment of Data		L			
ote:	N = Not provided/applicable R = F	No compounds Rinsate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipmen	OTHER	ırce blank :
c	lient ID			Lab ID	Matrix	Date
s	P-19A_041916_01_L			8344299	Water	04/19/16
<u> </u>	P-19B_041916_01_L		8344300	Water	04/19/16	
-						
1						
						<b>I</b>
	un.					
,						

Notes:

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	_			
Cooler temperature criteria was met.		<u> </u>	<u> </u>	
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/		<u> </u>	
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration				
Were all instruments calibrated daily, each set-up time?	_			
Were the proper number of standards used?				
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/			
Were all initial calibration correlation coefficients > 0.995?				
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			\_	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			\	
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			/	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/	_		



## **VALIDATION FINDINGS CHECKLIST**

Page: Z of Z Reviewer: SSS 2nd Reviewer: SSSS

Validation Area	Yes	No	NA	Findings/Comments			
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)							
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/						
If the %Rs were outside the criteria, was a reanalysis performed?	/						
IX. ICP Serial Dilution							
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			/				
Were all percent differences (%Ds) < 10%?			_				
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/				
X. Sample Result Verification							
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	\						
XI. Overall assessment of data							
Overall assessment of data was found to be acceptable.	/						
XII. Field duplicates							
Field duplicate pairs were identified in this SDG.							
Target analytes were detected in the field duplicates.			/				
XIII. Field blanks		_					
Field blanks were identified in this SDG.							
Target analytes were detected in the field blanks.							

LDC #: 364835A14

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: <u> </u> of <u> </u>
Reviewer: 35
2nd reviewer:

All circled elements are applicable to each sample.

<u> </u>		
Sample ID	<u> Matrix</u>	Target Analyte List (TAL)
1-2	$\sim$	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg (Ni, K) Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, Li (25) Se
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Ti, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Analysis Method O O O O
CP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg Ni/K, Se, Ag (Na.) Tl, (V, Zn, Mo, B, Sn, Ti, L)
CP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
3FAA		Al. Sh. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Ph. Mg. Mn. Hg. Ni. K. Se. Ag. Na. Tl. V. Zn. Mo. B. Sn. Ti.

Comments: Mercury by CVAA if performed

LDC #: 36433A4a

## VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample

Page:_	<u>C</u> of <u>\</u>
Reviewer:	<u> </u>
2nd Reviewer:	8h

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Plea	Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  YN N/A Were ICP interference check samples performed as required?								
	Y/N) N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?								
	EVEL IV ONLY:								
<u>/Y)</u>	N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.								
#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications			
	04/26/16	ICSAB (9:59)	Sr	68.0	All	J/UJ/P (det) (I)			
		,				, , , , , , , , , , , , , , , , , , , ,			
	04/26/16	ICSAB (10:53)	Sr	64.0	All	J/UJ/P (det)			
		, ,							
П									
П									

Comments:				
	•	•		·

#### **VALIDATION FINDINGS WORKSHEET** PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1 Reviewer: JD 2nd Reviewer: Soil preparation factor applied:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

12

Sample C	oncentratio	n units, unic	ess otherwi	se noted: _	mg/L		As	sociated Sam	ples:	All C	 	
			Hastal Bruit						ടുണുവിച്ചി	ിച്ചിട്ടികളിക്ക		
Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/l.)	Maximum ICB/CCB <sup>a</sup> (ug/L)	Blank Action Limit	1	2						
ΑI			53.6	0.268000							 	
Ca		117.760		0.588800							 	
Cr			1.1	0.005500	0.0048	0.0024						
Со			0.73	0.003650	0.00095							
Cu			1.7	0.008500	0.0079		)					
Mg		18.420		0.092100								
Ti			0.21	0.001050								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36427-Ala

## **VALIDATION FINDINGS WORKSHEET** Initial and Continuing Calibration Calculation Verification

Page: \of\
Reviewer:
2nd Reviewer:

**METHOD:** Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found</u> x 100 True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

		:			Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
3W 11:13	ICP (Initial calibration)	14	300274914	BOODOUGIC	(00.1%	100-1%8	7
7CV 9:48	ICP/MS (Initial calibration)	Se	50.121g/L	50 valu	100-29.8	127.8	
3:17 3:17	CVAA (Initial calibration)	Ha	2.48 41c	2. Sugle	99.21/R	99.2%R	
(571)	ICP (Continuing calibration)	Sb	480 ug/c	500.091	96.0%R	96.0%	
(CV)	ICP/MS (Continuing calibration)	Aq	25-85-91C	25 vg/c	103.48R	103.47.2	
(CC)	CVAA (Contining calibration)	7 Hg	0.94291	129/2	94.0%	94,0%	<u></u>
·	GFAA (Initial calibration)	<u> </u>		(			
	GFAA (Continuing calibation)						

Comments:			
		•	

LDC #: 36433A4

## **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

	Page:_	<u>\</u> of \
	Reviewer:	OZ
2nd	Reviewer:	82

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laborate	ry control sample and a matrix s	spike sample were recalculated usir	g the following formula:
--	----------------------------------	-------------------------------------	--------------------------

 $%R = Found \times 100$ True

Where, Found = Concentration of each analyte <u>measured</u> in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{|S-D|} \times 100$ (S+D)/2

Where, S = Original sample concentration

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

%D = <u>[I-SDR[</u> x 100

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated  %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB	ICP interference check	As	1003 41	looyl	1003%	100 3°/2	6
4:10	Laboratory control sample	Ha	1.06 2010	lugh	106%8	106%R	7
2	Matrix spike	7	(SSR-SR)	)			
2	Duplicate						_
N	ICP serial dilution						

Comments: _				 	 
				 	 •
	-	<del></del>	·	 	

LDC # 36433A49

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Plaase see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Page: of Reviewer: 2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Y N Y N Y N Detec	ted analyte results for _	been reported and calculated correctly? within the calibrated range of the instrumention limits below the CRDL?	ents and within the ling		
equati	ion; itration = <u>(RD)(FV)(Dil)</u> (In. Vol.)	Recalculation:			
RD FV in. Vol. Dil	= Raw data conce = Final volume (m	DOC 215.	ngl		
#	Sample ID	Analyte	Reported Concentration (mg(U	Calculated Concentration	Acceptable (Y/N)
	\	Ca	218	218	7
	2	Sr	P81.0	0-789	I
				·	
				<u> </u>	
				<del></del>	
				<del> </del>	- <del></del>
	·			<del>                                     </del>	
	<u> </u>				
				<u> </u>	
				1	
			<del>- </del>	<del>                                     </del>	
				<u> </u>	
lote:_				·	
			······································	<del></del>	
		· · · · · · · · · · · · · · · · · · ·			

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

June 27, 2016

Parameters:

Fluoride

Validation Level:

Level IV

Laboratory:

Eurofins

Sample Delivery Group (SDG): PH270

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8344299	Water	04/19/16
SP-19B_041916_01_L	8344300	Water	04/19/16
SP-19A_041916_01_LMS	8344299MS	Water	04/19/16
SP-19A 041916 01 LDUP	8344299DUP	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Fluoride by Environmental Protection Agency (EPA) Method 300.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

## III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

### IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

## VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits.

## VII. Duplicates

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Sample Result Verification

All sample result verifications were acceptable.

## XI. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Fluoride - Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Laboratory Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Fluoride - Field Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

SDG a	#:36433A6 <b>VALIDA</b> #: <u>PH270</u> atory:_ <u>Eurofins</u>		PLETENES _evel IV	S WORKSHEE		Date: b(Z1\) Page: of \ Reviewer: \
METH	IOD: (Analyte) Fluoride (EPA Me	thod 300.0)				-
	amples listed below were reviewed to findings worksheets.	for each of the f	ollowing valid	ation areas. Valida	tion findings are	noted in attached
	Validation Area			Com	ments	
1.	Sample receipt/Technical holding times	A	4/19/10			
II.	Initial calibration	A				
III.	Calibration verification	A				
IV	Laboratory Blanks	A				
V	Field blanks					
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS= (	13		
VII.	Duplicate sample analysis	A	DUR			
VIII.	Laboratory control samples	A	دعا			
IX.	Field duplicates	12				
X.	Sample result verification	A				
ΧI	Overall assessment of data	A				
Note:	N = Not provided/applicable F	ND = No compounds R = Rinsate B = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	rce blank
· ·	Client ID			Lab ID	Matrix	Date
1 ;	SP-19A_041916_01_L			8344299	Water	04/19/16
2 5	SP-19B_041916_01_L			8344300	Water	04/19/16
3 8	SP-19A_041916_01_LMS			8344299MS	Water	04/19/16
4	SP-19A_041916_01_LDUP			8344299DUP	Water	04/19/16
5				l		
6						
7						
8						
9						
10						
11						
12						
13						
14						

Notes:

LDC#: 36433A10

#### VALIDATION FINDINGS CHECKLIST

Page: of Z Reviewer: 2nd Reviewer: 2

Method:Inorganics (EPA Method Seo Conse)

Method:Inorganics (EPA Method Soo (* SWEK)		<del></del>					
Validation Area	Yes	No	NA	Findings/Comments			
I. Technical holding times							
All technical holding times were met.							
Cooler temperature criteria was met.							
II. Calibration							
Were all instruments calibrated daily, each set-up time?	_						
Were the proper number of standards used?							
Were all initial calibration correlation coefficients ≥ 0.995?	/						
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	/						
Were titrant checks performed as required? (Level IV only)							
Were balance checks performed as required? (Level IV only)			_				
III. Blanks							
Was a method blank associated with every sample in this SDG?	_						
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		/					
IV. Matrix spike/Matrix spike duplicates and Duplicates							
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	/						
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	/						
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of $\leq$ CRDL( $\leq$ 2X CRDL for soil) was used for samples that were $\leq$ 5X the CRDL, including when only one of the duplicate sample values were $\leq$ 5X the CRDL.	/						
V. Laboratory control samples							
Was an LCS anaylzed for this SDG?	/						
Was an LCS analyzed per extraction batch?	/						
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	/						
VI. Regional Quality Assurance and Quality Control							
Were performance evaluation (PE) samples performed?			_				
Were the performance evaluation (PE) samples within the acceptance limits?			/				

LDC#: 36433AP

## **VALIDATION FINDINGS CHECKLIST**

Page: 2\_of 2 Reviewer: 2 2nd Reviewer: \( \square\)

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	_			
Were detection limits < RL?				
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		\		
Target analytes were detected in the field duplicates.			_	
X. Field blanks				
Field blanks were identified in this SDG.		1		
Target analytes were detected in the field blanks.				

LDC #: 36433AV

## Validation Findings Worksheet Initial and Continuing Calibration Calculation Verification

Page:\	_ of
Reviewer:	<u> </u>
nd Reviev	ver: <u> چ</u> کے

Method: Inorganics, Meth	od <u>See Cover</u>	<del></del>
The correlation coefficient (r) fo	or the calibration of <u></u>	was recalculated.Calibration date: 4/2/10
An initial or continuing calibrat	ion verification percent	recovery (%R) was recalculated for each type of analysis using the following formula:
%R = <u>Found X 100</u>	Where,	Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True		True = concentration of each analyte in the ICV or CCV source

					Recalculated	Reported	Acceptable
Type of analysis	Analyt	e Standard	Conc. (mg/L)	Area	r or r <sup>2</sup>	r orr²	(Y/N)
Initial calibration		s1	0.0	0			
		s2	0.1	0.0205	0.999925	0.999929	
		s3	0.4	0.0735	<u> </u>	,	4*
	F	s4	1	0.18			7,
		s5	2	0.3534			
		s6	3	0.5352			
TCV 1712 Calibration verification		Eand 0.774 mg/l	0.75 mg/c		103%R	24	Z
CCV 2144 Calibration verification	4	0.751 mg/c	0.75mg/c		100%R	NR	7
Calibration verification							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree withir
10.0% of the recalculated results



LDC#: 36433AX

## VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

	Page:_	<u>\</u> of_\
	Reviewer:_	$\overline{\mathcal{Q}\mathcal{C}}$
2nd	Reviewer:_	on

METHOD: Inorganics,	Method	_See_	Cores

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100True Where,

Found =

concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ 

Where,

S =

Original sample concentration

(S+D)/2

D =

Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS 11:43	Laboratory control sample	H -	0.729 mg/L	0.75 mg/c	97%2	97%R	7)-
MS 2'-10	Matrix spike sample		(SSR-SR) 4.63 mg/	Single	93%R	92%R	
1.70 DNS	Duplicate sample	J	1.07 mg/c	1,13 mg/L	5%RO	5%	<b>+</b>

Comments:		

LDC#:364332AV

## **VALIDATION FINDINGS WORKSHEET**

## Sample Calculation Verification

METHOD: Inorganics, Method Sec	Lover	
Please see qualifications below for all questions N N/A Have results been reported and Y N N/A Are results within the calibrated Y N N/A Are all detection limits below the Compound (analyte) results for	calculated correctly? range of the instruments?	ns are identified as "N/A".  _reported with a positive detect were
recalculated and verified using the following equ	ation:	_reperied with a positive detect were
Concentration = $A - 0.00Z$	Recalculation: 0.0420.0	02 )x5 = 1.1 mg/
0.177	(0.177	), 9
A=0.042		

#	Sample ID	Analyte	Reported Concentration (Wa\\)	Calculated Concentration (سح/ك)	Acceptable (Y/N)
	1	<u> </u>	7.1	1-7	2)
	2_	7	0.75	0.76	4*
			****		
					<u> </u>
			.,		
	<del></del>				
				-	
				_	
			<u></u> -		

Note: Floundin	8	 		
	)			

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level IV

Laboratory: Eurofins

Sample Delivery Group (SDG): PH270

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8344299	Water	04/19/16
SP-19B_041916_01_L	8344300	Water	04/19/16
TB 041916	8344301	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Gasoline by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0%.

#### III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0%.

#### IV. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### V. Field Blanks

Sample TB\_041916 was identified as a trip blank. No contaminants were found.

#### VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

#### VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

### IX. Field Duplicates

No field duplicates were identified in this SDG.

## X. Compound Quantitation

All compound quantitations met validation criteria.

## XI. Target Compound Identifications

All target compound identifications were within validation criteria.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

SDG a abor <b>METH</b> The sa	#:36433A7	L 6 Method 80	evel IV 015B)	S WORKSHEET ation areas. Validation	Rev 2nd Rev	Date: \(\frac{1}{2}\) Page: \(\frac{1}{2}\) riewer: \(\frac{1}{2}\) riewer: \(\frac{1}{2}\) ted in attached
	Validation Area			Comme	ents	
l.	Sample receipt/Technical holding times	AIA	,			
11.	Initial calibration/ICV	A <sub>/</sub> A	%	PAD/ICY = :	20	
111.	Continuing calibration	Δ		" CW = 2	<i>w</i>	
IV،	Laboratory Blanks	Δ				
V.	Field blanks	100	TB= 3	<b>&gt;</b>		
VI.	Surrogate spikes	Δ			<u> </u>	
VII.	Matrix spike/Matrix spike duplicates	2	cs			
VIII.	Laboratory control samples	A	Les /r	>		
IX.	Field duplicates	N				
Χ.	Compound quantitation RL/LOQ/LODs	Δ				
XI.	Target compound identification	A				
XII	Overall assessment of data					
lote:	N = Not provided/applicable R = Rir	lo compounds nsate ield blank	detected	D = Duplicate TB = Trip blank EB = Equipment blank	SB=Source b OTHER:	olank
	Client ID			Lab ID	Matrix	Date
7 1	SP-19A_041916_01_L			8344299	Water	04/19/16
	SP-19B_041916_01_L			8344300	Water	04/19/16
2 : 3 ·	TB_041916			8344301	Water	04/19/16
4						
5						
6						
7						
8						
9						
10					<u> </u>	
11					<u> </u>	
12						<u></u>
lotes:			<del></del>			<del></del>
14	·117820A					

LDC#	36433A

## **VALIDATION FINDINGS CHECKLIST**

	. /		
Method:	<u> </u>	_GC	HPLC

Validation Area	Yes	No	NA	Findings/Comments
ા મેદ્રાસ્ત્રમના હતા હોલ્લા હોલા હોલ્લા હોલા હોલ્લા હોલા હોલ્લા હોલા હોલા હોલ્લા હોલ્લા હોલ્લા હોલ્લા હોલ્લા હોલા હોલા હોલા હોલા હોલ્લા હોલા હોલા હોલા હોલા હોલા હોલા હોલા હો				
Were all technical holding times met?				
Was cooler temperature criteria met?		-		
ાશિક મિતાલેકો હસા[[ફોક્યાહા				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) ≤ 20%?				
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?		\ 		
Were the RT windows properly established?				
Dis datual calibration vertication	<u> </u>	· .		
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?		-		
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		_	, -	
IIII Continuing cellocutor		_		
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?				
Were all the retention times within the acceptance windows?		5 7		
(M) Saboliationy (Steintes			<u></u>	
Was a laboratory blank associated with every sample in this SDG?				
Was a laboratory blank analyzed for each matrix and concentration?				· · · · · · · · · · · · · · · · · · ·
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
A Life Black				
Were field blanks identified in this SDG?				
Were target compounds detected in the field blanks?			-	
W Sympositic gollies				
Were all surrogate percent recovery (%R) within the QC limits?				
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			_	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?		· •=-	_	
All thence spike and the spike spokes spokes	~			
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	i			
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				

LDC#: 36433A7

#### VALIDATION FINDINGS CHECKLIST

Page: 7 of 7 Page: P7 2nd Reviewer: 9 P7

Validation Area	Yes	No	NA	Findings/Comments
MIII <u>ଜଣ୍ଡଗ୍ଟ୍ର୍ଡ୍</u> ବର୍ଷ୍ୟର ହେମାହାର				
Was an LCS analyzed for this SDG?				_
Was an LCS analyzed per extraction batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?				
१९८८ क्षेत्र				
Were field duplicate pairs identified in this SDG?				
Were target compounds detected in the field duplicates?				
🗴 ्रविन्तृत्वमान्त्रे स्थात्नांस्त्रीराजाः				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/	_		
AGE 11 STOOTS) (GEOVENISTING) (GEOVENISTING) (GEOVENISTING)				
Were the retention times of reported detects within the RT windows?				
XIII Overell assessingen of date		<del> </del>		
Overall assessment of data was found to be acceptable.	7			

LDC#: 36433A7

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page:	/ of _/_
Reviewe	r: FT
2nd Reviewer:	82
<del>-</del>	

METHOD: GC \_\_X\_\_\_ GC Method 8015C TPH Gasoline

The calibration factors (CF), average CF, and relative standard deviation (%RSD) were recalculated for compounds identified below using the following calculations:

CF = A/C

average CF = sum of the CF/number of standards

%RSD = 100 \* (S/X)

Where:

A = Area of compound

C = Concentration of compound

S = Standard deviation of calibration factors

X = Mean of calibration factors

				Reported	Recalculated	Reported	Recalculated	Reported	Recalculated
1		Calibration			i	Average CF	Average CF	%RSD	%RSD
#	Standard ID	Date	Compound	550	550	(Initial)	(Initial)		
	ICAL	1/3/2150	Gasoline	3928.724	3928.724	3827.346	3827.346	10.0	10.0
	PT2 Luft 20246								

LDC	#·	3643	307
	··· ·-		'

## VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

Page:_	of	1
Reviewer:_	FT	_
2nd Reviewer:	Sh	-

METHOD:	GC	HPLC

The percent difference (%D) of the initial calibration average Calibration Factors (CF) and the continuing calibration CF were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF

CF = continuing calibration CF

A = Area of compound

C = Concentration of compound

	Standard	Calibration			Reported	Recalculated	Reported	Recalculated
#	ΙĐ	Date	Compound	Average CF(ICAL)/ CCV Conc.	CF/ Conc. CCV	CF/ Conc. CCV	%D	%D
1	acv 1627	4/27/16	GRU	1100.60	1097.84	1097.44	0	U
						† <del>* * * * * * * * * * * * * * * * * * *</del>		
2								
3								
						<u> </u>		
4								
								<u>-</u>

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 3643347

## **VALIDATION FINDINGS WORKSHEET Surrogate Results Verification**

Page:_	of
Reviewer:	FT
2nd reviewer:_	m

METHOD: \_\_GC \_\_ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS \* 100

Where: SF = Surrogate Found

SS = Surrogate Spiked

Sample ID:\_\_\_# /

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
TFT		30.0	28.1736	94	94	70
				,		

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
Α	Chlorobenzene (CBZ)	G	Octacosane	М	Benzo(e)Pyrene	\$	1-Chloro-3-Nitrobenzene	Υ	Tetrachloro-m- xylene
В	4-Bromofluorobenzene (BFB)	н	Ortho-Terphenyl	N	Terphenyl-D14	Т	3,4-Dinitrotoluene	z	2-Bromonaphthalene
C,	a,a,a-Trifluorotoluene	1	Fluorobenzene (FBZ)	0	Decachlorobiphenyl (DCB)	C	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	Р	1-methylnaphthalene	V	Tri-n-propyltin	ВВ	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	к	Hexacosane	α	Dichlarophenyl Acetic Acid (DCAA)	w	Tributyl Phosphate	cc	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	L x	Triphenyl Phosphate	1	

LDC#: 36433A7

### **VALIDATION FINDINGS WORKSHEET**

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page:_	_of_	
Reviewer:_	FT	_
2nd Reviewer:	Sh	_

METHOD:	GC _	_HPLC

The percent recoveries (%R) and relative percent differences (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

%Recovery = 100 \* (SSC/SA)

RPD =(({SSCLCS - SSCLCSD} \* 2) / (SSCLCS + SSCLCSD))\*100

Where SSC = Spiked sample concentration LCS = Laboratory Control Sample

SA = Spike added

LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples:\_\_ LCS /D

		Sı	oike	Spike S	Sample	LC	cs	LC	SD	LCS/I	CSD
Comp			ded 9/L)	Concer ( ug	ntration )	Percent l	Recovery	Percent I	Recovery	RF	PD
		LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline	(8015)	1100	1100	983.5	980.36	87	89	89	89	0	U
Diesel	(8015)										
Benzene	(8021B)										
Methane	(RSK-175)	•			=						
2,4-D	(8151)										
Dinoseb	(8151)										
Naphthalene	(8310)	 L									
Anthracene	(8310)										
НМХ	(8330)										
2,4,6-Trinitrotolue	ene (8330)										
Phorate	(8141A)										
Malathion	(8141A)										
Formaldehyde	(8315A)										

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicate findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC#: 36433A7

## VALIDATION FINDINGS WORKSHEET <u>Sample Calculation Verification</u>

Page:	of	,
Reviewer:	FT_	
2nd Reviewer:	-8h	

METHOD: //GC HPLO
-------------------

	1	- 1	
/	<u>Y</u>	Ŋ	N/A
	Y	Ν	N/A
	7		

Were all reported results recalculated and verified for all level IV samples?

Were all recalculated results for detected target compounds within 10% of the reported results?

A= Are Fv= Fir Df= Dil RF= Ave In t Vs= Init Ws= Init	ntration= (A)(Fv)(Df) (RF)(Vs or Ws)(%S/100) ea or height of the compound to be a nal Volume of extract lution Factor erage response factor of the composite initial calibration tial volume of the sample tial weight of the sample ercent Solid	Sample ID measured	Sample ID. Les Compound Name $GRO$ Concentration = $3872431 - 108558$ =					
#	Sample ID	Compound	Reported Concentrations	Recalculated Results Concentrations (	Qualifications			
					·			
Comm	ents:							
				<del></del>				

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: June 27, 2016

Parameters: Perchlorate

Validation Level: Level IV

**Laboratory:** Eurofins

Sample Delivery Group (SDG): PH270

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8344299	Water	04/19/16
SP-19B_041916_01_L	8344300	Water	04/19/16
SP-19A_041916_01_LMS	8344299MS	Water	04/19/16
SP-19A 041916 01 LMSD	8344299MSD	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Superfund Organic Methods Data Review (June 2008). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered not detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

#### II. LC/MS Instrument Performance Check

Instrument performance check was performed as prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

#### III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r<sup>2</sup>) was greater than or equal to 0.990.

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0%.

#### IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0%.

The percent differences (%D) of the limit of detection verification (LODV) calibration standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

#### VI. Field Blanks

No field blanks were identified in this SDG.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Internal Standards

All internal standard areas and retention times were within QC limits.

#### XI. Compound Quantitation

All compound quantitations were within validation criteria.

## XII. Target Compound Identifications

All target compound identifications were within validation criteria.

#### XIII. System Performance

The system performance was acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Perchlorate - Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Laboratory Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Perchlorate - Field Blank Data Qualification Summary - SDG PH270

No Sample Data Qualified in this SDG

SDG # _abora	#: 36433A87 VALIDATIO #: PH270 atory: Eurofins	L	evel IV	SS WORKSHEET	2nd	Date: 4/2 Page: _/ of_ Reviewer: Reviewer:
The sa	IOD: LC/MS Perchlorate (EPA SW846 amples listed below were reviewed for etion findings worksheets.			dation areas. Validatio		
	Validation Area			Comm	ents	
l	Sample receipt/Technical holding times	AIA				
II.	GC/MS Instrument performance check	AIA				
111.	Initial calibration/ICV	$A/\Delta$	12	1er =15		
IV.	Continuing calibration	D		1ev =15 acv=15	LOD	V = 30
V.	Laboratory Blanks	A				
VI.	Field blanks	N				
VII.	Surrogate spikes	<b>/</b>	not	regimes		•••
VIII.	Matrix spike/Matrix spike duplicates	A		· //	<del>.</del>	
IX.	Laboratory control samples	A	KS			
Х.	Field duplicates	N				
XI.	Internal standards	A		The second of th		
XII.	Compound quantitation RL/LOQ/LODs	A				· · · · · · · · · · · · · · · · · · ·
XIII.	Target compound identification	A				
XIV.	System performance	4				·- ···
		A	· · · · · · · · · · · · · · · · · · ·	······································		
XV.	Overall assessment of data	4				
ote:	N = Not provided/applicable R = R	No compounds tinsate Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment blanl	OTHER	urce blank ::
c	Client ID			Lab ID	Matrix	Date
1 5	SP-19A_041916_01_L			8344299	Water	04/19/16
2 5	SP-19B_041916_01_L			8344300	Water	04/19/16
3 5	SP-19A_041916_01_LMS			8344299MS	Water	04/19/16
4 8	SP-19A_041916_01_LMSD			8344299MSD	Water	04/19/16
5						
3						
7						
8						
9						
lotes:						
$\perp \mid f$	°BLK08117					

LDC#: 36433A87

## VALIDATION FINDINGS CHECKLIST

Pag	e: <u>/</u> of_ <b>2</b>	_
Reviewe	er: <i>F 7</i>	<b>,</b>
2nd Reviewe	er: Ç⁄\	_
	17	-

Method: Perchiorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	/			
Was cooler temperature criteria met?		<u> </u>		
III. L'C/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?				
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?	/			
IIIa Initial calibration.				
Did the laboratory perform a 5 point calibration prior to sample analysis?				
Were all percent relative standard deviations (%RSD) ≤ 20%?	صمد	/		
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?				
IIIb. Initial Calibration Verification		Maria de la Companya	A SEC	
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?				).
Were all percent differences (%D) < 15%?				
IV. Continuing calibration			. Se	<u>a Arthur Barthar an </u>
Was a continuing calibration analyzed daily?				
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?				
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?	/			
V: Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?		<u> </u>		
Was a laboratory blank analyzed for each matrix and concentration?				
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		_		
VÎ. Field blanks		Spring	mercija Vide	
Were field blanks identified in this SDG?			-	
Were target compounds detected in the field blanks?		:	_	
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.		_		
Was a MS/MSD analyzed every 20 samples of each matrix?				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?				

LDC#: 36433187

## VALIDATION FINDINGS CHECKLIST

Page: 7 of 7
Reviewer: F7
2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
IX. Laboratory control samples	1 163	11.15		
Was an LCS analyzed for this SDG?		1	16.7	Market of the Control
Was an LCS analyzed per extraction batch?	<del> </del>			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		<u></u>	<u> </u>	
X. Field duplicates	Asi Yst	e se d		
Were field duplicate pairs identified in this SDG?		_		
Were target compounds detected in the field duplicates?.			/	
XI. Internal standards	4" 3			
Were internal standard area counts within $\pm$ 50% of the associated calibration standard?	_			
Were retention times of m/z 89 (Cl <sup>18</sup> O <sub>3</sub> ) within 0.2 minutes of m/z 83 (ClO <sub>3</sub> )?				
XII. Compound quantitation		7	数数分子 计编码	
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
XIII: Target:compound identification	pet 1977 Staronard Staronard			
Were relative retention times (RRT's) within 0.98 to 1.02?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?				
Was the isotope ratio of <sup>35</sup> Cl/ <sup>37</sup> Cl or m/z 99/101 within 2.3 to 3.8?  XIV: System performance:		gary a Lagar	ign.	
System performance was found to be acceptable.		_		
XIII Overall assessment of data				
Overall assessment of data was found to be acceptable.				

LDC#: 36433A87 SDG#: 100 cover

## VALIDATION FINDINGS WORKSHEET Initial Calibration Calculation Verification

Page: of Reviewer: 7

Method: Perchlorate (6850)

Calibration				(Y)	(X)		
Date	System	Compound	Standard	Response	Concentration		
4/27/2016	LCMS	Perchlorate	1	0.141202359	0.4		
	MS5P11716		2	0.36791282	1		
				ļ	3	0.679327168	2
	ļ		4	1.38163546	4		
			5	3.902347418	10		
	i		6	10.40220669	25		

**Regression Output** 

Reported

Constant	-0.149181	-0.049600
Std Err of Y Est		
R Squared	0.999097	0.996510
Degrees of Freedom	·	
X Coefficient(s)	0.419097	0.405000
Std Err of Coef.		
	·	==
Correlation Coefficient	0.999549	
Coefficient of Determination (r^2)	0.999097	0.996510

LDC#:\_36433 A87

## **VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification**

Page:_	1_of_1_
Reviewer:	FT
2nd Reviewer:	7h

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = 100 \* (ave. RRF - RRF)/ave. RRF  $RRF = (A_x)(C_{is})/(A_{is})(C_x)$ 

Where: ave. RRF = initial calibration average RRF

RRF = continuing calibration RRF

A = Area of compound,

A<sub>is</sub> = Area of associated internal standard

C = Concentration of compound, C<sub>is</sub> = Concentration of internal standard

					Reported	Recalculated	Reported	Recalculated
#	Standard iD	Calibration Date	Compound (Internal Standard)	Average RRF (Initial)	RRF (CC)	RRF (CC)	%D	%D
1	cev 18:18	4/26/16	Perchlorale (1st is)	4.0	4.3	4-3	8, 8	<b>3</b> .0
2	ceV 20:37	4/26/16	Perchlorati (1st 18)	0.4	0.51	0.5/	28	2
•			(4.10)					
3			(1st IS)					

Comments:	Refer to Continuing	Calibration findings v	vorksheet for list o	f qualificati	<u>ons and associat</u>	<u>ed samples whe</u>	n reported result	s do not agree with	in 10.0% of
the recalcula	ated results.		į.					· · · · · · · · · · · · · · · · · · ·	
								· · · · · · · · · · · · · · · · · · ·	

LDC#: 36433A87	.DC #:	36433A8	゚フ
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## **VALIDATION FINDINGS WORKSHEET** Matrix Spike/Matrix Spike Duplicates Results Verification

Page:_	1_of_1_
Reviewer:_	E.
2nd Reviewer:	84

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SSC - SC)/SA

Where: SSC = Spiked sample concentration SA = Spike added

SC = Sample concentation

RPD = I MSC - MSC i \* 2/(MSC + MSDC)

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: \_\_\_\_

	Si	oike	Sample	Spiked	Sample	Matrix	Spike	Matrix Spik	e Duplicate	Mis/	WSD.
Compound		(ded	Concentration (ルタ/上)	Conce ( U	ntration	Percent	Recovery	Percent I	Recovery	RI	סי
	MS	MSD		MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
Perchlorate	5.0	5.0	ND	5.52	2.28	סון	110	112	//2_	1	1
· ·											
								•			
								:			-
				,	1.						
											• • •
						_					

Comments: Refer to Matrix Spike/Matrix Spike	<u>Duplicates findings worksheet</u>	for list of qualifications and asso	<u>ciated samples when reported re</u>	esults do not agree within
10.0% of the recalculated results.				
	,			

LDC #: 364331187

## **VALIDATION FINDINGS WORKSHEET**

## Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Page:_	1	_of_1_
Reviewer:	F	<u>-T</u>
2nd Reviewer:	_}	2

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 \* (SC/SA

Where: SSC = Spike concentration

SA = Spike added

RPD = I LCSC - LCSDC | \* 2/(LCSC + LCSDC)

LCS/LCSD samples: usos117

Compound	Spike Added ( ug/L)		Spike I CS Concentration ( \( \mathcal{G} \) \( \mathcal{L} \) Percent Recovery				TCS J TCSD				L CSD PD
Exc Community	LCS	LCSD	LCS	I CSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated	
Perchlorate	5.0	NA	5./3	NA	103	/03	NA -				
					<u>.</u>	-					
		· · · · · · · · · · · · · · · · · · ·									

Comments: Refer to Laboratory Control Sample/Laboratory C	Control Sample Du	<u>uplicates findings wo</u>	<u>orksheet for list of qualification</u>	ons and associated samples	when reported
results do not agree within 10.0% of the recalculated results	j.		,	<del>-</del>	
	<del></del>		<u>-</u>		

LDC#: 36433A87

## **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Page:_	1_of_1_
Reviewer:_	FT
2nd reviewer:	200

METHOD: LC/MS Perchlorate (EPA SW 846 Method 6850)

Y <u>|N\_N/A</u> Were all reported results recalculated and verified for all level IV samples? N N/A

Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

Example:

Concentration =  $(A_{\cdot})(I_{\cdot})(V_{\cdot})(DF)(2.0)$ (A;s)(RRF)(V,s)(V;)(%S) Area of the characteristic ion (EICP) for the A, compound to be measured Area of the characteristic ion (EiCP) for the specific internal standard Amount of internal standard added in nanograms (ng) i, Volume or weight of sample extract in milliliters (ml) or ٧, grams (g). Volume of extract injected in microliters (ul) V, V, Volume of the concentrated extract in microliters (ul) Dilution Factor. Df Percent solids, applicable to soil and solid matrices **%**S

CO to a second for ODO alamous

Perch/brall Sample I.D.

= 5.13 ug/L

2.0	= Factor of 2 to account	ent for GPC cleanup	<del></del>		
#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification
	68907 34000	= 0.405(x) -0.	0496		
]	34000				
	(X =	5./3 ug/L)			
ļi					
<b></b>					
				<u> </u>	
			<u>.</u>		
	_				

The attached zipped file contains two files:

<u>File</u> 1) Readme\_SSFL\_062916.doc

**Format** MS Word 2003 **Description** 

A "Readme" file (this document).

MS Excel 2003

A spreadsheet for the following SDG(s):

2) PH270.EZ.v1.xls

PH270 36433A

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Shauna McKellar at (760) 827-1100 if you have any questions regarding this electronic data submittal.

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

July 5, 2016

Parameters:

Metals

Validation Level:

Level IV

Laboratory:

**Eurofins** 

Sample Delivery Group (SDG): PH271

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-19A_041916_01_L	8361892	Water	04/19/16
SP-19B_041916_01_L	8361893	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

#### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	05/10/16 (07:31)	Strontium	70.0 (80-120)	All samples in SDG PH271	J (all detects)	P
ICSAB	05/10/16 (08:38)	Strontium	72.0 (80-120)	All samples in SDG PH271	J (all detects)	Р

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Manganese	54.750 ug/L 1.740 ug/L	All samples in SDG PH271
ICB/CCB	Соррег	1.9 ug/L	All samples in SDG PH271

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

#### VI. Field Blanks

No field blanks were identified in this SDG.

### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For SP-424C\_041316\_01\_LMS/MSD, no data were qualified for Calcium and Strontium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

#### VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

#### X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

#### XI. Field Duplicates

No field duplicates were identified in this SDG.

#### XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

#### XIII. Sample Result Verification

All sample result verifications were acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICS %R, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH271

Sample	Analyte	Flag	A or P	Reason (Code)
SP-19A_041916_01_L SP-19B_041916_01_L	Strontium	J (all detects)	Р	ICP interference check sample (%R) (I)

Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH271

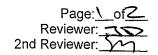
No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH271

No Sample Data Qualified in this SDG

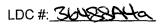
SDG 7	t: <u>36488A4a</u> <b>VALIDATIO</b> I #: <u>PH271</u> atory: <u>Eurofins</u>		PLETENES: Level IV	S WORKSHEET		Date: 6 28 10 Page: \[ \lof \] Reviewer: \[ \lof \log \]	_
METH	IOD: Metals (EPA SW 846 Method 60100	C/6020A/7	470A)		2na	Reviewer: \( \sum_{\text{\ti}\text{\texi{\text{\texi}\text{\text{\text{\texi}\tex{\text{\text{\text{\text{\text{\texi}\text{\texi}\tint{\texitt{\texi{\texi{\texi}\texi{\texi{\texi{\texi{\texi{\texi{\texi{\texi}	•
	amples listed below were reviewed for eaction findings worksheets.	ch of the f	ollowing valida	ition areas. Validatio	n findings are	e noted in attached	I
	Validation Area	Comments					
l.	Sample receipt/Technical holding times	A	4/19/10		,		
11.	ICP/MS Tune	A	, , _ 3,				
III.	Instrument Calibration	A					
IV.	ICP Interference Check Sample (ICS) Analysis	800					
V.	Laboratory Blanks	SW					
VI.	Field Blanks	2					
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSID=ST	2-424C-041316-	-01-CMS10	(SDG:PHZ73)=6	,Sx7
VIII.	Duplicate sample analysis	A	I .	-424(-041316.		<u>√</u>	
IX.	Serial Dilution	A		-424C-04131		· 1	
Χ.	Laboratory control samples	A	لدح				
XI.	Field Duplicates	2					:
XII.	Internal Standard (ICP-MS)	A					
XIII.	Sample Result Verification	A					
XIV	Overall Assessment of Data	A					
lote:	N = Not provided/applicable R = Rins	o compounds sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	OTHER	irce blank :	
	Client ID			Lab ID	Matrix	Date	
1 .	SP-19A_041916_01_L			8361892	Water	04/19/16	
2 :	SP-19B_041916_01_L			8361893	Water	04/19/16	
3							
4							
5							
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7				,			
8							
9							
10							
11		<del></del>			1		
<sub>12</sub>   lotes:		<del></del>					

## **VALIDATION FINDINGS CHECKLIST**



Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	/			
Cooler temperature criteria was met.				
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	/			
Were %RSD of isotopes in the tuning solution ≤5%?				
III. Calibration		- <u></u> -		
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	/			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	/		·	
Were all initial calibration correlation coefficients ≥ 0.995?		<u> </u>		
IV. Blanks				
Was a method blank associated with every sample in this SDG?	/			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	/			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		_		
VI. Matrix spike/Matrix spike duplicates		,	· <del>-</del>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			/	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			1	
VII. Laboratory control samples	·	<del>,</del>		
Was an LCS anaylzed for this SDG?				
Was an LCS analyzed per extraction batch?	_			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	_			



## **VALIDATION FINDINGS CHECKLIST**

Page: Zof Z Reviewer: SO 2nd Reviewer: SO

Validation Area	Yes	No	NA	Findings/Comments
	<u> </u>		<u> </u>	i manigoroommonto
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)		т	T	
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	/			
If the %Rs were outside the criteria, was a reanalysis performed?				
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			/	
Were all percent differences (%Ds) < 10%?	<u> </u>	ļ	<	
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			_	
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	/			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		/		
Target analytes were detected in the field duplicates.			/	
XIII. Field blanks				
Field blanks were identified in this SDG.		/		
Target analytes were detected in the field blanks.			/	

LDC #: 36488AVa

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: \of \
Reviewer: \of \
2nd reviewer: \of \

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-2	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Analysis Method
СР		ALJSBJAS BaJBeJCdJCaJCrJCdjCuJFeJPbJMgJMnJHg/NiJKJSe, Ag,(Na)TI, VJZnJMoJBJSnJTiJLiJEJZr
CP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K/Se/Ag/Na/Tl, V, Zn, Mo, B, Sn, Ti,
GEAA		Al. Sh. As. Ba. Be. Cd. Ca. Cr. Co. Cu. Fe. Ph. Mg. Mn. Hg. Ni, K. Se. Ag. Na, Tl. V. Zn. Mo. B. Sn. Ti.

ELEMENTS.wpd

Mercury by CVAA if performed

LDC #: 36488A4a

## VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample

Page: \\_of\_\ Reviewer: \\_\ 2nd Reviewer: \\_

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Ý/1 Y/1 <b>/₹V</b>	ease see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  N N/A Were ICP interference check samples performed as required?  N N/A Were the AB solution percent recoveries (%R) within the control limits of 80-120%?  VEL IV ONLY:  N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.							
#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications		
Ш	05/10/16	ICSAB (7:31)	Sr	70.0	All	J/UJ/P (det) 【工)		
H								
$\vdash$								
	05/10/16	ICSAB (8:38)	Sr	72.0	All	J/UJ/P (det)		
		<u></u>						
		AC-1				1		
Cor	mments:							

LDC #:36488A4a

#### **VALIDATION FINDINGS WORKSHEET** PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD 2nd Reviewer:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Sample Concentration units, unless otherwise noted:

Soil preparation factor applied:\_ ma/l

(8) Associated Samples:

Jailible C	Oncentiatio	ii uiiks, uiii	CSS Official	se noteu	!!	iy/L	 ssocialeu Saii	ipies/			 
的特殊支持		<b>io</b> se il		E1721年8月39	34.14			ട്രണിചി	ലബിലലിക		764
Analyte	Maximum PB <sup>a</sup> (mg/Kg)		Maximum ICB/CCB <sup>a</sup> (ug/L)		No Qual.						
Са		54.750		0.273750							
Cu			1.9	0.009500							
Mn		1.740		0.008700							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36488AU

## **VALIDATION FINDINGS WORKSHEET Initial and Continuing Calibration Calculation Verification**

	Page:_	
	Reviewer:	QZ
2nd	Reviewer:	Py

**METHOD:** Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found</u> x 100 True

Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
17:50	ICP (Initial calibration)	A	3049741	30000 val		10177.e	2
724	ICP/MS (Initial calibration)	Aa	5197 valu	500gl~	103,9%	10397.2	,
10×15	CVAA (Initial calibration)	Ha	2.47 09/	2-Sigle	98.8%	98.8%.R	
CCV 18:10	ICP (Continuing calibration)	S	491.3 vg/L	500 vg/c	98-38E	98.3%R	
CCV 7:36	ICP/MS (Continuing calibration)	TI	26.32 4	9	105.3%	105.3%R	
9'16	CVAA (Contining calibration)	Hay	1.0/vg/	logic	1018sP	(01%R	<b>\</b>
	GFAA (Initial calibration)			9			
	GFAA (Continuing calibation)						

Comments:		 	

LDC #: 36488A4C

### VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: of Page: Of Pag

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = <u>Found</u> x 100 True Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{[S-D]} \times 100$ 

Where, S = Original sample concentration

(S+D)/2

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

 $%D = II-SDRI \times 100$ 

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated  %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
30281 30281	ICP interference check	Zn	994.4 291	1000011	99.4%R	99.4%R	Z
اردج ع120	Laboratory control sample	Ha	0,921 ugic	lugic	927.R	92%2	
MS 18:32	Matrix spike	4	(SSR-SR)	50 ug/L	98-1-R	98%R	
000 8:29	Duplicate	K	3.10 mg/L	3.04 mg/L	24-80	2% RPD	
SER 18:38	ICP serial dilution	Mg	22.60 mg/L	22.43 mgil	1%5	1%0	

Comments:	 · · · · · · · · · · · · · · · · · · ·	 

LDC #: 30488ANG

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: of Neviewer: 2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

	<b>OD</b>	200 11101010 (21 7	(OVI ONO MOUN		٠,			
Please Y/N I Y/N I Y/N I	<u>N/A</u> N/A	Have results Are results w	been reported a	ind calculated corr ed range of the in:	ectly?	cable questions are		
Detecto equation	ed anal	yte results for _	(2)	Mg		were recalcu	lated and verified	using the following
Concent	ration =	(RD)(FV)(Dil) (In. Vol.)		Recalc	ulation:			
RD FV In. Vol. Dil	= = = = = = = = = = = = = = = = = = = =	Raw data conce Final volume (m Initial volume (m Dilution factor	i)	P7 =	30.	4 mg/		
#	S	Sample ID		Analyte		Reported Concentration (Mg\L)	Calculated Concentration (iMa(U	Acceptable (Y/N)
		(		Sx		(1)	1.7	3
		2_		Ma		4,08	30,4	1
				7				
			_					
Vote:								

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

**LDC Report Date:** July 5, 2016

Parameters: Metals

Validation Level: Level IV

Laboratory: Eurofins

Sample Delivery Group (SDG): PH272

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424A_041416_01_L	8361894	Water	04/14/16
SP-424A 041416 36 L	8361895	Water	04/14/16

#### Introduction

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The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

#### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	05/10/16 (07:31)	Strontium	70.0 (80-120)	All samples in SDG PH272	J (all detects)	Р
ICSAB	05/10/16 (08:38)	Strontium	72.0 (80-120)	All samples in SDG PH272	J (all detects)	Р

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Calcium Manganese	54.750 ug/L 1.740 ug/L	All samples in SDG PH272
ICB/CCB	Copper	2.2 ug/L	All samples in SDG PH272

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

#### VI. Field Blanks

No field blanks were identified in this SDG.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For SP-424C\_041316\_01\_LMS/MSD, no data were qualified for Calcium and Strontium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

#### VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

#### X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

#### XI. Field Duplicates

Samples SP-424A\_041416\_01\_L and SP-424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Concentrati	on (mg/L)			
Analyte	SP-424A_041416_01_L		RPD (Limits)	Flag	A or P
Barium	0.0319	0.0323	1 (≤35)	-	-
Boron	0.0659	0.0668	1 (≤35)	-	-
Calcium	85.2	86.0	1 (≤35)	-	-
Chromium	0.0021	0.0300U	174 (≤35)	NQ	-
Lithium	0.0508	0.0508	0 (≤35)	-	_
Magnesium	23.8	24.1	1 (≤35)	-	-

	Concentrati	on (mg/L)			
Analyte	SP-424A_041416_01_L	SP-424A_041416_36_L	RPD (Limits)	Flag	A or P
Manganese	0.234	0.239	2 (≤35)	-	_
Potassium	3.34	3.39	1 (≤35)	-	-
Sodium	83.6	85.0	2 (≤35)	-	-
Strontium	0.436	0.415	5 (≤35)	-	-

NQ = One or both results were less than 5x the reporting limit, therefore no data were qualified.

#### XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

#### XIII. Sample Result Verification

All sample result verifications were acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICS %R, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH272

Sample	Analyte	Flag	A or P	Reason (Code)	
SP-424A_041416_01_L SP-424A_041416_36_L	Strontium	J (all detects)	P	ICP interference check sample (%R) (I)	

Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH272

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH272

No Sample Data Qualified in this SDG

	<u> </u>						
SDG	#:36488B4aVALIDATIO #:PH272 ratory:_Eurofins		PLETENESS _evel IV	S WORKSHEET	Rev	Date: 6/28/V Page: 1/of 1 viewer: 30 viewer: 30	<u></u> ⊌ - -
The s	HOD: Metals (EPA SW 846 Method 6010 samples listed below were reviewed for eation findings worksheets.			ition areas. Validation			
	Validation Area			Comme	nte		
l.	Sample receipt/Technical holding times	A	4/14/10	- William			
II.	ICP/MS Tune	A					
III.	Instrument Calibration	A					
IV.	ICP Interference Check Sample (ICS) Analysis	SW					
V.	Laboratory Blanks	SW					
VI.	Field Blanks	2					<u> </u>
VII.	Matrix Spike/Matrix Spike Duplicates	A	MSD=SI	P-424C-041316-0	) LMS/D (STE	:PHZ73)=(a	,Sc76
VIII.	Duplicate sample analysis	A	1	2-4240-041316-0			
IX.	Serial Dilution	A		424C-041316-01.			
X.	Laboratory control samples	A	LCS		,		
XI.	Field Duplicates	SW	FO=(1,	2)			
XII.	Internal Standard (ICP-MS)	A		,			
XIII.	Sample Result Verification	A					
_XIV	Overall Assessment of Data	A					}
Note:	N = Not provided/applicable R = Rir	o compounds sate eld blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blank	SB=Source I OTHER:	olank	_
	Client ID			Lab ID	Matrix	Date	
1	SP-424A_041416_01_L			8361894	Water	04/14/16	
2	SP-424A_041416_36_L			8361895	Water	04/14/16	<u> </u>
3							
4							
5							
6							
7							
8							

10 Notes:

Page: of Reviewer: 2nd Reviewer:

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<del>'</del>			
All technical holding times were met.				
Cooler temperature criteria was met.				
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	_			
Were %RSD of isotopes in the tuning solution ≤5%?	_			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	/			
Were the proper number of standards used?	_			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?				
Were all initial calibration correlation coefficients ≥ 0.995?	/			
IV. Blanks		<del></del>		
Was a method blank associated with every sample in this SDG?		!		
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.				
V. ICP Interference Check Sample		<del>,</del>		
Were ICP interference check samples performed daily?	_			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?				
VI. Matrix spike/Matrix spike duplicates			<u> </u>	
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			_	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.			/	
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	_			
Was an LCS analyzed per extraction batch?		<b> </b>		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	/			

LDC #: 36488B49

## **VALIDATION FINDINGS CHECKLIST**

Page: 2 of Z Reviewer: 35 2nd Reviewer: 51

Validation Area	Yes	No	NA	Findings/Comments						
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)										
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	_									
If the %Rs were outside the criteria, was a reanalysis performed?										
IX. ICP Serial Dilution										
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?			_							
Were all percent differences (%Ds) < 10%?			/							
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.			/							
X. Sample Result Verification										
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/									
XI. Overall assessment of data										
Overall assessment of data was found to be acceptable.	/									
XII. Field duplicates										
Field duplicate pairs were identified in this SDG.	/									
Target analytes were detected in the field duplicates.										
XIII. Field blanks										
Field blanks were identified in this SDG.		/								
Target analytes were detected in the field blanks.			/							

LDC #: 3648B49

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page: of \
Reviewer: 50
2nd reviewer: 50

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-2	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti)
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
	1	Analysis Method
ICP		Al/Sb/As/Ba)Be/Cd/Ca,Cr,Co,Cu,Fe,Pb,Mg/Mn, Hg,Ni)K)Se, Ag, Na)TI/V/Zn,Mg/B,/Sn/Ti)C/C2-
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se/Ag, Na(Ti)V, Zn, Mo, B, Sn, Ti,(Sr)
GEAA		Al, Sh, As, Ra, Re, Cd, Ca, Cr, Co, Cu, Fe, Ph, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

ELEMENTS.wpd

Mercury by CVAA if performed

LDC #: 36488B4a

## VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample

Page: <u></u> of_
Reviewer: 30
2nd Reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

14 XX	Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".  YN N/A  Were ICP interference check samples performed as required?  YN N/A  Were the AB solution percent recoveries (%R) within the control limits of 80-120%?  VEL IV ONLY:  YN N/A  Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.								
#	Date	ICS Identification	Analyte	Finding	Associated Samples	Qualifications			
	05/10/16	ICSAB (7:31)	Sr	70.0	All	J/UJ/P (det)			
$\mathbb{H}$				<u> </u>					
			1		<u> </u>	· · · · · · · · · · · · · · · · · · ·			

| 05/10/16 | ICSAB (8:38) | Sr | 72.0 | All | J/UJ/P (det) | S |

Comments:	 		 		_	
					_	
				,=	• • •	

LDC #:36488B4a

#### **VALIDATION FINDINGS WORKSHEET** PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: 2nd Reviewer:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)

Soil preparation factor applied:

12 Sample Concentration units, unless otherwise noted: Associated Samples:

Sample Concentration units, unless otherwise noted.			[]	IG/L		socialed San	ihies/	111 / 6	7		 		
			Walter VI		7- 7-		Sample il	enilierim.		75 190 37 18			
Analyte	Maximum PB <sup>a</sup> (mg/Kg)	Maximum PB <sup>a</sup> (ug/L)	Maximum ICB/CCB <sup>a</sup> (ug/L)		No Qual.								
Ca		54.750		0.273750									
Cu			2.2	0.011000									
Mn		1.740		0.008700									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

#### LDC#: 36488B4a

## VALIDATION FINDINGS WORKSHEET

Field Duplicates

METHOD: Metals (EPA Method 6010B/7000)

YN NA YN NA Were field duplicate pairs identified in this SDG? Were target analytes detected in the field duplicate pairs?

	Concentra	ition (mg/L)			
Analyte	1	2	RPD (≤35)	Qual. (Parent Only)	
Barium	0.0319	0.0323	1		
Boron	0.0659	0.0668	1		
Calcium	85.2	86.0	1	,	
Chromium	0.0021	0.0300U	174	NQ	
Lithium	0.0508	0.0508	0		
Magnesium	23.8	24.1	1		
Manganese	0.234	0.239	2		
Potassium	3.34	3.39	1		
Sodium	83.6	85.0	2		
Strontium	0.436	0.415	5		

NQ = No qual. because one or both results < 5X RL

 $\verb|\LDCFILESERVER|\Validation|\FIELD DUPLICATES|\FD_inorganic|\36488B4a.wpd|$ 

LDC#: 3648884a

## VALIDATION FINDINGS WORKSHEET <u>Initial and Continuing Calibration Calculation Verification</u>

Page:_	<u></u> of <u>\</u>
Reviewer:	2
2nd Reviewer:	12
-	

**METHOD:** Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found</u> x 100 True Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

					Recalculated	Reported	
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	Acceptable (Y/N)
11:20 ZM	ICP (Initial calibration)	Zr	594 291	600ylc	99.09.8	99.0%R	7
7:19	ICP/MS (Initial calibration)	て	S1.62uglu	)	103-282	103-248	
6757 2007	CVAA (Initial calibration)	Ha	2.47 vgl	2.5 yol	98.8%	98.8%	
CCV 18:48	ICP (Continuing calibration)	V	506.2 vg/L	Soogle	101.2%2	101.2%2	<u></u>
CCV 8:03	ICP/MS (Continuing calibration)	Se	26.41.91	25 ugil	1056%R	105782	<b>3</b> *
9:41	CVAA (Contining calibration)	Hg	1.0 mg/c	1 291	100%2	100%2	7
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments:	* Rounding			
			 <del></del>	

LDC #: 36488BUE

### **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

	Page:_	<u>\</u> of_\
	Reviewer:	QL
2nd	Reviewer:_	82
		<u> </u>

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample concentration

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

 $%D = II-SDRI \times 100$ 

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

			Found / S / I	True / D / SDR (units)	Recalculated	Reported	Acceptable
Sample ID	Type of Analysis	Element	(units)		%R / RPD / %D	%R / RPD / %D	(Y/N)
ICSAB 7:31	ICP interference check	Sc	3.54 0910	Sugic	71%8	70%R	y*
18:19	Laboratory control sample	So	481.2 mg/	500 cg/L	96%.R	96%	7)
MS 18:32	Matrix spike	ص	(SSR-SR) ZSZ uglu	zsough	(0) % (2	101%R	
DUP 18:29	Duplicate	Na	90.2 mg/l	87.2 mg/L	37,800	3%RPO	
SER 18:58	ICP serial dilution	Ca	75.43 mg/c	7627 mg/L	1%	1%0	4

Comments: _	* Pounding				
		7	"		
<u> </u>			 		 

LDC #: 3648884a

## **VALIDATION FINDINGS WORKSHEET Sample Calculation Verification**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Page:_	<u>\</u> of\_
Reviewer:	QU
2nd reviewer:_	50

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

YN YN YN	N/A Have results w N/A Are all detect	been reported and calculated correctly rithin the calibrated range of the instruntion limits below the CRDL?	1?		
Oetec equati	ted analyte results for _	(1) Na	were recalcu	lated and verified t	using the following
Concen	tration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$	Recalculation	n:		
RD FV In. Vol. Dil	= Raw data conce = Final volume (m = Initial volume (m = Dilution factor	n)	ongle		
#	Sample ID	Analyte	Reported Concentration (⋎∧ຊໄ∟)	Calculated Concentration (MG\L)	Acceptable (Y/N)
	1	Da	2.58	83.6	3
	2	Sr	0.415	0.415	7
Note:_					

# Laboratory Data Consultants, Inc. Data Validation Report

**Project/Site Name:** 

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

July 5, 2016

Parameters:

Metals

Validation Level:

Level IV

Laboratory:

**Eurofins** 

Sample Delivery Group (SDG): PH273

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP-424B_041316_01_L	8361908	Water	04/13/16
SP-424C_041316_01_L	8361909	Water	04/13/16
SP-424C_041316_01_LMS	8361909MS	Water	04/13/16
SP-424C_041316_01_LMSD	8361909MSD	Water	04/13/16
SP-424C_041316_01_LDUP	8361909DUP	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, and Zirconium by Environmental Protection Agency (EPA) SW 846 Methods 6010C/6020A

Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level IV evaluation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

#### III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

#### IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits with the following exceptions:

ICS ID	Date/ Time	Analyte	%R (Limits)	Associated Samples	Flag	A or P
ICSAB	05/10/16 (07:31)	Strontium	70.0 (80-120)	All samples in SDG PH273	J (all detects)	Р
ICSAB	05/10/16 (08:38)	Strontium	72.0 (80-120)	All samples in SDG PH273	J (all detects)	Р

#### V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analyte	Maximum Concentration	Associated Samples		
PB (prep blank)	Calcium Manganese	54.750 ug/L 1.740 ug/L	All samples in SDG PH273		
ICB/CCB	Copper	1.9 ug/L	All samples in SDG PH273		

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated laboratory blanks.

#### VI. Field Blanks

No field blanks were identified in this SDG.

#### VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For SP-424C\_041316\_01\_LMS/MSD, no data were qualified for Calcium and Strontium percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration. Relative percent differences (RPD) were within QC limits.

#### VIII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

#### IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

#### X. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the methods. Percent recoveries (%R) were within QC limits.

#### XI. Field Duplicates

No field duplicates were identified in this SDG.

#### XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits.

#### XIII. Sample Result Verification

All sample result verifications were acceptable.

#### XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods. No results were rejected in this SDG.

Due to ICS %R, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Metals - Data Qualification Summary - SDG PH273

Sample	Analyte	Flag	A or P	Reason (Code)
SP-424B_041316_01_L SP-424C_041316_01_L	Strontium	J (all detects)	Р	ICP interference check sample (%R) (I)

Santa Susana Field Laboratory, GW Metals - Laboratory Blank Data Qualification Summary - SDG PH273

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Metals - Field Blank Data Qualification Summary - SDG PH273

No Sample Data Qualified in this SDG

				S WORKSHEE		Date: 6/29
	: <u>PH273</u> atory: <u>Eurofins</u>	L	_evel IV			Page: \of \ Reviewer: \square
_abore	atory. <u>Laronna</u>				2nd	Reviewer: St
METH	OD: Metals (EPA SW 846 Method 6010	C/6020A/7	470A)			-0
The ec	umples listed helpsy were reviewed for e	ach of the fe	مانمستور والم	ation oroso Valido	tion finalinas	
/alidat	imples listed below were reviewed for eation findings worksheets.	acii di tile it	ollowing vallua	alion areas. Valida	uon iindings are	noted in attache
		· · · · ·				
	Validation Area			Com	ments	
l.	Sample receipt/Technical holding times	A	4/13/11	0		
II.	ICP/MS Tune	A				
III.	Instrument Calibration	A				
IV.	ICP Interference Check Sample (ICS) Analysis	Sw				
V.	Laboratory Blanks	(1)				
VI.	Field Blanks	+	MCID =	(2 W) = C=	C - >UV	
VII.	Matrix Spike/Matrix Spike Duplicates	+~	7 P	(3,4) = Ca	25 / 4x	
VIII.	Duplicate sample analysis	<u>                                    </u>				
IX.	Serial Dilution	1	لدفح			
Χ.	Laboratory control samples		105			
XI.	Field Duplicates	$+ \sim$				
XII.	Internal Standard (ICP-MS)	<u>                                    </u>				
XIII.	Sample Result Verification	<del>                                      </del>	:			
ΧIV	Overall Assessment of Data					
lote:	N = Not provided/applicable R = Ri	No compounds insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	irce blank :
	Client ID			Lab ID	Matrix	Date
1 5	SP-424B_041316_01_L			8361908	Water	04/13/16
2 5	SP-424C_041316_01_L			8361909	Water	04/13/16
3 5	SP-424C_041316_01_LMS			8361909MS	Water	04/13/16
4 8	SP-424C_041316_01_LMSD			8361909MSD	Water	04/13/16
5 5	SP-424C_041316_01_LDUP			8361909DUP	Water	04/13/16
3						
7						
3						
,						
10						

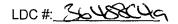
Notes:

#### **VALIDATION FINDINGS CHECKLIST**

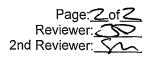
Page: \\_\of \\_Z Reviewer: \\_\\_\\_\\_\\_\_ 2nd Reviewer: \\_\\_\\_

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments	
I. Technical holding times					
All technical holding times were met.					
Cooler temperature criteria was met.					
II. ICP/MS Tune					
Were all isotopes in the tuning solution mass resolution within 0.1 amu?					
Were %RSD of isotopes in the tuning solution ≤5%?	/				
III. Calibration					
Were all instruments calibrated daily, each set-up time?					
Were the proper number of standards used?	/				
Were all initial and continuing calibration verification %Rs within the 90-110% (80- 120% for mercury) QC limits?	/				
Were all initial calibration correlation coefficients ≥ 0.995?	/				
IV. Blanks					
Was a method blank associated with every sample in this SDG?	1				
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	/				
V. ICP Interference Check Sample					
Were ICP interference check samples performed daily?	/				
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?		/			
VI. Matrix spike/Matrix spike duplicates	<del></del>		· <del>-</del> ,		
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	_				
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.					
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq$ 20% for waters and $\leq$ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were $\leq$ 5X the RL, including when only one of the duplicate sample values were $\leq$ 5X the RL.	/				
VII. Laboratory control samples	<del>,</del>				
Was an LCS anaylzed for this SDG?	_				
Was an LCS analyzed per extraction batch?					
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	_				



#### **VALIDATION FINDINGS CHECKLIST**



Validation Area	Yes	No	NA	Findings/Comments		
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)						
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	_					
If the %Rs were outside the criteria, was a reanalysis performed?	_					
IX. ICP Serial Dilution						
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	/					
Were all percent differences (%Ds) < 10%?	/					
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		/				
X. Sample Result Verification	·r=-					
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	/					
XI. Overall assessment of data						
Overall assessment of data was found to be acceptable.	/					
XII. Field duplicates						
Field duplicate pairs were identified in this SDG.		\				
Target analytes were detected in the field duplicates.			1			
XIII. Field blanks						
Field blanks were identified in this SDG.		/				
Target analytes were detected in the field blanks.			/			

LDC #: 36488C4a

## VALIDATION FINDINGS WORKSHEET Sample Specific Element Reference

Page:\_\_\_of\_\_\_ Reviewer:\_\_\_\_\_\_ 2nd reviewer:\_\_\_\_\_\_

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-2	$\mathcal{C}$	(Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti)
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
QC:3-5	$\overline{\mathcal{W}}$	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti
<u></u>		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
	<u> </u>	Analysis Method
CP		Al/Sh (As Ba Be Cd) Ca Cr, Co Cu Fe Pb Mg Mn, Hg, Ni K, Se, Ag, Na, Ti VZn Mo B Sn Ti, C Z
P-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,
FAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti,

ELEMENTS.wpd

LDC #: 36488C4a

# VALIDATION FINDINGS WORKSHEET ICP Interference Check Sample

Page:_`	_of_	/
Reviewer:_	Z	$\geq$
2nd Reviewer:	<i>y</i> (	7

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

N/A	Were ICP interference			ole questions are identified a ed?	
N/A N/N/A VEL IV ON	Were the AB solution	percent recoverie	es (%R) within the co	ontrol limits of 80-120%?	
EVEL IV ON	ILY:				
<u> </u>	Were recalculated res	sults acceptable?	See Level IV Recal	culation Worksheet for recal	culations.
1	<del></del>	T I			T
# Date_	ICS Identification	Analyte	Finding	Associated Samples	Qualifications
05/10/16	ICSAB (7:31)	Sr	70.0	All	J/UJ/P (det)
<u> </u>					
05/10/16	ICSAB (8:38)	Sr	72.0	All	J/UJ/P (det) (\( \)
			_		,
1	4	1			

Comments:			

LDC #:36488C4a

## VALIDATION FINDINGS WORKSHEET PB/ICB/CCB QUALIFIED SAMPLES

12

Page: 1 of 1
Reviewer: JD
2nd Reviewer:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000)
Sample Concentration units unless otherwise noted:

Soil preparation factor applied:

Associated Samples:

sample concentration units, unless otherwise noted.				19/L	 Socialed Sam		<u>''' \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \</u>					
		<b>B</b>						Sampledo	ไอสมีมีคร์มีเกล	e en la des		
Analyte	Maximum PB <sup>a</sup> (mg/Kg)	PB <sup>a</sup>	Maximum ICB/CCB <sup>a</sup> (ug/L)		No Qual.							
Са		54.750		0.273750								
Cu			1.9	0.009500								
Mn		1.740		0.008700								

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note: a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC#:3648864C

## VALIDATION FINDINGS WORKSHEET <u>Initial and Continuing Calibration Calculation Verification</u>

Page:_	<u>\</u> of_\_
Reviewer:	20
2nd Reviewer:	82

**METHOD:** Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = <u>Found</u> x 100 True Where, Found = concentration (in ug/L) of each analyte <u>measured</u> in the analysis of the ICV or CCV solution

True = concentration (in ug/L) of each analyte in the ICV or CCV source

, , , , , , , , , , , , , , , , , , ,					Recalculated	Reported	Acceptable
Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	%R	%R	(Y/N)
11:80 11:80	ICP (Initial calibration)	Fe	29834-y/L	30000 yol	97.48R	99,4%2	y
3CV 7:19	ICP/MS (Initial calibration)	B	51.06 yl	50 yl	102.1%R	102.1%R	
13CV 6:12	CVAA (Initial calibration)	Hg	2.47 vg/c	2,5 4	98.8%R	98.8%2	
18710 18710	ICP (Continuing calibration)	Pb	487.6 291	500 2/2	97,5%R	97.5%R	
2:36	ICP/MS (Continuing calibration)	Ag	26.116491	25 mg/c	104,68R	104.688	
CCV 9:16	CVAA (Contining calibration)	Ha	1.01.091	lyll	(01%2	1018R	
	GFAA (Initial calibration)	2					
	GFAA (Continuing calibation)						

Comments:	 	 	

LDC #: 36488C40

#### VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

 $%R = \frac{Found}{True} \times 100$ 

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,

Found = SSR (spiked sample result) - SR (sample result).

True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = <u>|S-D|</u> x 100

Where, S = Original sample concentration

(S+D)/2

D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

 $%D = II-SDRI \times 100$ 

Where, I = Initial Sample Result (mg/L)

SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
JCS AB 18:06	ICP interference check	2	Jps d. 488	100000016	88.5%.R	8.5%	2
LCS 9:20	Laboratory control sample	Hg	0,921.091	logic	92%	92%=R	
MS 18:32	Matrix spike	V	(SSR-SR)	500 vg/c	1057.2	(05%R	
DUP 7:49	Duplicate	Sc	419.1 gl	419.7091	0%	0%,800	
SER 7:56	ICP serial dilution	Sr	437.0 vg(C	497091	4%0	430	1

Comments:	 	 	

LDC #: 36488(4a

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page: of Reviewer: 2nd reviewer:

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Prease Y N Y N Y N	N/A Have results N/A Are results w	ow for all questions answered "N". Not been reported and calculated correctly ithin the calibrated range of the instru- tion limits below the CRDL?	ly?		
Detect equation	ed analyte results for _ on:	(1) Se	were recalcu	lated and verified	using the following
Concen	tration = $\frac{(RD)(FV)(Dil)}{(In. Vol.)}$	Recalculation	on:		
RD FV In. Vol. Dil	= Raw data conce = Final volume (m = Initial volume (m = Dilution factor		eglexing=	0.403 mg	<u>l</u> c
#	Sample ID	Analyte	Reported Concentration (\W_\)	Calculated Concentration (W強し)	Acceptable (Y/N)
	(	Sr	0.403	0.403	$\mathcal{C}$
	2	Ca	76.3	76.3	T
-					
<del>                                     </del>	·				
Note:_					



## LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

CDM July 26, 2016

555 17th Street, Suite 1100 Denver, CO 80202

ATTN: Mrs. Cherie Zakowski

SUBJECT: Santa Susana Field Laboratory, GW, Data Validation

Dear Mrs. Zakowski,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on June 7, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

#### LDC Project #36501:

SDG#	<u>Fraction</u>
30180275 30180731	Gross Alpha Beta, Tritium, Gamma Spectroscopy, Isotopic Uranium, Strontium-90

The data validation was performed under Level IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1, December 2010
- Multi Agency Radiological Laboratory Analytical Protocols, July 2004
- USEPA Contract Laboratory Program National Functional Guidelines, CLPNFG, for Inorganic Superfund Data Review, January 2010

Please feel free to contact us if you have any questions.

Sincerely,

Shauna McKellar

Project Manager/Chemist

0 0

0 0 0 0 0 0

T/SM

Total

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

July 1, 2016

Parameters:

Gross Alpha & Beta

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180275

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_424A_041416_01_L	30180275001	Water	04/14/16
SP_424A_041416_36_L	30180275002	Water	04/14/16
SP_424B_041316_01_L	30180275003	Water	04/13/16
SP_424C_041316_01_LMS	30180275004	Water	04/13/16
SP_424C_041316_01_LMS MS	30180275005	Water	04/13/16
SP_424C_041316_01_LMS MSD	30180275006	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gross Alpha and Beta by Environmental Protection Agency (EPA) Method 900.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP\_424A\_041416\_01\_L and SP\_424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Activity (pCi/L)				
Isotope	SP_424A_041416_01_L	SP_424A_041416_36_L	RPD (Limits)	Flag	A or P
Gross alpha	5.71	4.38	26 (≤35)	-	-
Gross beta	5.98	6.70	11 (≤35)	•	-

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Laboratory Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Field Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

DG#	t:36501A22 <b>VALIDA</b> T #:30180275 atory:Pace_Analytical		PLETENES Level IV	S WORKSHEE		Date: 01 Page: \( \) of Reviewer: 01
	IOD: Gross Alpha & Beta (EPA SW 8		·	ation areas. Valida		Reviewer:
alidat	tion findings worksheets.					
	Validation Area	1 A		Com	ments	
1.	Sample receipt/Technical holding times	A/A	-			
11.	Initial calibration	14	<u> </u>			
III.	Calibration verification	1/				
IV.	Laboratory Blanks	<u> </u>				<del></del> -
V.	Field blanks	<i>N</i>				
VI.	Matrix Spike/Matrix Spike Duplicates	A	M5/1	_)		
/II.	Duplicates	$\mathcal{N}$				
7II.	Laboratory control samples	A	LCSIY	)		
Χ.	Field duplicates		101,27			
X.	Minimum detectable activity (MDA)	A				
XI.	Sample result verification	A				
(II	Overall assessment of data	A				
∋:	A = Acceptable ND N = Not provided/applicable R =	= No compound: = Rinsate = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	urce blank :
0	Client ID			Lab ID	Matrix	Date
Ţ	SP 424A 041416 01 L			30180275001	Water	04/14/16
T	SP_424A_041416_36_L			30180275002	Water	04/14/16
	SP_424B_041316_01_L			30180275003	Water	04/13/16
T	SP_424C_041316_01_LMS			30180275004	Water	04/13/16
7	SP_424C_041316_01_LMS MS			30180275005	Water	04/13/16
$\neg$	SP_424C_041316_01_LMS MSD			30180275006	Water	04/13/16
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Notes:

#### **VALIDATION FINDINGS CHECKLIST**

Page: 1 of 2
Reviewer: 07
2nd Reviewer: 54

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	,			
All technical holding times were met.		<u> </u>		
II. Calibration				
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?		<u> </u>		
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?			   	
III. Blanks	<del></del>			
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) <1.42?.				
V. Laboratory control samples			, <del></del> _	
Was an LCS analyzed per analytical batch?			l	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery			<del></del>	
Was a tracer/carrier added to each sample?				
Were tracer/carrier recoveries within the QC limits?				
VII. Regional Quality Assurance and Quality Control	<del>,</del>			
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
VIII. Sample Result Verification			, <del></del> _	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		·		
Were the Minimum Detectable Activities (MDA) < RL?	/			

LDC#: 36504722

#### VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: 01
2nd Reviewer: 14

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XI. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

LDC# 36501A22\_

## VALIDATION FINDINGS WORKSHEET

#### Field Duplicates

Page!_	of	
Reviewer:	9	_
2nd Reviewer:	S	_

Radiochemistry, Method see cover

	Activity	(pCi/L)		
Isotope	1	2	RPD (≤35)	Qual (Parent Only)
Gross Alpha	5.71	4.38	26	
Gross Beta	5.98	6.70	11	

\\LDCFILESERVER\Validation\FIELD DUPLICATES\FD\_inorganic\36501A22.wpd

LDC#: 3650/122

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

	Page:_	of
ı	Reviewer:	00
2nd l	Reviewer:	82
		1

METHOD: Radiochemistry (Method: Secretary)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalluculated using the following formula:

 $%R = Found \times 100$ True Where, Found = activity of each analyte <u>measured</u> in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{[S-D]} \times 100$ 

Where, S = Original sample activity

(S+D)/2 D = Duplicate sample activity

Sample ID	Type of Analysis	_ Analyte	Found/S (units)	True/D (units)	Recalculated  %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Gosd	13.416	15.806	84.88	84.88	7
5	Matrix spike sample	GrossB	74.318	62.212	19,59	19.59	
5/6	Duplicate RPD	GOSSY	47,005	751,55A	9.76	9.76	
4	Chemical recovery						

Comments:	Refer to appropriate	worksheet for li	st of qualification	ns and associa	ted samples whe	en reported resu	ilts do not agree v	<u>vithin 10.0% of</u>	the recalculated results.	<u>.                                    </u>
						·-····································	. <u> </u>			_
	<del></del> - · ·			<del></del>						_

LDC #: 3650422

#### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:_	a
2nd reviewer:_	500

METHOD: Radiochemistry (Method: See Cov

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

YN N/A

Have results been reported and calculated correctly?

YN N/A

Are results within the calibrated range of the instruments?

Analyte results forusing the following equation	on:	(SCSS)	reported with a pos	itive detect were recalculated and verified
Concentration =		Recalculation	***	,
(cpm - background) 2.22 x E x SA x Vol	<i>r</i> =	(,0	7 -0040157	= 4.438p(.'/C
E = Counter Efficiency SA = Self-absorbance factor Vol = Volume of sample	4	2.LZLOT	3814)(0.4224)	

·				<u>,                                    </u>	
#	Sample ID	Analyte	Reported Concentration (X://-)	Calculated Concentration (Pri L	Acceptable (Y/N)
		Gross 2	5.71	5.7	Y
	2	Gross B	6.70	6.70	
	3	Gross B	6.65	0.65	
	4	Gross B	14.44	4.44	+
			<u> </u>		
			<u> </u>		
ļ					
<b> </b>					
1 1			<u> </u>		il i

Note:		

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

July 1, 2016

Parameters:

Tritium

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180275

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_424A_041416_01_L	30180275007	Water	04/14/16
SP_424A_041416_36_L	30180275008	Water	04/14/16
SP_424B_041316_01_L	30180275009	Water	04/13/16
SP_424C_041316_01_LMS	30180275010	Water	04/13/16
SP_424C_041316_01_LMS MS	30180275011	Water	04/13/16
SP_424C_041316_01_LMS MSD	30180275012	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Tritium by Environmental Protection Agency (EPA) Method 906.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

Quench curves were generated for each sample when applicable.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP\_424A\_041416\_01\_L and SP\_424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

#### Santa Susana Field Laboratory, GW Tritium - Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Laboratory Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Field Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

	:36501A34VALIDATI t:_30180275 atory:_Pace_Analytical		PLETENES Level IV	SS WORKSHEE		Page: of Reviewer: 1
IETH	OD: Tritium (EPA Method 906.0)				Zilū	reviewer. <u>y s</u>
	amples listed below were reviewed for elion findings worksheets.	each of the	following valid	dation areas. Valida	ation findings are	e noted in attach
	Validation Area			Com	nments	
	Sample receipt/Technical holding times	A-A				
11.	Initial calibration	A				
III.	Calibration verification	A			V Ovench	curil
IV.	Laboratory Blanks	A			<u> </u>	<u> , , , , , , , , , , , , , , , , , </u>
V.	Field blanks	N	1 .			
VI.	Matrix Spike/Matrix Spike Duplicates	K	ms/1			- w
VII.	Duplicates	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1, -,			
VIII.	Laboratory control samples	A	1,55	$\langle \hat{f} \rangle$		<del></del>
IX.	Field duplicates	- QN	((1))			
		A	101,0)			
X	Minimum detectable activity (MDA)	\ <u>\( \times \)</u>				
XI.	Sample result verification	1 // 3				
XII_	Overall assessment of data	A				· · · · · · · · · · · · · · · · · · ·
te:	A = Acceptable ND = N = Not provided/applicable R = R SW = See worksheet FB =	No compound finsate Field blank	is detected	D = Duplicate TB = Trip blank EB = Equipment bi	OTHER	· · · · · · · · · · · · · · · · · · ·
te:	A = Acceptable ND = N = Not provided/applicable R = R SW = See worksheet FB =	No compound	ds detected	TB = Trip blank EB = Equipment bi	OTHER	Date
te:	A = Acceptable ND = N = Not provided/applicable R = R SW = See worksheet FB =  Client ID  P_424A_041416_01_L	No compound	is detected	TB = Trip blank EB = Equipment bi  Lab ID  30180275007	OTHER	Date 04/14/16
te:	A = Acceptable ND = N = Not provided/applicable R = R SW = See worksheet FB =	No compound	is detected	TB = Trip blank EB = Equipment bi Lab ID 30180275007 30180275008	OTHER	Date
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te:	A = Acceptable ND = N = Not provided/applicable R = R = R = R = R = R = R = R = R = R	No compound	ds detected	TB = Trip blank EB = Equipment bi Lab ID 30180275007 30180275008 30180275009 30180275010 30180275011	Matrix Water Water Water Water Water Water Water Water	Date 04/14/16 04/13/16 04/13/16 04/13/16
e:	A = Acceptable ND = N = Not provided/applicable R = R = R = R = R = R = R = R = R = R	No compound	ds detected	TB = Trip blank EB = Equipment bi Lab ID 30180275007 30180275008 30180275009 30180275010 30180275011	Matrix Water Water Water Water Water Water Water Water	Date 04/14/16 04/13/16 04/13/16 04/13/16
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#### **VALIDATION FINDINGS CHECKLIST**

Page: of Z Reviewer: 77 2nd Reviewer: 77

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	, <del></del> _		<b>,</b>	
All technical holding times were met.				
II. Calibration				
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?	/			
Was the check source identified by activity and radionuclide?				
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks	, — <u> </u>	<del>,</del>	,	
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates	,	·		
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.				
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) <1.42?.				
V. Laboratory control samples	, <del></del> _			
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery	·		,_ <del>_</del>	
Was a tracer/carrier added to each sample?				
Were tracer/carrier recoveries within the QC limits?				
VII. Regional Quality Assurance and Quality Control	<del>,</del> -			
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?				
VIII. Sample Result Verification	,	<del></del>		
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1		i	
Were the Minimum Detectable Activities (MDA) < RL?			<del></del>	

LDC#: 36501A34

#### **VALIDATION FINDINGS CHECKLIST**

Page: 7
Reviewer: 7
2nd Reviewer: 1

Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the field duplicates.	
XI. Field blanks	
Field blanks were identified in this SDG.	$M \cap X$
Target analytes were detected in the field blanks.	

#### **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page:_\	<u>of</u> /
Reviewer:	QQ
2nd Reviewer:_	17

METHOD: Radiochemistry (Method: Secover

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = Found x 100True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = \underline{|S-D|} \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported.  %R or RPD	Acceptable (Y/N)
us	Laboratory control sample	H3	2235.11	2375.81	94.08	9408	<i>Y</i>
5	Matrix spike sample		4163,42	50449	98,39	98.39	
Sh	Duplicate RPD		5732.76	4504.67	10.67	10.61	
~	Chemical recovery						

Comments:	Refer to appropri	ate worksheet fo	r list of qualification	ons and associate	ed samples wher	reported results	do not agree within	10.0% of the rec	alculated results.
	•		<del></del>			<del></del>			

LDC #: 3650/A34

E = Counter Efficiency SA = Self-absorbance factor Vol = Volume of sample

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of/
Reviewer:_	a
2nd reviewer:_	500

METHOD: Radiochemistry (Method: See aven

* `	- <del> </del>	
Please see qualifications below fo Y N N/A Have results beer Y/N N/A Are results within	r all questions answered "N". In reported and calculated correct the calibrated range of the ins	Not applicable questions are identified as "N/A". ectly? truments?
Analyte results forusing the following equation:		reported with a positive detect were recalculated and verified
Concentration =	Recalculation:	
(cpm - background) 2.22 x E x SA x Vol	All M	

#_	Sample ID	Analyte	Reported Concentration	Calculated Concentration ( )	Acceptable (Y/N)
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			· · · · · · · · · · · · · · · · · · ·		
					<del></del>
, , , , , , , , , , , , , , , , , , ,					
				<u> </u>	
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Vote:	 	 <u></u>	·	<del></del>		
	 	 			· · · · · · · · · · · · · · · · · · ·	
	 	 <del></del>				

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: July 1, 2016

Parameters: Gamma Spectroscopy

Validation Level: Level IV

Laboratory: Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180275

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_424A_041416_01_L	30180275001	Water	04/14/16
SP_424A_041416_36_L	30180275002	Water	04/14/16
SP_424B_041316_01_L	30180275003	Water	04/13/16
SP_424C_041316_01_LMS	30180275004	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gamma Spectroscopy by Environmental Protection Agency (EPA) Method 901.1

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA) with the following exceptions:

Blank ID	Isotope	Activity	Associated Samples
PB (prep blank)	Barium-133	9.330 pCi/L	All samples in SDG 30180275

Sample activities were compared to activities detected in the laboratory blanks. The sample activities were either not detected or were significantly greater (>5X blank activity) than the activities found in the associated laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicates (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP\_424A\_041416\_01\_L and SP\_424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GWs
Gamma Spectroscopy - Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Laboratory Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Field Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

SDG Labo	#: 30180275 pratory: Pace Analytical	L	PLETENES Level IV	S WORKSHEE		Date 25 Page: of Reviewer: Reviewer:
The:	HOD: Gamma Spectroscopy (EPA M samples listed below were reviewed for ation findings worksheets.	·	ollowing valid	ation areas. Valida	ition findings are	e noted in attache
	Validation Area			Com	ments	
1.	Sample receipt/Technical holding times	AA				
11.	Initial calibration	A		· · · · · ·		
		A				
IV.		5W				
		N				
VI.		N	MS	notreau	red	
VII.				11920		
VIII		A	LCS/1	$\overline{}$		
IX.	Field duplicates	N(C)	(1.2)	<del></del>		la de la constantina
Х.	Minimum detectable activity (MDA)	A	1, 2			***
XI.	Sample result verification	A				
XII	Overall assessment of data	À				
Note:	A = Acceptable N N = Not provided/applicable R	D = No compounds = Rinsate B = Field blank	detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	urce blank :
	Client ID			Lab ID	Matrix	Date
1	SP_424A_041416_01_L			30180275001	Water	04/14/16
2	SP_424A_041416_36_L			30180275002	Water	04/14/16
3	SP_424B_041316_01_L			30180275003	Water	04/13/16
4	SP_424C_041316_01_LMS			30180275004	Water	04/13/16
5						
6						
7					,	
8						
9				•		
10						
11	····					
12	· · ·					
13						
14						

Notes:

#### **VALIDATION FINDINGS CHECKLIST**

Page: U of Z Reviewer: OZ 2nd Reviewer: SM

Method: Radiochemistry

Method: Radiochemistry			<u> </u>	
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.			<u> </u>	
II. Calibration	, <i></i>	<u> </u>		
Were all instruments and detectors calibration as required?		<u></u>		
Were NIST traceable standards used for all calibrations?	/			
Was the check source identified by activity and radionuclide?	1			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks	$\bot$			
Were blank analyses performed as required?		<u></u>		
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.	/	!		
IV. Matrix spikes and Duplicates	,	<del></del> -		
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			/	
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?			/	
Were all duplicate sample duplicate error rations (DER) ≤1.42?.	 			<u> </u>
V. Laboratory control samples	<i></i>	·		
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery	<del>,</del>		··	
Was a tracer/carrier added to each sample?			/	/
Were tracer/carrier recoveries within the QC limits?				
VII. Regional Quality Assurance and Quality Control	<del></del> -			
Were performance evaluation (PE) samples performed?				
Were the performance evaluation (PE) samples within the acceptance limits?				
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?				

LDC #: 3650V435

## VALIDATION FINDINGS CHECKLIST

Page: Of 2 Reviewer: Ot 2nd Reviewer: Sw

Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	· ·
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the field duplicates.	
XI. Field blanks	
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

LDC #: 36501A35

# VALIDATION FINDINGS WORKSHEET Blanks

METHOD: Radiochemistry, Method See Cover

Conc. units: pCi/L Associated Samples: All

0010. 41710	onic. units. poi/c — Associateu Sainpies. — Ali												
Isotope	Blank ID	Blank Action Limit		Sample Identification									
2.44	РВ	Action Limit	No Qualifiers										
Ba-133	9.330	46.65											
													-
												-	
						<u></u>							
													<del></del>
									1				
<b></b>			<u> </u>		(	1		<u> </u>	<u> </u>				
					1								
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			-										
		1			ļ	1					t		

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 3650/A37

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page:_	of
Reviewer:	00
2nd Reviewer:	84

METHOD: Radiochemistry (Method: Secover	IETHOD: Radiochemistry	(Method:_	Secover	,
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Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = <u>Found</u> x 100 True Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D| \times 100$ (S+D)/2 Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Am241	4,22.24	529.75	79.7	A.7	4
$\sim$	Matrix spike sample						
N	Duplicate RPD						
$\wedge$	Chemical recovery						

Comments:	Refer to appropriate	worksheet for list of	<u>of qualifications an</u>	<u>d associated sample</u>	<u>s when reported re</u>	esults do not agree	within 10.0% of the	recalculated results.
		<del></del>					·····	
					<u>.</u>			

LDC#: 36504357

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:_	a
2nd reviewer:	SM

METH	OD: Radiochemistry (I	Method: See over		2na re	eviewer: SVV
Please	e see qualifications belo N/A Have results	ow for all questions answered "N". Not app been reported and calculated correctly? vithin the calibrated range of the instrumen		re identified as "N/.	A".
Analyte using t	e results for he following equation:	repo	orted with a positive	detect were recald	culated and verified
Concent	ration =	Recalculation:			
2,22 x E = Cou SA = Se	- background) E x SA x Vol nter Efficiency If-absorbance factor lume of sample	allNO			
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
			<u> </u>		
			<del> </del>		
				<u> </u>	
			<u> </u>		
-			<u> </u>		
Vote:					

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: July 1, 2016

Parameters: Isotopic Uranium

Validation Level: Level IV

Laboratory: Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180275

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_424A_041416_01_L	30180275001	Water	04/14/16
SP_424A_041416_36_L	30180275002	Water	04/14/16
SP_424B_041316_01_L	30180275003	Water	04/13/16
SP_424C_041316_01_LMS	30180275004	Water	04/13/16
SP_424C_041316_01_LMS MS	30180275005	Water	04/13/16
SP_424C_041316_01_LMS MSD	30180275006	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Isotopic Uranium by the Health and Safety Laboratory (HASL) Method 300

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP\_424A\_041416\_01\_L and SP\_424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

	Activit				
Isotope	SP_424A_041416_01_L	SP_424A_041416_36_L	RPD (Limits)	Flag	A or P
Uranium-233/234	1.09	1.28	16 (≤35)	-	-
Uranium-235	0.122	0.083U	38 (≤35)	NQ	•
Uranium-238	0.742	0.885	18 (≤35)	-	,,

NQ = One or both results were < 5x the reporting limit, therefore no data were qualified.

#### X. Tracer Recovery

All tracer recoveries were within validation criteria.

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Isotopic Uranium - Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Isotopic Uranium - Field Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

LDC #: 36501A59	VALIDATION COMPLETENESS WORKSHEET
SDG #: 30180275	Level IV
Laboratory: Pace Analytical	

Reviewer: 2nd Reviewer:

METHOD: Isotopic Uranium (HASL 300)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A-1A	
11.	Initial calibration	A'	
111.	Calibration verification	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	N	40
VI.	Matrix Spike/Matrix Spike Duplicates	<u> A</u>	ms/D
VII.	Duplicates	N	
VIII.	Laboratory control samples	A,	LSIP
IX.	Field duplicates	5	(1,2)
X.	Tracer Recovery	LA	
XI.	Minimum detectable activity (MDA)	A	
XII.	Sample result verification	A	
XIII	Overall assessment of data	A	

Note:

A = Acceptable N = Not provided/applicable SW = See worksheet

ND = No compounds detected

R = Rinsate

FB = Field blank

D = Duplicate

TB = Trip blank EB = Equipment blank SB=Source blank

OTHER:

	Client ID	Lab ID	Matrix	Date
1	SP_424A_041416_01_L	30180275001	Water	04/14/16
2	SP_424A_041416_36_L	30180275002	Water	04/14/16
3	SP_424B_041316_01_L	30180275003	Water	04/13/16
4	SP_424C_041316_01_LMS	30180275004	Water	04/13/16
5	SP_424C_041316_01_LMS MS	30180275005	Water	04/13/16
6	SP_424C_041316_01_LMS MSD	30180275006	Water	04/13/16
7		<u> </u>		
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

Page: \( \text{of } \frac{2}{\text{Conditions}} \)
Reviewer: \( \frac{2}{\text{Conditions}} \)

Method: Radiochemistry

LDC # 3050 AC

Wethod: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<b></b>		,—	
All technical holding times were met.		<u> </u>		
II. Calibration				
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?		_		·
Was the check source identified by activity and radionuclide?				
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks		<del>-</del>	<u>.</u>	
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		( ,		
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) ≤1.42?.		·	 	
V. Laboratory control samples		<b></b>		
Was an LCS analyzed per analytical batch?		/		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery		·	<del></del>	
Was a tracer/carrier added to each sample?		-		
Were tracer/carrier recoveries within the QC limits?	/			
VII. Regional Quality Assurance and Quality Control		<del></del> _		
Were performance evaluation (PE) samples performed?				<u> </u>
Were the performance evaluation (PE) samples within the acceptance limits?			/	
VIII. Sample Result Verification			,—. <u> </u>	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?				

LDC#. 36501459

#### **VALIDATION FINDINGS CHECKLIST**

Page: Of Z Reviewer: O1 2nd Reviewer: 5

Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the field duplicates.	
XI. Field blanks	
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

LDC#<u>36501A59</u>

## VALIDATION FINDINGS WORKSHEET

Field Duplicates

Page: of / Reviewer: d Reviewer:

Radiochemistry, Method\_see cover\_

	Activity	Activity (pCi/L)		
Isotope	1	2	RPD (≤35)	Qual (Parent Only)
U-233/234	1.09	1.28	16	
U-235	0.122	0.083U	38	NQ (<5xRL)
U-238	0.742	0.885	18	

 $\verb|\LDCFILESERVER|\Validation|\FIELD DUPLICATES|\FD\_inorganic|\36501A59.wpd|$ 

LDC #: 36501AST

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Page: <u> </u> of <u> </u>
Reviewer.
2nd Reviewer:

METHOD: Radiochemistry (Method: Secrover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalluculated using the following formula:

%R = <u>Found</u> x 100

Where, Found = activity of each analyte measured in the analysis of the sample.

True

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = <u>[S-D]</u> x 100

Where, S = Original sample activity

(S+D)/2

D = Duplicate sample activity

					Recalculated	Reported	
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	%R or RPD	Acceptable (Y/N)
the s	Laboratory control sample	U-235	14.80	14.625	101.2	61.2	
5	Matrix spike sample	\$U23(	16.2	17.445	92.86	92.87	
5/6	Duplicate RPD	UZ34	17.4	18.2	4,24	4.24	
	Chemical recovery	U-232	8.845	10.4433	84,70	84.70	4

Comments:	Refer to appropriate	worksheet for list	of qualifications and	associated samp	<u>ies when reporte</u>	d results do not a	gree within 10.0%	of the recalculated r	esults.

LDC#: 3650459

### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of/
Reviewer:_	a
2nd reviewer:	SVI

METI	HOD: Radiochemistry (M	Method: <u>S</u>	ecover)			Zna n	eviewer: YV I
<u> </u>		been report	estions answered "N". I ed and calculated corre brated range of the ins	ectly?		e identified as "N/.	A".
Analy using	te results for the following equation:	U ·	233/234	report	ed with a positive	detect were recal	culated and verified
Conce	ntration =		Recalculation:				
2.22	<u>n - background)</u> x E x SA x Vol	_ 6	57,52/				- L.M.
SA = S	unter Efficiency elf-absorbance factor olume of sample	1=	12.226.	2723	16.841)(2	246)(0.504	.) p(1/L
#	Sample ID		Analyte		Reported Concentration (PC-14)	Calculated Concentration ( PG' I L)	Acceptable (Y/N)
		()-	233/234		1.09	1.09	7
	2	Ü	.238		0885	0.885	4
	3		)-238		0.858	0.858	
	7	(	1-233/234		1.20	1.20	
Note:_							

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: July 1, 2016

Parameters: Strontium-90

Validation Level: Level IV

Laboratory: Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180275

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_424A_041416_01_L	30180275001	Water	04/14/16
SP_424A_041416_36_L	30180275002	Water	04/14/16
SP_424B_041316_01_L	30180275003	Water	04/13/16
SP_424C_041316_01_LMS	30180275004	Water	04/13/16
SP_424C_041316_01_LMS MS	30180275005	Water	04/13/16
SP_424C_041316_01_LMS MSD	30180275006	Water	04/13/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Strontium-90 by American Society for Testing and Material (ASTM) D5811-95

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to nonconformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

Samples SP\_424A\_041416\_01\_L and SP\_424A\_041416\_36\_L were identified as field duplicates. No results were detected in any of the samples.

#### X. Carrier Recovery

All carrier recoveries were within validation criteria.

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

#### Santa Susana Field Laboratory, GW Strontium-90 - Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Laboratory Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Field Blank Data Qualification Summary - SDG 30180275

No Sample Data Qualified in this SDG

SDG #	#: 36501A61 VALIDATION #: 30180275 atory: Pace Analytical		Date Page: 1 of 1 Reviewer: Reviewer:			
METH	HOD: Strontium-90 (ASTM D5811-95)					7-
	amples listed below were reviewed for e tion findings worksheets.	each of the f	ollowing valida	ation areas. Valida	tion findings are	e noted in attache
	Validation Area			Com	ments	
1.	Sample receipt/Technical holding times	ALA				
II.	Initial calibration	A				
111.	Calibration verification	A				****
IV.	Laboratory Blanks	A				
V.	Field blanks					
VI.	Matrix Spike/Matrix Spike Duplicates	A	MSD			
VII.	Duplicates	$\mathcal{N}$	/			
VIII.	Laboratory control samples	A	LEST	)		
IX.	Field duplicates	ND	(1.27			
Х.	Carrier recovery	A	<del>- ',                                   </del>			
XI.	Minimum detectable activity (MDA)	A				
XII.	Sample result verification	A				
_X!!!	Overall assessment of data	A				
lote:	N = Not provided/applicable R = R	No compound: insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	urce blank :
	Client ID		. "	Lab ID	Matrix	Date
1	SP_424A_041416_01_L			30180275001	Water	04/14/16
2 5	SP_424A_041416_36_L			30180275002	Water	04/14/16
	SP_424B_041316_01_L			30180275003	Water	04/13/16
4 8	SP_424C_041316_01_LMS			30180275004	Water	04/13/16
5 8	SP_424C_041316_01_LMS MS			30180275005	Water	04/13/16
1	SP_424C_041316_01_LMS MSD			30180275006	Water	04/13/16
7						
8						
9						
10						
11						
12						
13						

Notes:\_

#### VALIDATION FINDINGS CHECKLIST

Page: U of Z Reviewer: OT 2nd Reviewer: M

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	·			
All technical holding times were met.				
II. Calibration				
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?			<u> </u>	
Was the check source identified by activity and radionuclide?			<u> </u>	
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III, Blanks	,			
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates	·	<del></del>		
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		•	,	
Was a duplicate sample anayized at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) ≤1.42?.				
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%		 		
VI. Sample Chemical/Carrier Recovery	$\mathcal{L}$			
Was a tracer/carrier added to each sample?		·		
Were tracer/carrier recoveries within the QC limits?	/			
VII. Regional Quality Assurance and Quality Control		<del></del>		
Were performance evaluation (PE) samples performed?		/	<del>/</del>	
Were the performance evaluation (PE) samples within the acceptance limits?				
VIII. Sample Result Verification	, —— ,	/	,	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?				

LDC#: 36501A6

#### **VALIDATION FINDINGS CHECKLIST**

Page: Of 2 Reviewer: O1

Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data		_		
Overall assessment of data was found to be acceptable.				
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XI. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.			Z	

LDC #: 36561A61

# VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet

Pag	ge: <u> </u>	of <u>/</u>	
Reviev	ver: <u>(</u>	20	
2nd Reviev	ver:_	Sz	
		- 1	

METHOD: Radiochemistry (Method: Secover )

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recalluculated using the following formula:

%R = <u>Found</u> x 100 True Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD =  $|S-D| \times 100$ (S+D)/2 Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LS	Laboratory control sample	5-90	18.38	16.71	109.99	16999	4
5	Matrix spike sample		32,012	32.825	97.52	97.52	
5/4	Duplicate RPD		37.05	31.28	2.92	2.92	
1	Chemical recovery	5	119	12.22	97.38	97.38	<i>y</i>

Comments:	Refer to appropriate	worksheet for list of o	ualifications and	associated sample	<u>s when reported res</u>	<u>ults do not agree wit</u>	<u>hin 10.0% of the i</u>	recalculated results.
		<del></del>						
		·						

LDC #: 3650/A6

## VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of/
Reviewer:_	a
2nd reviewer:_	SM

MET	HOD: Radiochemistry (	Method: See ave L_)			<del> </del>
Pleas Y\N Y\N	e see qualifications bel <u>N/A</u> Have results <u>N/A</u> Are results v	low for all questions answered "N". Not apples been reported and calculated correctly? within the calibrated range of the instrument	licable questions an	e identified as "N//	4".
Analy using	te results for the following equation:	repo	rted with a positive	detect were recald	culated and verified
Conce	ntration =	Recalculation:			
E = Co SA = S	n - background) x E x SA x Vol unter Efficiency elf-absorbance factor olume of sample	all M			
#	Sample ID	Analyte	Reported Concentration	Calculated Concentration ( )	Acceptable (Y/N)
•					
<del></del>					
			<del></del>		
<u> </u>					
<del></del>					
Note:_			I		

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

July 1, 2016

Parameters:

Gross Alpha & Beta

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180731

Comple Identification	Laboratory Sample	NA 4!	Collection
SP_19B_041916_01_L	Identification 30180731001	<b>Matrix</b> Water	<b>Date</b> 04/19/16
SP_19A_041916_01_L	30180731002	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gross Alpha and Beta by Environmental Protection Agency (EPA) Method 900.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Laboratory Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gross Alpha & Beta - Field Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

SDG#	#: 30180731		<b>PLETENES</b> Level IV	S WORKSHEE		Date: <u>6/25</u> Page:_cof_/ Reviewer:
	atory: Pace Analytical	40 Billion de Ori	20.0\			Reviewer: 500
METH	IOD: Gross Alpha & Beta (EPA SW 84	to Method 90	00.0)			
	amples listed below were reviewed for tion findings worksheets.	each of the	following valid	ation areas. Valida	tion findings are	noted in attached
	Validation Area			Com	ments	
1.	Sample receipt/Technical holding times	AA				
11.	Initial calibration	A				
111.	Calibration verification	A				
IV.	Laboratory Blanks	A				
V.	Field blanks	N				
VI.	Matrix Spike/Matrix Spike Duplicates	$\mathcal{N}$	<u>CS</u>			
VII.	Duplicates	$\mathcal{N}$				
VIII.	Laboratory control samples	A	LCSIV			
IX.	Field duplicates	/_/				
Χ.	Minimum detectable activity (MDA)	A				
XI.	Sample result verification	A				
_ווא_	Overall assessment of data.	18		<u> </u>		
Note:	N = Not provided/applicable R =	= No compound Rinsate = Field blank	ds detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	rrce blank :
	Client ID			Lab ID	Matrix	Date
1 5	SP_19B_041916_01_L			30180731001	Water	04/19/16
	SP_19A_041916_01_L			30180731002	Water	04/19/16
3						
4						
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Notes:\_\_

### VALIDATION FINDINGS CHECKLIST

Page: 1. of 2 Reviewer: 77 2nd Reviewer: 77

Method: Radiochemistry

ivietnod: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.				
II. Calibration	/		,	
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?	/			
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?				
III. Blanks	<del></del>		<del></del>	
Were blank analyses performed as required?			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.		/	[ 	
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Was a duplicate sample analyzed at the required frequency of 5% in this SDG?				
Were all duplicate sample duplicate error rations (DER) ≤1.42?.				
V. Laboratory control samples	/			<u> </u>
Was an LCS analyzed per analytical batch?	/			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	/		ļ ————————————————————————————————————	
VI. Sample Chemical/Carrier Recovery	<del></del>		r·	<del></del>
Was a tracer/carrier added to each sample?			_	
Were tracer/carrier recoveries within the QC limits?				<u>{</u>
VII. Regional Quality Assurance and Quality Control		<del></del> -	<del></del>	1
Were performance evaluation (PE) samples performed?			/	
Were the performance evaluation (PE) samples within the acceptance limits?	L			
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?				

LDC#: 36501B27L

#### **VALIDATION FINDINGS CHECKLIST**

Page: Of 2 Reviewer: O1 2nd Reviewer: S1

Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the fleld duplicates.	
XI. Field blanks	
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

LDC#: 36501B27

### **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page:_	of
Reviewer:	00
2nd Reviewer:	an

METHOD: Radiochemistry (Method: Secover

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = <u>Found</u> x 100 True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ 

Where, S = Original sample activity

(S+D)/2

D = Duplicate sample activity

					Recalculated	Reported	Acceptable
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	%R or RPD	(Y/N)
US	Laboratory control sample	Gossib	70.TC	2064	100.39	100.39	7
	Matrix spike sample						
N							
N	Duplicate RPD						
$\mathcal{N}$	Chemical recovery						

Comments:	Refer to	appropriate	worksheet for	list of qualific	cations and	associated s	amples whe	n reported re	esults do not a	agree within	10.0% of the	recalculated	results.

LDC#: 3650\BZZ

## **VALIDATION FINDINGS WORKSHEET** Sample Calculation Verification

Page:_	of	/
Reviewer:_	a	_
2nd reviewer:	50	

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".    YN N/A	METH	HOD: Radiochemistry	y (Method:	see over	_)			7 V
using the following equation:  Concentration = Recalculation:  (cpm - background) 2.22 x E x SA x Vol  E = Counter Efficiency SA = Self-absorbance factor Vol = Volume of sample  Reported Concentration (PC:14)  Reported Concentration (PC:14) (Y/N)  GCSS - 7.86  7.87  Y		N/A Have resu	ılts been repoi	rted and calculated co	rrectly?	•	e identified as "N/	<b>4"</b> .
Copm - background   Coll   C				35 J	repo	rted with a positive	detect were recald	culated and verified
SA = Self-absorbance factor Vol = Volume of sample  Reported Calculated Concentration Concentration (PC:14) (PC:14) (Y/N)  COSS - 7,86 7,87 4	Concer	ntration =		Recalculation:				
SA = Self-absorbance factor Vol = Volume of sample  Reported Calculated Concentration Concentration (PC:14) (PC:14) (Y/N)  COSS - 7,86 7,87 4	(cpm	- background)	0.12-	0.048		. /		
# Sample ID Analyte Concentration (PC:14 (PC:14) (Y/N)  1 GOSS 7.86 7.87 4	E = Cot SA = Se	elf-absorbance factor	2.22100	168) (0.0891)	<del>-</del> 7,	865 Lil		
	#	Sample ID		Analyte		Concentration	Concentration	
2 GCSSB 2.43 7		1		Grossof		7.86		4
	<u> </u>	2_		Gross B		243	2.43	7
				<u></u>				
						·		
				<del></del>				
							<u> </u>	

Note:	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

July 1, 2016

Parameters:

Tritium

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180731

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_19B_041916_01_L	30180731001	Water	04/19/16
SP_19A_041916_01_L	30180731002	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Tritium by Environmental Protection Agency (EPA) Method 906.0

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

Quench curves were generated for each sample when applicable.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

## Santa Susana Field Laboratory, GW Tritium - Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Laboratory Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Tritium - Field Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

SDG Labor	#:30180731 ratory:_Pace_Analytical		PLETENES: _evel IV	S WORKSHEET	<b>.</b> 2nd	Date: PSA Page: of Reviewer: Reviewer:
The s	HOD: Tritium (EPA Method 906.0) amples listed below were reviewed for the findings worksheets.	or each of the fo	ollowing valida	ation areas. Validati		
	Validation Area			Comn	nonte	
I.	Sample receipt/Technical holding times	A,A		Omin		
II.	Initial calibration	A				
111.	Calibration verification	A			Querch	cure
IV.	Laboratory Blanks	1				
V.	Field blanks	N				
VI.	Matrix Spike/Matrix Spike Duplicates		CS			
VII.	Duplicates	Ň				
VIII.	Laboratory control samples	<u> </u>	LCSP			
IX.	Field duplicates	$\mathcal{N}$	-/\			
Χ.	Minimum detectable activity (MDA)	A				
XI.	Sample result verification	A				
XII	Overall assessment of data			· 1		
lote:	N = Not provided/applicable R	D = No compounds = Rinsate 3 = Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blar	OTHER:	rce blank
	Client ID			Lab ID	Matrix	Date_
1 :	SP_19B_041916_01_L			30180731001	Water	04/19/16
	SP_19A_041916_01_L			30180731002	Water	04/19/16
3						
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otes:						<del> </del>

# **VALIDATION FINDINGS CHECKLIST**

Page: \(\frac{1}{2}\) of \(\frac{2}{2}\)

Reviewer: \(\frac{1}{2}\)

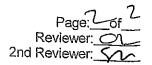
2nd Reviewer: \(\frac{1}{2}\)

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<del>~~</del>		<del></del>	
All technical holding times were met.				
II. Calibration				
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?	/		<u> </u>	
Were check sources including background counts analyzed at the required frequency and within laboratory control limits?				
III. Blanks				
Were blank analyses performed as required?	/			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates	·		····	
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.			/	
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?			/	
Were all duplicate sample duplicate error rations (DER) ≤1.42?.			/	
V. Laboratory control samples				
Was an LCS analyzed per analytical batch?				
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery	·	·		i
Was a tracer/carrier added to each sample?				
Were tracer/carrier recoveries within the QC limits?		Ĺ		
VII. Regional Quality Assurance and Quality Control			, . <u></u>	
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?			<u>//</u>	
VIII. Sample Result Verification				
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	1	}		
Were the Minimum Detectable Activities (MDA) < RL?	7			



#### **VALIDATION FINDINGS CHECKLIST**



Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data				
Overall assessment of data was found to be acceptable.				
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.				
XI. Field blanks			·	
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

LDC#: 36501137

# **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page: <u></u> of <u></u>	_
Reviewer: CY	
2nd Reviewer:	_

METHOD: Radiochemistry (Method: Secover

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = [S-D]_{x} \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
45	Laboratory control sample	H-3	2764,17	7557.34	7 108.11	108.11	4
N	Matrix spike sample						
N/	Duplicate RPD						
<b>(</b>	Chemical recovery						

Comments:	Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within	10.0% of the recalculated results.



# VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of_	
Reviewer:_	a	
2nd reviewer:_	W	

METH	HOD: Radiochemistry (	Method: See aver )		2.70	viewei. Y V
Pleas Y\N	e see qualifications bel N/A Have results	low for all questions answered "N". Not app s been reported and calculated correctly? within the calibrated range of the instrumen	olicable questions ar	e identified as "N//	<b>4"</b> .
Analy using	te results for the following equation:	repo	orted with a positive	detect were recald	culated and verified
Concer	ntration =	Recalculation:			
2.22 x E = Cor SA = S	n - background) x E x SA x Vol unter Efficiency elf-absorbance factor folume of sample	all M			
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
			- <del> </del>		
				<u> </u>	
		<del> </del>			
			<del> </del>		
			<del></del>	ļ	
	<u> </u>		<del> </del>		
Note:_				1	
				1	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

LDC Report Date:

July 1, 2016

Parameters:

Gamma Spectroscopy

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180731

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_19B_041916_01_L	30180731001	Water	04/19/16
SP_19A_041916_01_L	30180731002	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Gamma Spectroscopy by Environmental Protection Agency (EPA) Method 901.1

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA) with the following exceptions:

Blank ID	Isotope	Activity	Associated Samples
PB (prep blank)	Barium-133	9.330 pCi/L	All samples in SDG 30180731

Sample activities were compared to activities detected in the laboratory blanks. The sample activities were either not detected or were significantly greater (>5X blank activity) than the activities found in the associated laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicates (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XI. Sample Result Verification

All sample result verifications were acceptable.

#### XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

# Santa Susana Field Laboratory, GWs Gamma Spectroscopy - Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Laboratory Blank Data Qualification Summary - SDG 30180731

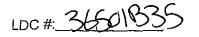
No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Gamma Spectroscopy - Field Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

SDG # Labora <b>METH</b> The sa	#:36501B35 VALIDATION #:_30180731 atory:Pace Analytical  IOD: Gamma Spectroscopy (EPA Methodamples listed below were reviewed for eation findings worksheets.	od 901.1)	Level IV	S WORKSHEE	2nd	Date: <u>P2S</u> Page: \_of\_ Reviewer: \ Reviewer: \ e noted in attached
	Validation Area			Com	ments	
<u> </u>	Sample receipt/Technical holding times	A-A	<u>"</u>			
11.	Initial calibration	A				
111.	Calibration verification	A				
IV.	Laboratory Blanks	SW				
V.	Field blanks	N				
VI.	Matrix Spike/Matrix Spike Duplicates	N	norreal	NOD		
VII.	Duplicates	$\mathcal{N}$				
VIII.	Laboratory control samples	I A	LCSID			
IX.	Field duplicates					
X.	Minimum detectable activity (MDA)	Á				
XI.	Sample result verification					
XII	Overall assessment of data	14	<u> </u>			
Note:	N = Not provided/applicable R = Rir	lo compound nsate ield blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bla	OTHER	rrce blank
	Client ID			Lab ID	Matrix	Date
1   8	SP_19B_041916_01_L			30180731001	Water	04/19/16
2 8	SP_19A_041916_01_L			30180731002	Water	04/19/16
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

Notes:\_



Page: of C Reviewer: OT 2nd Reviewer: D

Method: Radiochemistry

Wethod: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
i, Technical holding times	<del></del>	<del></del>		
All technical holding times were met.				
II. Calibration			,	
Were all instruments and detectors calibration as required?				
Were NIST traceable standards used for all calibrations?	/			
Was the check source identified by activity and radionuclide?				
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	/			
III. Blanks				
Were blank analyses performed as required?				
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.				
IV. Matrix spikes and Duplicates		<del></del> -		
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/	
Was a duplicate sample anayized at the required frequency of 5% in this SDG?			/	
Were all duplicate sample duplicate error rations (DER) ≤1.42?.		<u> </u>		
V. Laboratory control samples	· <del></del>	<i></i>	<del></del> -	
Was an LCS analyzed per analytical batch?	/	<u> </u>		
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%				
VI. Sample Chemical/Carrier Recovery			,	
Was a tracer/carrier added to each sample?		ļ		
Were tracer/carrier recoveries within the QC limits?				1
VII. Regional Quality Assurance and Quality Control		<del></del>	<u> </u>	
Were performance evaluation (PE) samples performed?		/	<u> </u>	
Were the performance evaluation (PE) samples within the acceptance limits?		<u> </u>	/	
VIII. Sample Result Verification	<del></del>	<del></del>	,	
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?	_/		<u></u>	



### VALIDATION FINDINGS CHECKLIST



Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the field duplicates.	
XI. Field blanks	
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

LDC #: 36501B35

# VALIDATION FINDINGS WORKSHEET Blanks

Page:of_)	_
Reviewer:	
2nd Reviewer:	_

METHOD: Radiochemistry, Method See Cover

Conc. units: pCi/L Associated Samples: All

<u></u>
<u> </u>

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC#: 36501B3<

# **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page:	of_
Reviewer	00
2nd Reviewer:	84

METHOD: Radiochemistry (Method: Secover)

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

%R = Found x 100 True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

					Recalculated	Reported	Annulati
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	%R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Amzul	9,22.24	529.15	19.7	P1.7	Y
	Matrix spike sample						
	Duplicate RPD						
	Chemical recovery						
				:			

Comments:	Refer to appropriate	<u>worksheet for list</u>	of qualifications and	<u>d associated samples</u>	when reported r	<u>esults do not agre</u>	<u>e within 10.0% of</u>	the recalculated results.
				<del></del>				

LDC#36501B35

# **VALIDATION FINDINGS WORKSHEET** Sample Calculation Verification

Page:_	of	_/
Reviewer:_	a	
2nd reviewer:	801	

METH	IOD: Radiochemistry (N	Method: See aver )		2.10.10	WOWCI
Please Y\N	e see qualifications belo <u>N/A</u> Have results	ow for all questions answered "N". Not app been reported and calculated correctly? vithin the calibrated range of the instrument		e identified as "N/,	<b>4"</b> .
Analytusing	e results for the following equation:	repo	orted with a positive	detect were recald	culated and verified
Concen	tration =	Recalculation:			
2.22 x	- background) E x SA x Vol	All N			
SA = Se	inter Efficiency elf-absorbance factor plume of sample				
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
			ļ		
<del>  </del>					
			<del> </del>		
-					
Note:_					
			<del></del>		· - · - · - · - · - · - · - · - · - · -

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Santa Susana Field Laboratory, GW

LDC Report Date: July 1, 2016

Parameters: Isotopic Uranium

Validation Level: Level IV

**Laboratory:** Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180731

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_19B_041916_01_L	30180731001	Water	04/19/16
SP_19A_041916_01_L	30180731002	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Isotopic Uranium by the Health and Safety Laboratory (HASL) Method 300

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

#### I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA) with the following exceptions:

Blank ID	Isotope	Activity	Associated Samples
PB (prep blank)	Uranium-233/234	0.034 pCi/L	All samples in SDG 30180731

Sample activities were compared to activities detected in the laboratory blanks. The sample activities were either not detected or were significantly greater (>5X blank activity) than the activities found in the associated laboratory blanks.

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) analyses were not required by the method.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Tracer Recovery

All tracer recoveries were within validation criteria.

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

#### XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

Santa Susana Field Laboratory, GW Isotopic Uranium - Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Isotopic Uranium - Laboratory Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Isotopic Uranium - Field Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

)G#	t:36501B59VALIDATION #:_30180731 atory:_Pace Analytical		PLETENES: Level IV	S WORKSHEET	, 01	Date:6/25 Page: \_ of \_ Reviewer:_6
ETH	IOD: Isotopic Uranium (HASL 300)				2nd	Reviewer: 5/4
			· II - · · · · · · · · · · · · · · · · ·	P	r	(-1:
ie sa lidat	amples listed below were reviewed for e tion findings worksheets.	each of the f	ollowing valida	ition areas. Validation	on findings are	noted in attache
	<u> </u>	<u> </u>	<del></del>			- <del> </del>
	Validation Area		<u> </u>	Comm	nents	
1.	Sample receipt/Technical holding times	AIA				
II.	Initial calibration	A				
<u>III.</u>	Calibration verification	A				
V	Laboratory Blanks	SW				
v.	Field blanks	N				
/I.	Matrix Spike/Matrix Spike Duplicates	N	not regu	inch		
/11.	Duplicates	N	T.C.			···
711.	Laboratory control samples	A	LES/C	)		
Х.	Field duplicates	\ \times_{\sqrt{\chi}}	1 1			
<u></u> Κ.	Tracer Recovery	A				
KI.	Minimum detectable activity (MDA)	Pr				<del></del>
al.	Sample result verification	1				
 	Overall assessment of data	TA				<u></u>
<del>)</del> :	A = Acceptable ND = N = Not provided/applicable R = R	No compound insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment blar	OTHER:	rce blank
c	Client ID			Lab ID	Matrix	Date
s	SP_19B_041916_01_L		- · · · ·	30180731001	Water	04/19/16
$\neg$	SP_19A_041916_01_L			30180731002	Water	04/19/16
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14

Notes:

# VALIDATION FINDINGS CHECKLIST

Page: of C Reviewer: O'C 2nd Reviewer: S

Method: Radiochemistry

Method: Radiochemistry								
Validation Area	Yes	No	NA	Findings/Comments				
I. Technical holding times			<del></del>					
All technical holding times were met.								
II. Calibration	II. Calibration							
Were all instruments and detectors calibration as required?	/	<u></u>						
Were NIST traceable standards used for all calibrations?	/		<u> </u>					
Was the check source identified by activity and radionuclide?	/		<u> </u>					
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?	/							
III. Bianks		<i></i>	<del>,</del>					
Were blank analyses performed as required?								
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.	/							
IV. Matrix spikes and Duplicates			<del></del>					
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.								
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.			/					
Was a duplicate sample anaylzed at the required frequency of 5% in this SDG?		<u> </u>						
Were all duplicate sample duplicate error rations (DER) ≤1.42?.	<u> </u>	<u> </u>		<i>X</i>				
V. Laboratory control samples	<del></del>	<del>,</del> -						
Was an LCS analyzed per analytical batch?	1		ļ					
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	/							
VI. Sample Chemical/Carrier Recovery	·							
Was a tracer/carrier added to each sample?	/	<u> </u>						
Were tracer/carrier recoverles within the QC limits?				Ĺ				
VII. Regional Quality Assurance and Quality Control	<del></del> -	<del></del>	<del>,</del>					
Were performance evaluation (PE) samples performed?		/	1					
Were the performance evaluation (PE) samples within the acceptance limits?		<u> </u>	/					
VIII. Sample Result Verification	г— <u>г</u>							
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?		<u>}</u>						
Were the Minimum Detectable Activities (MDA) < RL?								

LDC#: 36501BST

#### **VALIDATION FINDINGS CHECKLIST**



Validation Area	Yes	No	NA	Findings/Comments
IX. Overall assessment of data		_		
Overall assessment of data was found to be acceptable.				
X. Field duplicates				
Field duplicate pairs were identified in this SDG.				
Target analytes were detected in the field duplicates.			/	
XI. Field blanks				
Field blanks were identified in this SDG.				
Target analytes were detected in the field blanks.				

LDC #: 36501B59

# VALIDATION FINDINGS WORKSHEET Blanks

Page:\_\_\_of\_\_ Reviewer:\_\_\_\_\_ 2nd Reviewer:\_\_\_\_\_

METHOD: Radiochemistry, Method See Cover

Conc. units: pCi/L Associated Samples: All

Conc. umrs	onc. units: <u>pci/L</u> <u>Associated Samples: All</u>											
Isotope	Blank ID	Blank		Sample Identification								
	PB	Action Limit	No Qualifiers									
U-233/234	0.034	0.17			,							
									_			
			_									·
			-									
			-		<u> </u>							
_			-									
											<u>-</u>	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT: All contaminants within five times the method blank concentration were qualified as not detected, "U".

# **VALIDATION FINDINGS WORKSHEET** Level IV Recalculation Worksheet

Page:_	of
Reviewer:	00
2nd Reviewer:	52

METHOD: Radiochemistry (Method: Section )

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

 $%R = Found_x 100$ True

Where, Found = activity of each analyte <u>measured</u> in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| x 100

Where, S = Original sample activity

(S+D)/2

D = Duplicate sample activity

					Recalculated	Reported	
Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	%R or RPD	%R or RPD	Acceptable (Y/N)
LS	Laboratory control sample	U-234	13,3	14.133	94.11	94.11	7
	Matrix spike sample						
V							
$\wedge$	Duplicate RPD						
	Chemical recovery	U-723Z	7.5853	10:4437	77.63	72.63	4

Comments:	Refer to appropriate	<u>worksheet for list</u>	of qualifications ar	<u>id associated sam</u>	<u>ples when reported r</u>	esults do not agree	within 10.0% of the	<u>recalculated resu</u>	<u>ults.</u>
		* ******	· ·						
					•				
•	•					•			

LDC#: 36501B51

# **VALIDATION FINDINGS WORKSHEET** Sample Calculation Verification

Page:_	of	
Reviewer:	a	_
2nd reviewer:	5/1	

METH	OD: Radiochemistry (N	Method: See aver )			<del></del>
Y)N	N/A Have results	ow for all questions answered "N". Not app been reported and calculated correctly? vithin the calibrated range of the instrumen		e identified as "N/A	<b>\</b> ".
Analyte using t	e results for he following equation:	U.236repo	orted with a positive	detect were recald	culated and verified
2.22 x E = Cou SA = Se	ha aleman un d\	Recalculation: 856.0 1/ 1-	27(0.7263 X10	xwmm\(0.317	0= 208 Kik
#	Sample ID	Analyte	Reported Concentration	Calculated Concentration	Acceptable (Y/N)
	1	U-238 U-235	Z.08 0.038	2.08	7
Note:_				<u> </u>	

# Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name:

Santa Susana Field Laboratory, GW

**LDC Report Date:** 

July 1, 2016

Parameters:

Strontium-90

Validation Level:

Level IV

Laboratory:

Pace Analytical Services, Inc.

Sample Delivery Group (SDG): 30180731

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
SP_19B_041916_01_L	30180731001	Water	04/19/16
SP_19A_041916_01_L	30180731002	Water	04/19/16

#### Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Site-Wide Water Quality Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, CA, Revision 1 (December 2010), the Multi Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual (July 2004), and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines (CLPNFG) for Inorganic Superfund Data Review (January 2010). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Strontium-90 by American Society for Testing and Material (ASTM) D5811-95

All sample results were subjected to Level IV data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

## I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

#### II. Initial Calibration

All criteria for the initial calibration were met.

Counting and detector efficiency were determined for each detector and each radionuclide.

#### III. Continuing Calibration

Continuing calibration and background determination were performed at the required frequencies. Results were within laboratory control limits.

#### IV. Blanks

Laboratory blanks were analyzed as required by the method. Blank results contained less than the minimum detectable activity (MDA).

#### V. Field Blanks

No field blanks were identified in this SDG.

#### VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was not required by the method.

#### VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

#### IX. Field Duplicates

No field duplicates were identified in this SDG.

#### X. Carrier Recovery

All carrier recoveries were within validation criteria.

#### XI. Minimum Detectable Concentration

All minimum detectable concentrations (MDC) met the requested reporting limits (RL).

## XII. Sample Result Verification

All sample result verifications were acceptable.

#### XIII. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

### Santa Susana Field Laboratory, GW Strontium-90 - Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Laboratory Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

Santa Susana Field Laboratory, GW Strontium-90 - Field Blank Data Qualification Summary - SDG 30180731

No Sample Data Qualified in this SDG

DG#	: 36501B61 VALIDATION		PLETENES Level IV	S WORKSHEE		Date Page:of
1ETH	<b>OD:</b> Strontium-90 (ASTM D5811-95)				2nd	Reviewer:
		ash of the f	following volida	ation arosa Valida	tion findings are	noted in otton
	amples listed below were reviewed for e ion findings worksheets.	acii oi tile i	Ollowing valida	ation areas. Valida	uon midings are	e noted in attac
	Validation Area		ļ	Com	ments	
l.	Sample receipt/Technical holding times	AA				
II.	Initial calibration	A				
<u> 111.</u>	Calibration verification	A				
IV.	Laboratory Blanks	A			1	
V.	Field blanks	N				\
VI.	Matrix Spike/Matrix Spike Duplicates	A	ms/n	Cfrom 3	0180275	
VII.	Duplicates	N			-	
VIII.	Laboratory control samples	A-	LCSIC			
IX.	Field duplicates	N	1	***************************************		
X.	Carrier recovery	IA				<del></del>
XI.	Minimum detectable activity (MDA)	A				
XII.	Sample result verification	A				
XIII.	Overall assessment of data	A				
ote:	N = Not provided/applicable $R = R$	No compound insate Field blank	s detected	D = Duplicate TB = Trip blank EB = Equipment bl	OTHER	urce blank :
c	lient ID			Lab ID	Matrix	Date
s	P_19B_041916_01_L			30180731001	Water	04/19/16
s	P_19A_041916_01_L			30180731002	Water	04/19/16
,						
1						

### VALIDATION FINDINGS CHECKLIST

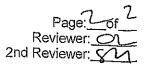
Page: V of C Reviewer: OT 2nd Reviewer: St

Method: Radiochemistry

Method: Radiochemistry				
Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times	<del>,</del>	···		
All technical holding times were met.			 	
II. Calibration	····	<u>.</u>		
Were all instruments and detectors calibration as required?		<u> </u>		
Were NIST traceable standards used for all calibrations?				
Was the check source identified by activity and radionuclide?				
Were check sources including background counts analyzed at the requiried frequency and within laboratory control limits?			 	
III. Blanks	<del></del> .		, <del></del> _	
Were blank analyses performed as required?	4			
Were any activities detected in the blanks greater than the minimum detectable activity (MDA)? If yes, please see the Blanks validation completeness worksheet.			<u> </u>	
IV. Matrix spikes and Duplicates				
Were a matrix spike (MS) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.				
Were the MS percent recoveries (%R) within the QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		<u>,                                     </u>		
Was a duplicate sample anayized at the required frequency of 5% in this SDG?		·		
Were all duplicate sample duplicate error rations (DER) ≤1.42?.				
V. Laboratory control samples	·			
Was an LCS analyzed per analytical batch?			ļ	
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 75-125%	/	·		
VI. Sample Chemical/Carrier Recovery			<b></b> -	
Was a tracer/carrier added to each sample?	/			
Were tracer/carrier recoveries within the QC limits?				
VII. Regional Quality Assurance and Quality Control	,. <u></u> ,		·	
Were performance evaluation (PE) samples performed?			1	
Were the performance evaluation (PE) samples within the acceptance limits?				
VIII. Sample Result Verification	<del></del> -		,	7
Were activities adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?				
Were the Minimum Detectable Activities (MDA) < RL?		<del></del>	<del></del> -	

LDC#: 3550 1861

### **VALIDATION FINDINGS CHECKLIST**



Validation Area	Yes No NA Findings/Comments
IX. Overall assessment of data	
Overall assessment of data was found to be acceptable.	
X. Field duplicates	·
Field duplicate pairs were identified in this SDG.	
Target analytes were detected in the field duplicates.	
XI. Field blanks	,
Field blanks were identified in this SDG.	
Target analytes were detected in the field blanks.	

LDC#: 36501B6/

### **VALIDATION FINDINGS WORKSHEET Level IV Recalculation Worksheet**

Page: <u></u> _of <u>/</u> _	
Reviewer: OO	
2nd Reviewer:	

METHOD: Radiochemistry (Method: Secret

Percent recoveries (%R) for a laboratory control sample, a matrix spike and a matrix spike duplicate sample were recaluculated using the following formula:

 $%R = Found \times 100$ True

Where, Found = activity of each analyte measured in the analysis of the sample.

True = activity of each analyte in the source.

A matrix spike and matrix spike duplicate relative percent difference (RPD) was recalculated using the following formula:

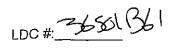
 $RPD = |S-D| \times 100$ (S+D)/2

Where, S = Original sample activity

D = Duplicate sample activity

Sample ID	Type of Analysis	Analyte	Found/S (units)	True/D (units)	Recalculated %R or RPD	Reported %R or RPD	Acceptable (Y/N)
LCS	Laboratory control sample	Sc40	18.38	6.711	109,99	10999	4
58-124C-0	Matrix spike sample		32.012	32.825	97.52	9752	
	Duplicate RPD	+	32.05	31.28	292	292	
J	Chemical recovery	S	11.4	12.22	93.29	93.29	4

Comments:	Refer to appropriate	<u>worksheet for list of qu</u>	<u>alifications and asso</u>	<u>ociated samples wh</u>	<u>nen reported resu</u>	<u>lts do not agree with</u>	<u>nin 10.0% of the l</u>	recalculated results.
		· · · · · · · · · · · · · · · · · · ·						
				· · · · · · · · · · · · · · · · · · ·		<del></del>		



### VALIDATION FINDINGS WORKSHEET Sample Calculation Verification

Page:_	of
Reviewer:_	a
2nd reviewer:_	\$

METHO	D: Radiochemistry (Method	:_See over)		zna re	viewer: <del>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</del>
	see qualifications below for /A Have results been	all questions answered "N". Not a reported and calculated correctly ne calibrated range of the instrum	?	e identified as "N/A	<b>\</b> ".
Analyte using the	results for e following equation:		eported with a positive	detect were recald	ulated and verified
Concentra	tion =	Recalculation:			
2.22 x E E = Count SA = Self-	oackground) x SA x Voi er Efficiency absorbance factor me of sample	all	200		
#	Sample ID	Analyte	Reported Concentration ( )	Calculated Concentration ( )	Acceptable (Y/N)
ļ					
				-	
Note:					

# Appendix B Seep Field Forms

1415 RECON SEEPS SP-TOZD SP-TOZB

SP-TOZC, HAMESD 4-5-16 AND SP-TOZB

1450 FOUND SEEP LOCATIONS, HAVE

LOCKS ABLE TO OPEN SP-TOYD

WITHOUT KEY WIL = 7-41 BTOC

1600 BACK AT TRAILER. CHEAN CP.

1635 END OF DAY /OFFSITE. 0830 000 1745 COM SMITH) 6700 MOPRING HES MEETING 1015 31-5-16 CAM H. AARON H., ETY, M.
DEPART SITE. CONFERENCE CALL FROM BAKER TANK IDW-CHOSIG DRILLERS HEAD TO NBZ TO COLLECT HACID IDM SAMPLE DEMOSE EQUIPMENT ARON RDS7 MARON HEAVLIN (BCZ) AM HERBER (BCC. SSFL FLUTE REMOVAL + SEEPS 1200 2460 1000 M.J. OFFSITE -1945 RECON SP-19 LOCATION ON CAS M. JUSAYAN (COM SMITH) 300 V-TOZD-OHOW 16-36-L CPARENT SAMPLE WEATHER: SUMM, 705, BREEZE (AM) BCO PREP FOR SFEP SAMPLING: 1915 FILLING OUT FSDS! WAS COLLECTED AT 1050 COLLECT SAMPLE SP-TO-TO-CHARLE A-L COLLECT DUPLICATE SAMPLE LUNCH P. BUTLER (COM SMITH) SCER SANDING SSFL FLOWER BLOOM TO 46-16

0700 1000 1600 1418 SPACOA DRY AFTER 2 MIN, BECIN 1915 GO TO NBZ TO SCOPE OUT SP W 1245 1045 REACH AREA MARKED ON MAP. 0900 FOUND REMINANTS OF ROAD LEADIN END OF DAY OFFSITE a 150' RADIUS. M. JUSAYAN ARRIVES TO SITE MORNING HES MEETING. TO RECON SP-424 STEP CLUSTER BARBEDWIRE FENCE. TO CLUSTER, BUT THERE IS A M. JUSAYAN (COM SMITH NOTETAKER)

J. SOLE (BCZ)

S. MYSAL (COM SMITH)

RPE - LEVEL P WEATHER: GOS CNERCAST, CAM . HONG CANNOT FIND SP-19 CLUSTER RUZZIZG A UNDER ZITIZ SSFL SEEP SAMPLING BEGINNING TO RAW HEADING UP. 200 0935 GTOO MORNING HE'S MEETING, 0730 LCAD TRUCK WITH SAMPLE GEAR, 0820 MOSSE TO NORTH RMHF 0200 LOWCH. S. WILLARDED (NORTHWIND) M. DISAYAN (COM SMITH NOTELIATER) P. BUTLER (COM SMITH) FILL OUT PARERWARIC SP-TØ2B PUMPS DRY WITHIN SP-TAZC PUMPS DRY WITHIN A MINCTE 3 MINUTES OF PURGING, THESE VOLUME FOR SAMPLES SCIFFICIENT ANTENDYB-16 2 WELLS WILL NOT PROPULE HIVE TO SP-TOP CWSTER SSFL SEEP SAMPUNG 4-8-16 6-8-10

4 13 11 be accessing 2490 1020 We successfully 0850 Enterel Grandes property 1056 1040 sperred OBOD lance e sesse Grande Onder to get seep samples Treaduray @ SSFI to Sursus SEEPS, 'We quality out next South water See so. de some FAR or 20. Me commo Water PH atmer have to return a SHED Flow o (636 m) Takene break they focal elupker along ardinag 30 nesi 8:91 200 9 Heh-35 - 1.30 surran nound SSFL where permission ton Howir withour no 757 Fam the Sumi Valley SSEL scep- water come @ tauler th bettles Takins help me called Time wake tecated brandlew bons petere trens mesos Logo b724-05 presone Reade poth whitners (CO17).

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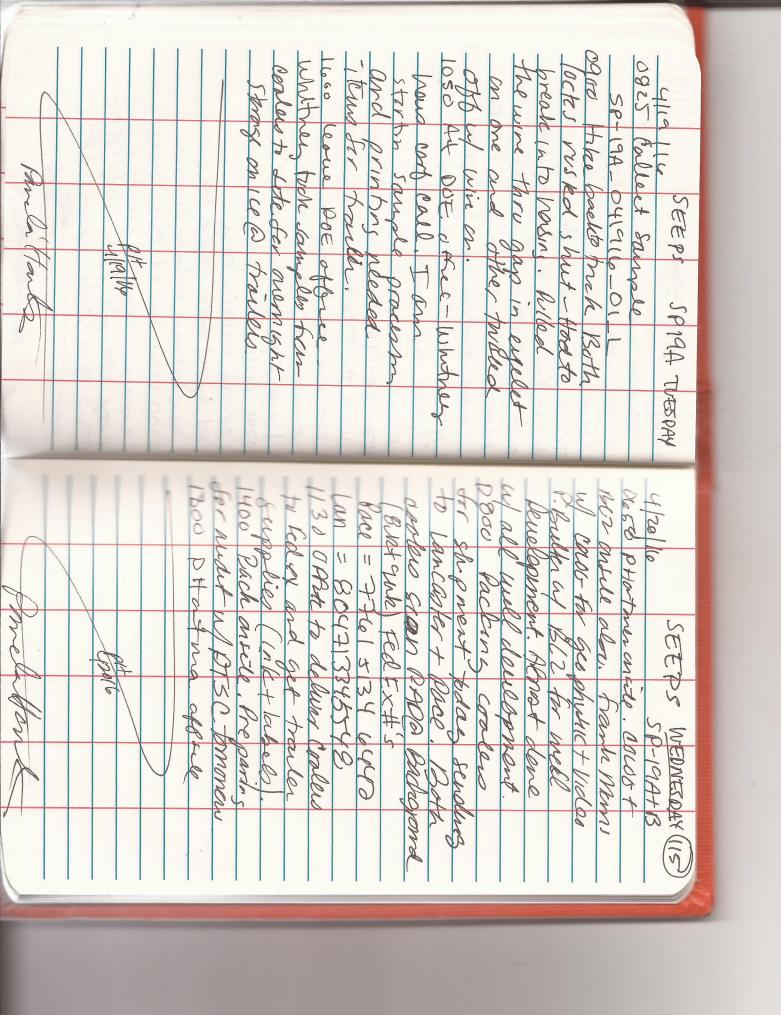
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1130 1120 Allery to 630 1700 aguiphent and pense 06 19 300 1340 Says ELEH-US AP 13 2000 myse Sendy Helmint to track. Cols tracker callacted Jheh-ds VOCS, PAD, Inhum, Flande Welsh Rech wapler exple valuno better. 9181401816101316 02/378 E/th08 : # x0 100 tun flowing, Otherwood office relected full nekeed up u tet as of truck It takes backers oustainer. 100 grad Lock med Iced Sw In same as proje 7433 041316-01 leader scarced for 58-4240 paper: 19:0 5 Sanols + SETPS 1 mage to Brander inv pump anlew badene Sample sext couler Pracasin bottle 1.2 miles (ansle) nater Sheh-As 424-45 ary a MJ/MJO organt Tuk the pack Jas Sed A 109

252 1250 oto PHANA 1008 1050 0 0900 1015 renause locks open てもし-OS Jeep w A HCH -98 Till trut Paleirs Calle - shrpins attention reded + hireins ALCH Wereal Panale, Metals Meet Duplicale Hearlack Calleet back and Drer-1 Bot Sterring armo orus noted shit hall seeps. Brandeis GW SEEPS mice over colo bach athan and SP-424 mile 91416 Horne. 041416-36mes Clary + sanding MON KAD TITUM Conde replace makes + equipment Some ough readed mot. 8.8 H down ( Swhire Brandew ter Whitney Thealers Property 0 fanins 12000rl gether into THICSRY wine acpens elesang h high whose 10630 080 Wind 5 0930 today COLOGY truck by Callos from Video 330 edox # weekground Both + whitnes Pace Produtical + Packery coles Trick 1088 tt 1346 # Riteria april extremely thing work our diese £ 51718 51 th 08 melete 60 mph winelbusts SEEPS reactual, ansite. 18011 + 8wh clared RAD fear perm called for shapping many ontite 4/18/18 Sta prajected to last Sindra weather. Hay Chater driver notreade Fanh Mons unaster Sal 111

(Con Kind o Dur & Ser 0620 650 1000 MOR 0000 Crava. 55 development Timemen PHENTRAM ON SILL Juntan enficiel in anne PH-TON द्रयंत द deuelopnent Gee physix1 log plus SEEPS suppo samplin 2 readney of no affred Wo Ahrib 00000 3 posset 96,-05 one 0640 Final 1101 95C0 Acess from Tape larger (# 1648 use townshe nele Ill required bother filled PAD to tun MICE rear Irrah -0550 PHatro nitile 10-97610-96-06 leave are Mics, Rohlnade, Metals, Plounde Sex Inch remore your ul toped stockes + tolsen lake mast northern 20% cha 7.05% thee to up peristally pump and Callet Jample after perso Red 8.65 Btoc pepe at the one are medition Brandeis Property. Vous to 1916 Waser -- PT 760 We are wearing Volume casing SP-19A SEEPS + W.Treadway OTB = 1019 Sini Valley. tank 3 411100 orn crowl Casens shiting = 3" 2228 b) 10 to 01drainage 14-1 S



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-		later Leve					Time O850 Comments						
		olume in			t i	Total Well Depth (TOC) 10.4 ft							
		Purged I				Screened Interval (TOC) 7-10 ft Stabilized Flow Rate							
ŀ	Purging	Method	0	W 100	10W Stal		Specific		generalism consiste and the second		Oxidation		
<u>ე</u>	Time	DTW	Cumulative Volume		Temp (°C)		onductance rosiemens/cm)	рН	Turbidity	Dissolved Oxygen	Reduction Potential		
<u>N</u>	0848				179		1159	7.63	53.4				
OURGING	0849		40,000		16.7			7.62	18.0	*******			
n.	0850	·			17.5	1197		7.53	3.96				
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_	Analytic	al Matrix		Yes Y	ZINO		ttached	Ti	me Sampleo				
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		) mi V	JA		vorre 4				<u> </u>		<u> </u>		
نلا	Appear	ance / Od	or	- ,	none								
∢	pH (las	t stabilize	d)	7.53		Temperature (°C) 17.5							
4	Eh (mil	livolts)		, married 11 11 11 11 11 11 11 11 11 11 11 11 11		Specific Conductance (microsiemens/cm) 1197							
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SAMPLE	Chain-of-Custody   ✓ Yes   No					dender virtual de la constant de la	Chain-of-Custoo			and the state of t	and the second of the second of		
SAMP DAT	A. CHARLES CO.	Duplicate Sample ID N/4					Replicate Sample Nos.  Date Sent to Lab						
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DISPOSITION SAMP	Duplica Analyt	tical Lab	Lab Shi Nar	p <b>me</b> nt Me			Dat	e oem w					
galage (cr. ease in proposition)	Duplica	it with	Lab Shi Nar	pment Me me (s)			Dat	e Jenn					

LOW FLOW GROUNDWATER SAMPLING RECORD

SP-196-041916-01-

					Sample ID <del>SP</del>			L	SP-19B				
	100	-			-GW Progam 201	Date: _	19 APRI	4,7016					
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ပ္	Time	DTW	Cumulative Volume	Temp (°C)	Conductance (microsiemens/cm)	рН	Turbidity	Dissolved Oxygen	Reduction Potential				
PURGING	0718			17-1	2050	853	4.98		,				
PUF	0731			10.7	2100	728	0.83	<b>34.</b> 34					
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	JF156	\		16.le	2105	6.89	1.36	\$*************************************					
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<u>១</u>		cal Matrix		X No	At What pld		Filter Type	-	ooled By				
SAMPLING	Sample Container			served By	At What pH		N/A-		CC				
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(C)	OVM-P	ID Heads	pace (ppm)	0.0	ORP -								
	Chain-c	of-Custody	y 🄀 Yes	□ No_	Chain-of-Custod	y ID							
_	Duplica	ite Sampl	eID V/	A	Replicate Sample								
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<b>U</b> I		,					Sample ID <u>SP-L</u>	124 <u>4</u>	OH 141626	Well No.	SP-424A			
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		94489.1								Hartman				
-		MV.						_		Treadin	ay_			
							: 10:30	T	Comments					
}		Vater Lev			ags	Time	Total Well Depth (TOC)							
1		olume in				Screened Interval (TOC)								
		Purged     Method				Stabilized Flow Rate								
<i>(</i> h			Cum	ulative	Temp	C	Specific Conductance		Turbidity	Dissolved	Oxidation- Reduction Potential			
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<u>a.</u>	1070		<u></u>		16.6	2 2		8.22			,			
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	Samolin	ng Method	10	w flow	Ú									
SAMPLING		al Matrix			No		ttached	Ti	me Sampled	10:30				
		le Container Preserved			served B	<u>y</u>	At What pH		Filter Type	<u> </u>	ooled By			
	10-40	OML VO.					N/A		N/A		<u>ile</u>			
SAN	1-25	oml glo	على	<u>^</u>	ne_		<u> </u>			<u> </u>	one			
	1	poly		tia	ri <u>u</u>					<u> </u>	one			
	2-40	) mL VO	A	<u>^</u>	one.	4 4					xfice_			
ш	Appear	ance / Oc	lor	dear,					. 4					
APLE	pH (las	t stabilize	<u>d)</u>	8.22		Specific Conductance (microsiemens/cm) 291.3								
SAM	Eh (mil	***************************************	·····			<u></u>		ctance (n	ncrosiemen	<del>эсн)</del> (	·			
	OVM-F	PID Heads	2	-	П.,	······································	ORP Chain-of-Custod	LUD 00	14 0UIS -0	2011004	5-02			
	Chain-	of-Custod		Yes	L No	-			MW (0413-0	- Convers				
z	Duplica	ate Sampl	e ID T	7424-4C	4-041411	ه _ علام ا مفام	Replicate Samp	e Sent to	1 Lab 4/6	110				
10	Analy	tical Lab		Name <u>Y</u> pment Me				C COSTIL D		<u> </u>				
OSi					WOU YT	<u> </u>	*							
DISPOSITION	Spl	it with		ne (s) janization	(s)									
	Other	dunk	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	Sam		Wen	at 10:50							
		ents M			abore		and not ab	le to	neasu		7			
REV.		, y <b>x</b> 1	T.44E			7	* * *		forms\low flow	groundvrater san	npling record.doc			
		1 201	e	MT	v.		N/A	N	(/A	1(	<u>J</u>			
	WUM	c poly		אסר	3 ************************************			•	V	1	ı			
	250 m	i pol	y	nor	Ve.		~							

					;	Sample ID <u>SP-</u>	4248	-041316		Vell No.	SP-424B		
Daniont	. Santa	Susana F	eild Lab- GV	V Progran	n 2016		Date: _	1/13/16					
			204.009.909.				Sample	d By: P. F	brt				
-		nny.					Review	ed By: <u></u>	$\frac{T_{\Delta}}{}$	eade	vas		
					Time	11:20		Comments					
ł		<u>Vater Leve</u> Volume in		ags	1	Well Depth (TO							
ŀ			casing lefore Sampl	ina	T	ned Interval (TO							
	<del></del>		low flo		1	Stabilized Flow Rate							
9	Time		Cumulative Volume	Temp (°C)	Co	Specific Conductance (microsiemens/cm)		Turbidity	Dissolved Oxygen		Oxidation- Reduction Potential		
<u>z</u>	11:10		TOIGHT	H.5	925.2		8.9	3.60	~~~		Andrews .		
PURGING	11:15			17.2	<b>१८०.</b> 5		8.44	0.44			office.		
a.	11 .0		······································										
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			****										
:						······································			ļ				
			and the second s	<u></u>	<u> </u>		<u> </u>		<u></u>	· 10111-11-11-11-11-11-11-11-11-11-11-11-1			
	Samplii	ng Method		_					**************************************				
SAMPLING	Analytic	cal Matrix		PINO		ached		me Sampled	,	1:20			
	Sample Container Preserved B			<b>Y</b>	At What pH		Filter Type	<u> </u>		ooled By			
₫.	10-40	ML VOA		101		- NA		N/A			x, ile		
SA	1	to migi		pne						1	x, N/A= x N/A=		
	1	paly_		Withic						coderice			
	1	10 ml VO			· · · · · · · · · · · · · · · · · · ·								
MPLE	Appear	rance / Od	. 1.4	, none									
MP	pH (las	t stabilized	0.11		Temperature (°C) 17.2  Specific Conductance (microsiemens/cm) 889.5								
SAN	Eh (mil		pace (ppm)	<del> </del>		ORP							
		of-Custody	F-3	□ No	I	Chain-of-Custod	y ID 2	0160415	-0	2 20	160413-01		
		ate Sample				Replicate Samp							
Z	Dupinos		Lab Name	Pace 1	Furoh	ns-lancast Bat	e Sent t	o Lab 4/	13/1	le, 4/	15/16		
DISPOSITION	Analy	tical Lab	Shipment M	,		x cooler				*			
ő			Name (s)										
DIS.	Spl	it with	Organizatio	n (s)									
	Other								- ^		1.1.		
	Comm	ents 📈	Ha VENEL	above	q (a)	nd, not ab	te to	neasure	7 ()	( <u>()</u>	npling record.doc		
REV.					*		N/1	tormsvow now	groure	TANGGG SON	mpang rocord		
<b>-</b> 57	1250	oml pa	y nit	ri C	1	JA	" (	4	C	worer,	ile r, ile		
/	1 250	mL p	y nit	ne		V	<b>V</b>		4	10000	r, lle		

### LOW FLOW GROUNDWATER SAMPLING RECORD

							Sample ID <u>SP</u>	4740	-041316-	Well No	SP-424C.				
							Sample to ot				31-72-1				
					/ Prograi		<b>)</b>		4/13/16	) m of					
,,				9.909.0	19092.GV	VFIM				<u>larthran</u>					
Weath	ar: <u>SW</u>	my,	70'5					_Review	ved By: <u>W</u>	Treade	<u> </u>				
<del></del> 1	Combin 18	/ater Lev	a) (TO(	<u> </u>	225	Time	12:00		Comments		***************************************				
ŀ		olume in		,	ags		Total Well Depth (TOC)								
1			······			Screened Interval (TOC)									
Ì		Method	Before Sampling			†	Stabilized Flow Rate								
	ruigmis	Hetilod					Specific				Oxidation-				
ō	Time DTW		Cumu		Temp (°C)  7.3		onductance rosiemens/cm)	рН	Turbidity	Dissolved Oxygen	Reduction Potentia				
PURGING	11:45		~250			881.1		B.21	35.5						
5	II:SD			500	17.4	8	85.I	<b>2.03</b>	1.21	".w					
	11:55		~	~800 1		1	85,0	7.94	0.36	***					
				///····											
							*								
	Samplin	g Method	100	J 911	200										
		al Matrix		Yes X	JNo	□At	lached	T	ime Sampled	12:00					
NG	Sample Container Preserved By						At What ph	1	Filter Type	C C	poled By				
SAMPLING		mL VOA					<b>.</b>				2				
SAN		mt gla													
<i>•</i> ,	2-14	,	nitric								····				
		ml vox					Water		<u> </u>						
	Annage	ance / Od			ngny			······································							
PLE	pH (lasi	stabilize		7.94			Temperature (°	C) 1	7.4						
SAM	Eh (mill						Specific Condu	ctance (I	microsiemens	vcm) 885	5.0				
S		ID Heads	pace (p	pm)			ORP								
	Chain-c	of-Custody	, <sub> </sub>	Yes	□ No		Chain-of-Custoo	ty ID 21	0140413	-01 2016	10415-07L				
		te Sample					Replicate Samp	le Nos.	MS/MSI	same_	<u>rame</u>				
N O			************	ame ?	le Euri	1115	lamaser Dal	te Sent t	o Lab 4/13	/16 4/	15/16				
E	Analyti	ical Lab	1	nent Me		N EX					4				
DISPOSITION			Name	(s)						······································					
810	Spli	t with	Organ	nization	(s)					······································					
	Other MS/MSD rollected														
		Comments water level above ground surface, not able to													
REV. 2	007	M	LASW	< 0	curati	dy	1		forms'low flow s	roundwater sam	pling record.doc				

1-250 mc pay nitric

10

						Sample ID/							
Project	: 557	- 6	m Pr	0510-	~ ~	016	Date:	<u> </u>	7-16	-			
- Project	No.:	9445	39,004.	009,90	9,0	9092.670411	<u>∕∕</u> Samp	led By:/	nJusage	<u>~</u>			
<b>Neath</b>	er: <u>/)</u>	ver ca	of to po	arth	Cler	9092.504 M	Revie	wed By:	Ptlartm	<u>~</u>			
		Vater Lev			Time Comments								
F		olume in				i Well Depth (T	OC)						
<u> </u>		*****	Before Samp	lina		ened Interval (*							
		Method			Stab	ilized Flow Rat	е						
ರ			Cumulative Volume	Temp (°C)	Specific Conductance (microsiemens/cr		pH Turbidity		Dissolved Oxygen	Oxidation- Reduction Potential			
CG CG	1418		- Went	dry	a 4 h	v pumpi	15	70 sec					
PURGING				/			0						
<b>***</b>													
	Sampling Method  Time Sampled												
	Analytical Matrix ☐Yes ☐No					ttached	r	Time Sampled					
SAMPLING	Sample Container Preserved B					At What p	H	Filter Type	<u>C</u>	ooled By			
4													
SAI													
щ	Appear	rance / Oc											
SAMPLE DATA	pH (las	t stabilize	<u>d)</u>			Temperature (		(migration -	o/om}				
SAN D	Eh (mil				.,	Specific Condu	uctance	(microsiemen	8/CIII)				
	OVM-F	PID Heads	space (ppm)			ORP							
		of-Custod		L No		Chain-of-Custo			***************************************				
7	Duplica	ate Sampl				Replicate Sam	<u>ple Nos.</u> ete Sent						
Ē	Analy	tical Lab	Lab Name			D.	ale Sein	(O Lab					
USC			Shipment M	ethod				***************************************	**************************************				
DISPOSITION	Spl	it with	Name (s)		<b></b>								
ō	<u> </u>		Organizatio	n (s)						*			
	Comments Water level meter frake will not fit in caseng												
	Comm	ents 🗸	varr le	vu n	Y TU	1 11111	100	forms\low flow	***************************************				

		<del></del>					Sample ID/	VA_		Well No.	P-900 B			
Project		SSEL	Gev	Przc	var	201	6	Date: _	4-	7-16				
Project	No.:	944	89.12	<u>и.ŏ</u>	09.900	1.09	092. GWIM	Sample	ed By:	M Jusa	<del>5°r</del>			
Weath	er: 🛝	IERCA	T TO	₽A	MTLY	(1	orby	Review	ved By:	PHarton	٠			
		Vater Lev				Time	Date: 4-7-16  OPO92. & WIM Sampled By: M Jusagen  CLOUDY Reviewed By: PHentner  Comments							
***		olume in					Well Depth (TO	C)			MANAGEMENT CONTRACTOR OF THE STREET CONTRACTOR			
		Purged I		ampli	na	Screened Interval (TOC)								
		g Method				Stabilized Flow Rate								
ភ្	Time	DTW	Cumulative Volume		Temp (°C)	Specific Conductance (microsiemens/cm)		рН	Turbidity	Dissolved Oxygen	Oxidation- Reduction Potential			
PURGING	1105		_ D	R 4		<u> </u>								
ž														
U.,														
	Compli	ng Method	4											
			Y	es [		□At	ttached	Т	ime Sampled	<u> </u>				
9	Analytical Matrix					y	At What pH		Filter Typ	e C	ooled By			
SAMPLING	Janip	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,				<b></b>								
Σ														
Ś														
	An====	rance / Od	⊥ lor				<u>,</u>							
SAMPLE	Appea	st stabilize					Temperature (°C)							
MP	pri (ia:		<u> </u>			***	Specific Conductance (microsiemens/cm)							
SA	En (m)	illivolts)		2027			ORP							
	+	PID Heads			No		Chain-of-Custod	Iv ID						
		of-Custod	4	Yes	<u> </u>	<u> </u>	Replicate Sample							
z	Duplic	ate Samp							to Lab					
0	Analy	tical Lab	Lab Na							Annual An				
DISPOSITION			Shipm				4.			· · · · · · · · · · · · · · · · · · ·				
SPC	Sp	lit with	Name											
ō			Organ	ization	1 (S)									
C September 1	Other					~~~								
	Comp	nents												

	= = =						Sample ID	um en cottottille oute		Well No.	SP 900L			
Projec	t: 53	SFL.	- V1	N Prz	iara w	2	016	Date: _	4-	7-16				
Projec Projec	t No.:	14489	1 12	04,000	19090	9092	, GWFIM	Sampl	ed By:	MJUGA	40-			
Weath	ier: 🛛 🗓 🗸	ERCAS	T 1	D PAA	714	un				PHato				
		Water Lev				<u> </u>			Comments					
		Volume ir				<del></del>	Time Comments  Total Well Depth (TOC)							
		e Purged			ina	1	ened Interval (TC							
•		g Method		ССССТВ	··· <b>·</b>	Stabilized Flow Rate								
<u> </u>	Time	DTW	Cumulative Volume		Temp (°C)	Specific Conductance (microsiemens/cm)				Dissolved Oxygen	Oxidation- Reduction Potential			
5	1365	-,		- 12	2 Y	A STATE OF THE PARTY OF THE PAR								
PURGING					,									
<u> </u>														
	Samoli	na Method	L d		3					(A)				
		Sampling Method  Analytical Matrix □Yes □No					ttached	T	ime Sampled					
S N		Sample Container Preserved By					At What pH		Filter Type	e Co	ooled By			
SAMPLING														
S											opportunities and the contract of the contract			
	Appea	rance / Oc	dor											
SAMPLE DATA	nH (las	st stabilize					Temperature (°C)							
AM C	Eh (mi	llívolts)					Specific Conductance (microsiemens/cm)							
S	OVM-I	PID Heads	space	(maga)			ORP							
	<del> </del>	of-Custod		Yes	□ No		Chain-of-Custody	/ ID		A) (()				
		ate Sampl			······································		Replicate Sample	e Nos.						
Ž	Dupiro	ato oump		o Name		Date Sent to Lab								
Ë	Analy	tical Lab		ipment Me	ethod					Managarous sus sus substitutios at term substitution a company				
ŠŪ			1	me (s)		***************************************								
NOILISOdSiū	Sp	lit with		ganization	ı (s)									
<b>C</b> I	Other		1 213		)-/									
	Comm	annte.												
		ICHIO												



SP-TOJA

						Sample ID <u>/Vo</u>	samp	<u> </u>	Well No.	gn-			
Project	: <i>S</i> S	FL C	w Bregi	on c	2016	3	Date: _	4 -8	3-16	***************************************			
Project	No.:	14489	.1204.000	1.909			Sample	ed By:	M Jusac	der			
Weath	er:	OVER	CAST MI	3 T			Review	ed By:	PHatn	یک ا			
	······································	Vater Lev			-	Time Comments							
		olume in			<del></del>	Total Well Depth (TOC)							
			Before Sampli	ng	Screened Interval (TOC) Stabilized Flow Rate								
L	Purging	Method			Stab	Specific				Oxidation-			
ပ္	Time	DTW	Cumulative Volume	Temp (°C)	(mic	onductance rosiemens/cm)	рН	Turbidity	Dissolved Oxygen	Reduction Potential			
<u>z</u>	Time	D180	000	/	1	,							
PURGING			VIC Y		<del>  ,</del>								
Ω	4												
;													
			**************************************										
					•								
	Samplir	ng Method											
		cal Matrix		J <b>n</b> o	□At	tached	Ti	me Sampled		1119			
S N	Sample Container Preserved By					At What pH		Filter Type	e Co	ooled By			
SAMPLING	1		1						** ***********************************				
. AM													
o o								and the state of t					
	<u></u>												
	Appear	rance / Od	or										
PLE TA	nH (las	t stabilize				Temperature (°C)							
SAME	Eh (mil					Specific Conductance (microsiemens/cm)							
Ś	OVM-F	PID Heads	pace (ppm)			ORP							
		of-Custod		□No		Chain-of-Custody	y ID						
		ate Sampl				Replicate Sample	e Nos.		Action of the second se	opposes. I socio responsibilità del constituto del compresso del compresso del compresso del compresso del constituto dela constituto del constituto del constituto del constituto del con			
Z:			Lab Name			Date	e Sent to	o Lab					
Ĕ	Analy	tical Lab	Shipment Me	ethod									
Š			Name (s)							The supposed decreased and the supposed			
DISPOSITION	Spl	it with	Organization	(s)									
	Other						was a second			The second secon			
	Comm	ents					.,						



						Sample ID/	Well No.:	Well No.5P-TOLY					
Projec	: Santa	Susana	Feild Lab- GV	V Prograt	n 201	6	Date: _	4-8-	16				
Projec	No.:	94489.1	204.009.909.	09092.GV	VFIM		Sample	ed By: M	Turaya				
Project No.: 94489.1204.009.909.09092.GV Weather: CNESCAST, MIST							Review	ved By: <u>₽</u>	HW.Tr				
		***************************************	el (TOC) つ.		Time	0915		Comments					
			Casing	- , a	Tota	Total Well Depth (TOC) 12.42							
			Before Samp	ing	Scre	ened Interval (TO	OC)	10-12,4	12'				
	Purging	Method	PERI ?	UMP	Stat	Stabilized Flow Rate							
NG	Time	WTQ	Cumulative Volume	Temp (°C)		Specific Conductance crosiemens/cm)	рН	Turbidity	Dissolved Oxygen	Oxidation- Reduction Potential			
PURGING	<i>3935</i>		$\overline{p}$	<u> </u>					COMMAN, NAME OF THE PROPERTY OF				
P					<u> </u>								
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			en e										
					<u> </u>								
	Samplin	ig Method											
Ø	Analytic	al Matrix	□Yes	***************************************		ttached	Ti	me Sampled					
Ž	Sampl	e Contair	ner Pre	served By		At What pH		Filter Type	<u> </u>	ooled By			
SAMPLING					······································		_						
A2		······································			· · · · · · · · · · · · · · · · · · ·								
		······································											
Щ		ance / Od				Tamparatura (9C	}			99999-1999-1999-1999-1999-1999-1999-19			
MPI E	<del></del>	stabilize	0)			Temperature (°C)							
AS.	Eh (mill				Specific Conductance (microsiemens/cm)  ORP								
<b>_</b>	<del> </del>		pace (ppm) √ □Yes	□No		Chain-of-Custody	/ ID			<del>, , , , , , , , , , , , , , , , , , , </del>			
		of-Custody	<u> </u>	1AO		Replicate Sample		ALCO AND A CONTRACTOR OF THE ACCOUNTS OF THE A	A STATE OF THE PARTY OF THE PAR				
Z	Duplica	te Sample	Lab Name		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		Sent to	o Lab					
E	Analyl	ical Lab	Shipment Me	etnod									
SO			Name (s)										
DISPOSITION	Spli	t with	Organization	(s)					***************************************				
	Other	1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000								((((a) - (a)			
	Comme	ents											



Sample ID SP -TOZB\_041210-Project: Santa Susana Feild Lab- GW Program 2016 Date: 4/12/16 Sampled By: P. Hartman Project No.: 94489.1204.009.909.09092.GWFIM Reviewed By: W The advous Weather: Time 4:00 Comments Static Water Level (TOC) 7.07 Total Well Depth (TOC) Water Volume in Casing Screened Interval (TOC) Volume Purged Before Sampling Purging Method 10W flow Stabilized Flow Rate Specific Oxidation-Reduction Dissolved Temp Conductance Cumulative **Potential** PURGING **Turbidity** Oxygen DTW (°C) (microsiemens/cm) Time Volume flow au Sampling Method □Attached □yes ØNo Time Sampled Analytical Matrix SAMPLING Cooled By Filter Type Preserved By At What pH Sample Container none. NITHIC 2-14 palu none none 1-250 mLalass Ha 3-40ml 40A) Appearance / Odor Temperature (°C) pH (last stabilized) Specific Conductance (microsiemens/cm) Eh (millivolts) ORP OVM-PID Headspace (ppm) □ No Chain-of-Custody ID 2016 Mole - 02. V Yes Chain-of-Custody Replicate Sample Nos. Duplicate Sample ID Lab Name Pale Flux Ofins larget Date Sent to Lab 4/12/16, 4/13/16 DISPOSITION Analytical Lab Shipment Method GAEX Name (s) Split with Organization (s) Other Comments



							Sample ID	MA_		Well No.	P-TØZC.			
Project	Santa	Susana 1	Feild	Lab- GV	N Progran	n 201	6			16				
					09092 GV	VETM								
Weath	er: <u>೮۷</u>	ERLA	ST.,	MI	<u>5T</u>			_Revi <b>ew</b>	ed By:	<u>' + ~ + </u>				
	Static V	Vater Lev	el (To	OC)	84'	Time	Time 09 45 Comments							
		/olume ir					Total Well Depth (TOC) +9 24.3 24.5							
	Volume	Purged	Befor	re Samp	ling —	Scre	Screened Interval (TOC) 19 - 24.3'							
	Purging	Method	PERI	1. PUR	49	Stat	oilized Flow Rate							
စ္	Time	DTW	Cumulative Temp				Specific Conductance crosiemens/cm)	рН	Turbidity	Dissolved Oxygen	Oxidation- Reduction Potential			
5	1000			····	15.5	I	089	6.16		NTM	- i07			
PURGING	1603 - DRY													
_									-					
						<u></u>					WAA (Angeleinen			
						ļ		ļ						
				ar-dus-uppertunitation (TV master)		ļ		-						
			.,		1	<u></u>		<u> </u>						
	Sampling Method										A CONTRACTOR OF THE CONTRACTOR			
(C)	Analytic	al Matrix	L		No		ttached		me Sampled					
Š	Samp	le Contai	ner	ner Preserved By			At What pH		Filter Type	<u> </u>	ooled By			
SAMPLING											***************************************			
SA						<u></u>					**************************************			
									······································					
			······································	<u>L</u>			<u> </u>		***************************************					
MPLE		ance / Od		<del></del>			Tomporature (2C)							
MPL		t stabilize	<u>u)</u>		**************************************		Temperature (°C)  Specific Conductance (microsiemens/cm)							
SAI DV	Eh (mil			(onm)	***	ORP								
-		ID Heads		(ppm) □Yes	□No		Chain-of-Custod	v ID						
		of-Custod ite Sampl	<b>4</b>	1 69			Replicate Sample		· · · · · · · · · · · · · · · · · · ·					
z	Duplica	no Sampi		Name				e Sent to	Lab		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			
DISPOSITION	Analyl	ical Lab		pment M	ethod									
SOc			1	ne (s)										
JISF	Spl	it with		anizatio	າ (s)									
	Other													
	Comm	ents												



Sample ID SP-TO2C-041210-01 Well No. SP-TOZC Project: Santa Susana Feild Lab- GW Program 2016 Date: 4/12/14 Sampled By: P. Hartman Project No.: 94489.1204.009.909.09092.GWFIM Reviewed By: WThe advoca Weather: Time 14:30 Comments Static Water Level (TOC) Total Well Depth (TOC) Water Volume in Casing Screened interval (TOC) Volume Purged Before Sampling Purging Method | ON TOW Stabilized Flow Rate Specific Oxidation-Reduction Dissolved Cumulative Temp Conductance PURGING (microsiemens/cm) Hq **Turbidity** Oxygen Potential DTW Volume (°C) Time Your Flow Sampling Method □Yes ☑No Attached Time Sampled Analytical Matrix SAMPLING Filter Type Cooled By At What pH Sample Container Preserved By NIA none nithe 2-14 Daly nonce none 250 ml plats 10 3-40ml VDAS HCC Appearance / Odor Temperature (°C) pH (last stabilized) Specific Conductance (microsiemens/cm) Eh (millivolts) ORP OVM-PID Headspace (ppm) Chain-of-Custody 1020160406-02, 20160413-01 □No ☑ Yes Chain-of-Custody Replicate Sample Nos. Duplicate Sample ID Lab Name Pau Eurofin Langaster Date Sent to Lab 4/12/16. **DISPOSITION** Analytical Lab Shipment Method Fce EX Name (s) Split with Organization (s) Other

Comments



						Sample ID <u>SQ - 1</u>	TOZV-	040016.01.	Well No.	SY-TOZD			
Project	: Santa	Susana	Feild Lab- GV	V Progran	n 201	6		4-6-16					
			204.009.909.0				Reviewed By: MTusayer						
Weath	er: <u>&gt; (</u>	NN Y	, 80 s ,	BREET	2-E		Review	ed By: <u>나</u>	'the Dr				
	Static V	Vater Lev	el (TOC) 구	.471	Time	Time 1010 Comments INTAILE AT 32'8							
		/olume in			Tota	il Well Depth (TC		35					
			Before Sampl	ng		ened Interval (T		30 -35	>				
			PERI PUM			Stabilized Flow Rate 1300 mL/min							
				Temp		Specific			Dissolved	Oxidation- Reduction			
Š	Time	DTW	Cumulative Volume	(°C) (m		conductance crosiemens/cm)	рН	Turbidity	Oxygen	Potential			
₩.	025	NM		19.6		1079	669	22.7	NM	29			
PURGING	1030		16	16 9	1676	1679	667		NM	73			
	1035			19.2		1077	6.72		NM	69			
	040	ļ		179		1078	6.75	4.85	NM	68			
	1045	Ą	17.8			1078		4.21	NM	66			
								<u> </u>					
	Samplin	ng Method	LOW-FL	σW				******					
48		al Matrix	Yes .k	No	□A <sub>1</sub>	ttached	Ti	me Sampled	1050				
SAMPLING	Sampl	e Contail		served By		At What pH		Filter Type	<del></del>	ooled By			
APL	3× 40	ML VOA	1/4	1C.1		<u>~Z</u>		**************************************		£			
SAR	IX C	SOML A		XNE				*		,			
	2X 1L	, POLY	HN	J0 g		د. ک		******		<u>*</u>			
	,							7					
111	Appear	ance / Od	or CLEA	12, NO	3 51	HEEN !		<u>000/2</u>					
MPLE	pH (last	tstabilize	d) (ģ,	<del>75</del>		Temperature (°C	3)	7.8	- Al -	7.2			
SAN	Eh (mill	ivolts)			Specific Conductance (microsiemens/cm) 1078								
(O)	OVM-P	ID Heads	pace (ppm)			ORP (0(e							
	Chain-c	of-Custod	/ X Yes	□ No		Chain-of-Custod							
	Duplica	te Sampk	10 58-TØ	2D-040	016-	Replicate Sample	e Nos.		W				
S			Lab Name			Date	e Sent to	Lab					
DISPOSITION	Analyli	ic <b>al</b> Lab	Shipment Me	thod	****								
O O	C. F	4 (14fa	Name (s)										
DIS	Spli	t with	Organization				2						
	Other	PU <sup>(</sup>	PLICATE	COLLE	A.		<u>300</u>	***************************************					
1	Comme	ents ( À	IN NOT	MEASU	3E_	PRAWYOWN	PUE	TO WEL	L SP	A STATE OF THE STA			