



# Department of Toxic Substances Control

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## MEMORANDUM

**TO:** Gerard Abrams  
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**FROM:** Fred Seto, Ph.D. FS  
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**DATE:** August 10, 2004

**SUBJECT:** Review of Data Packages, Boeing Rocketdyne-Santa Susana  
Field Laboratory RFI  
Columbia Analytical Services, Inc.: EPA Method 6010 (Metals), EPA  
Method 7060 (Arsenic), EPA Method 7470 (Mercury in liquid), EPA  
Method 7471 (Mercury in solid), EPA Method 7740 (Selenium), and EPA  
Method 7841 (Thallium).

We have reviewed the data packages containing metal test results for 28 samples. The samples are described below. The analytical results and the associated reporting limits for metals in water samples and soil samples are given in Table 1 and Table 2.

<u>SDG No</u>	<u>Sample No</u>	<u>Date Collected</u>	<u>Matrix (No of Samples)</u>	<u>EPA Method</u>
L9801906	RH008	6/11/98	Water (4)	6010, 7060 7470, 7841 7740
	RH018	6/11/98		
	RH020	6/15/98		
	RH037	6/15/98		

<u>SDG No</u>	<u>Sample No</u>	<u>Date Collected</u>	<u>Matrix (No of Samples)</u>	<u>EPA Method</u>
L9801888	RH002	6/10/98	Soil (14)	6010, 7060 7471, 7841 7740
	RH003	6/10/98		
	RH004	6/10/98		
	RH005	6/10/98		
	RH006	6/10/98		
	RH007	6/10/98		
	RH021	6/12/98		
	RH025	6/12/98		
	RH026	6/12/98		
	RH030	6/15/98		
	RH031	6/15/98		
	RH032	6/15/98		
	RH033	6/15/98		
	RH036	6/15/98		
L9801914	RH011	6/11/98	Soil (10)	6010, 7060 7471, 7841 7740
	RH012	6/11/98		
	RH013	6/11/98		
	RH014	6/11/98		
	RH015	6/11/98		
	RH016	6/11/98		
	RH041	6/16/98		
	RH046	6/16/98		
	RH047	6/16/98		
	RH048	6/16/98		

We have evaluated, where applicable, the holding times, initial calibrations, calibration verifications, method blanks, laboratory control samples (LCS), matrix spike/matrix spike duplicate (MS/MSD), interference check standard (ICS), analyte identification and quantitation. The data review results for metals are summarized in Table 3.

The initial calibrations, calibration verifications, method blanks, LCS, MS/MSD, and applicable ICS results were within the control limits for EPA method 6010 (metals), EPA method 7060 (arsenic), EPA method 7470 (mercury in liquid), EPA method 7471 (mercury in solid), EPA method 7740 (selenium) and EPA method 7841 (thallium). Analyte identification and quantitation were acceptable. The holding times were acceptable except for samples RH008 and RH018. These samples were collected on 6/11/98 and their mercury analysis was performed on 8/25/98. The lapsed time from sample collection to sample analyses was about 75 days exceeding the holding time of 28 days.

Thus, the analytical results should be satisfactory for qualitative and quantitative uses except for samples RH008 and RH018. The reported mercury results of non-detect (ND) for samples RH008 and RH018 should be qualified as estimates because they were not analyzed within their holding time of 28 days.

If you have any questions, please contact me or James Cheng at (510)540-3003.

CC: Cindy Dingman  
Lorna Garcia  
James Cheng  
Thomas Li, Ph.D.

**Table 1: Analytical Results and Reporting Limits for Metals in Water Samples**

Analyte	Sample No				Reporting Limit (ug/L)
	RH-008 (ug/L)	RH-018 (ug/L)	RH-020 (ug/L)	RH-037 (ug/L)	
Aluminum (Al)	ND	ND	ND	ND	0.05
Antimony (Sb)	ND	ND	ND	ND	0.05
Arsenic (As)	ND	ND	ND	ND	0.005
Barium (Ba)	ND	ND	ND	ND	0.02
Beryllium (Be)	ND	ND	ND	ND	0.005
Boron (B)	ND	ND	ND	ND	0.05
Cadmium (Cd)	ND	ND	ND	ND	0.005
Chromium (Cr)	ND	ND	ND	ND	0.01
Cobalt (Co)	ND	ND	ND	ND	0.01
Copper (Cu)	ND	ND	ND	ND	0.01
Lead (Pb)	ND	ND	ND	ND	0.05
Mercury (Hg)	ND	ND	ND	ND	0.001
Molybdenum (Mo)	ND	ND	ND	ND	0.02
Nickel (Ni)	ND	ND	ND	ND	0.04
Selenium (Se)	ND	ND	ND	ND	0.005
Silver (Ag)	ND	ND	ND	ND	0.01
Thallium (Tl)	ND	ND	ND	ND	0.005
Vanadium (V)	ND	ND	ND	ND	0.01
Zinc (Zn)	ND	ND	ND	ND	0.02

ND = Non-Detect

**Table 2: Analytical Results and Reporting Limits for Metals in Soil Samples**

Analyte	Sample No														Reporting Limit (mg/Kg)	
	RH-002 (mg/Kg)	RH-003 (mg/Kg)	RH-004 (mg/Kg)	RH-005 (mg/Kg)	RH-006 (mg/Kg)	RH-007 (mg/Kg)	RH-021 (mg/Kg)	RH-025 (mg/Kg)	RH-026 (mg/Kg)	RH-030 (mg/Kg)	RH-031 (mg/Kg)	RH-032 (mg/Kg)	RH-033 (mg/Kg)	RH-036 (mg/Kg)		
Al	6800	1300	4000	3300	ND	18000	18000	4900	3300	5600	4900	3900	4000	13000	11000	11
Sb	ND	10														
As	ND	9	ND	ND	14	14	ND	ND	9	ND	ND	ND	ND	ND	ND	5
Ba	53	76	61	29	140	170	31	23	36	35	37	39	97	82	1	
Be	ND	ND	ND	ND	1	1	ND	ND	ND	ND	ND	ND	0.7	0.7	0.6	
B	ND	11														
Cd	ND	1														
Cr	9	15	6	7	30	28	9	7	9	11	6	5	17	16	2	
Co	4	5	3	3	12	11	3	ND	4	5	6	3	5	6	2	
Cu	10	8	3	5	26	28	5	5	6	5	4	6	8	9	2	
Pb	ND	8	ND	ND	27	22	ND	ND	7	ND	ND	ND	10	14	6	
Hg	ND	0.2														
Mo	ND	10														
Ni	ND	11	8	9	30	27	ND	7	7	9	ND	ND	14	12	6	
Se	ND	5														
Ag	ND	1														
Tl	ND	5														
V	17	26	13	14	52	52	17	15	19	19	15	14	28	30	2	
Zn	37	47	28	28	110	110	30	24	35	37	28	27	32	56	1	

ND = Non-Detect

**Table 2: Analytical Results and Reporting Limits for Metals in Soil Samples  
(Continued)**

Analyte	Sample No										Reporting Limit (mg/Kg)
	RH-011 (mg/Kg)	RH-012 (mg/Kg)	RH-013 (mg/Kg)	RH-014 (mg/Kg)	RH-015 (mg/Kg)	RH-016 (mg/Kg)	RH-041 (mg/Kg)	RH-046 (mg/Kg)	RH-047 (mg/Kg)	RH-048 (mg/Kg)	
Al	6900	4400	3400	4100	8500	4500	13000	18000	16000	16000	11
Sb	ND	10									
As	8	ND	ND	ND	ND	ND	ND	14	16	14	5
Ba	63	30	22	27	110	31	84	140	87	91	1
Be	ND	ND	ND	ND	ND	ND	1.1	1.1	1.0	1.1	0.6
B	ND	11									
Cd	ND	1									
Cr	15	7	6	7	13	8	22	20	25	26	2
Co	5	3	ND	3	4	4	8	12	10	11	2
Cu	10	5	3	4	5	4	17	28	30	28	2
Pb	9	ND	ND	ND	8	ND	25	29	23	26	6
Hg	ND	0.2									
Mo	ND	10									
Ni	17	ND	ND	ND	ND	ND	17	29	20	23	6
Se	ND	5									
Ag	ND	1									
Tl	ND	5									
V	30	13	12	13	20	15	43	54	45	46	2
Zn	40	30	23	26	39	29	78	110	97	110	1

ND = Non-Detect

**Table 3. Metals Data Review Summary**

QA/QC Criteria	ACCEPTABILITY					
	EPA Method 6010 (Metals)	EPA Method 7060 (Arsenic)	EPA Method 7470 (Mercury in liquid)	EPA Method 7471 (Mercury in solid)	EPA Method 7740 (Selenium)	EPA Method 7841 (Thallium)
Holding Times 28 days	Yes	Yes	Samples RH008 and RH018 holding time was exceeded	Yes	Yes	Yes
Initial Calibration	Yes	Yes	Yes	Yes	Yes	Yes
Calibration Verification R=90%-110%(except Hg) R=80%-120% (Hg)	Yes	Yes	Yes	Yes	Yes	Yes
Method Blanks	Yes	Yes	Yes	Yes	Yes	Yes
Laboratory Control Samples R=75%-125%	Yes	Yes	Yes	Yes	Yes	Yes
Matrix Spike/Matrix Spike Duplicate R=75%-125%(Liquid) R=60%-130% (Solid except Sb,Se) R=30%-120(Sb-Solid) R=50%-130(Se-Solid) RPD=<20%	Yes	Yes	Yes	Yes	Yes	Yes
Interference Check Standard R=80%-120%	Yes	NA	NA	NA	NA	NA
Identification	Yes	Yes	Yes	Yes	Yes	Yes
Quantitation	Yes	Yes	Yes, except for samples RH008 and RH018	Yes	Yes	Yes

R= Recovery  
RPD= Relative Percent Difference  
NA= Not Applicable