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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

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AR0174

REVISED DRAFT

HUMAN HEALTH RISK ASSESSMENT AND

REMEDIAL INVESTIGATION REPORT

CARSON RIVER MERCURY SITE

APPENDIX: DATA VALIDATION REPORTS

CRMS/HHRA draft 12/94

Printed on Recycled Paper

RAS Metals: Soil

3417-00205

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: July 7, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	19908 Memo #01
SDG NO.:	MYL432
LABORATORY:	American Analytical & Technical Services (AATS)
ANALYSIS:	RAS Total Metals and Cyanide
SAMPLE NO.:	20 Soil Samples (See Case Summary)
COLLECTION DATE:	April 27 through May 10, 1993
REVIEWER:	Dina D. David, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Ray Flores, TPO USEPA Region VI
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

ESAT-QA-9A-8637/19908M01.RPT

Data Validation Report

Case No.: 19908 Memo #01
Site: Carson River
Laboratory: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF
Date: July 7, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL432 through MYL451

COLLECTION DATE: April 27 through May 10, 1993
SAMPLE RECEIPT DATE: May 12, 1993
CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: MYL451
Duplicates: MYL451
ICP Serial Dilution: MYL451

ANALYSIS: RAS Total Metals and Cyanide

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	May 19, 1993	May 20, 1993
GFAA: Arsenic	May 19, 1993	May 20, 21 and 25, 1993
Lead	May 19, 1993	May 19 through 21, 1993
Selenium	May 19, 1993	May 20 through 25, 1993
Thallium	May 19, 1993	May 19 through 21, 1993
Mercury	May 24, 1993	May 25, 1993
Cyanide	May 14, 1993	May 17, 1993
Percent Solids	Not Applicable	May 19, 1993

TPO ACTION:

Antimony results in all of the samples except sample MYL448 are rejected due to the less than 30% matrix spike recovery obtained in QC sample MYL451.

METHOD NON-COMPLIANCE:

TPO ACTION: A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. However, the

laboratory did use a standard at the CRDL in the calibration of the instrument.

SAMPLING ISSUES:

TPO ATTENTION: The measured temperature of all of the samples upon laboratory receipt was at 37°C, instead of 4°C as specified for soil samples. Note that the samples (MYL432 through MYL434) collected on April 27, 1993 were not received by the laboratory until May 12, 1993, causing the technical holding time for cyanide to be exceeded. Samples MYL435 through MYL437 were collected on April 28, 1993 and were received on May 12, 1993, the day when the technical holding time for cyanide expired.

ADDITIONAL COMMENTS:

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	G
2. Sample Holding Times	No	D
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	No	E
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	No	F
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	C
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in all of the samples except sample MYL448

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample number MYL451 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYL451 % Recovery	MYL451 % Bias
Antimony	25.0	-75.0

The results reported for antimony in all of the samples except sample MYL448 were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 109% was obtained for antimony in QC sample number MYL451. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (25.0%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in sample MYL448
- Silver in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and silver in QC sample number MYL451 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL451 % Recovery	MYL451 % Bias
Antimony	25.0	-75.0
Silver	67.7	-32.3

Results above the MDL are considered quantitatively uncertain. The results reported for antimony and silver in the samples listed above may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 109% was obtained for antimony in QC sample number MYL451. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (25.0%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the MDL but below the CRDL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- Cyanide in samples MYL432 through MYL440

Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria are applied at the reviewer's discretion to these soil analyses. These soil analyses exceeded the SW-846 14-day technical holding time for cyanide as shown below.

Sample Number	Date Collected	Date Received	Date Analyzed	# of days Exceeded
MYL432	4/27/93	5/12/93	5/17/93	6
MYL433	4/27/93	5/12/93	5/17/93	6
MYL434	4/27/93	5/12/93	5/17/93	6
MYL435	4/28/93	5/12/93	5/17/93	5
MYL436	4/28/93	5/12/93	5/17/93	5
MYL437	4/28/93	5/12/93	5/17/93	5
MYL438	4/30/93	5/12/93	5/17/93	3

Sample Number	Date Collected	Date Received	Date Analyzed	# of days Exceeded
MYL439	4/30/93	5/12/93	5/17/93	3
MYL440	4/30/93	5/12/93	5/17/93	3

In addition, these samples are considered estimated as the measured temperature of all of the samples upon laboratory receipt was at 37°C, instead of 4°C as specified for soil samples. Sample results may be biased low and false negatives may exist.

The SW-846 technical holding times were not exceeded for the other analytes in any of the samples. Note that the laboratory contract holding times were not exceeded for these samples or any of the analytes in any of the samples.

E. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Mercury in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2x CRDL criteria for precision as listed below.

Analyte	MYL451 Lab. Dup. RPD
Mercury	47.7

The results reported for mercury in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

F. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Lead in samples MYL436, MYL438, MYL441, MYL444, and MYL450
- Selenium in samples MYL432, MYL434, MYL438, MYL441 through MYL445, and MYL447
- Thallium in sample MYL436

Lead, selenium and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for lead, selenium and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each

analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Lead	MYL436	118.3	+18.3
	MYL438	119.8	+19.8
	MYL441	122.4	+22.4
	MYL444	125.2	+25.2
	MYL450	118.4	+18.4
Selenium	MYL432	71.4	-28.6
	MYL434	83.8	-16.2
	MYL438	81.4	-18.6
	MYL441	77.2	-22.8
	MYL442	76.6	-23.4
	MYL443	81.7	-18.3
	MYL444	63.0	-37.0
	MYL445	73.5	-26.5
	MYL447	71.6	-28.4
Thallium	MYL436	84.2	-15.8

The post-digestion spike recovery results for lead, selenium and thallium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The results reported for lead in the samples listed above may be biased high. The results reported for selenium and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

G. A CRDL standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the MDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #01
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 7, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS001-SD-14-A			MS001-SD-21-A			MS001-SD-26-A			MS001-SD-40-A			MS001-SD-50-A			MS001-SD-58-A			MS002-SD-10-A		
Sample I.D.	MYL432			MYL433			MYL434			MYL435			MYL436			MYL437			MYL438		
Date of Collection	04/27/93			04/27/93			04/27/93			04/28/93			04/28/93			04/28/93			04/30/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	16600			8770			12100			6560			7930			14400			13100		
Antimony	6.9 U	R	A	7.0 U	R	A	6.9 U	R	A	6.6 U	R	A	6.6 U	R	A	6.6 U	R	A	6.4 U	R	A
Arsenic	11.8			11.6			12.6			10.8			12.3			13.5			10.7		
Barium	158			95.9			99.4			58.1			65.9			115			107		
Beryllium	0.44 L	J	C	0.39 L	J	C	0.42 L	J	C	0.24 L	J	C	0.26 L	J	C	0.42 L	J	C	0.38 L	J	C
Cadmium	0.45 U			2.8			0.44 U			3.0			1.8			1.3			0.87 L	J	C
Calcium	6840			13000			6830			5960			3450			10400			5200		
Chromium	12.3			8.8			8.6			5.7			7.4			12.9			11.8		
Cobalt	12.4			8.6 L	J	C	10.9 L	J	C	6.1 L	J	C	7.6 L	J	C	11.1			10.1 L	J	C
Copper	33.9			131			25.6			125			81.1			70.5			38.9		
Iron	23300			16300			20500			13800			16600			24700			22800		
Lead	19.4			146			10.8			216			80.4	J	F	132			41.0	J	F
Magnesium	8960			5190			7870			3710			4200			7950			7100		
Manganese	636			561			562			459			398			722			604		
Mercury	3.0	J	E	840	J	E	0.67	J	E	1510	J	E	10.2	J	E	43.2	J	E	19.9	J	E
Nickel	10.4			8.2 L	J	C	9.3			5.4 L	J	C	5.5 L	J	C	10.3			8.2 L	J	C
Potassium	1480			2570			2590			1350			1390			3620			2450		
Selenium	0.45 U	J	F	1.4			0.44 U	J	F	0.94 L	J	C	0.56 L	J	C	0.43 U			0.41 U	J	F
Silver	3.0	J	B	38.7	J	B	2.0 L	J	BC	34.1	J	B	24.8	J	B	16.8	J	B	12.9	J	B
Sodium	461 L	J	C	374 L	J	C	216 L	J	C	188 L	J	C	197 L	J	C	216 L	J	C	114 U		
Thallium	0.45 U			0.45 U			0.44 U			0.43 U			0.43 U	J	F	0.43 U			0.41 U		
Vanadium	49.6			34.8			39.7			24.9			32.6			50.8			46.0		
Zinc	62.2			288			54.9			274			164			172			84.2		
Cyanide	0.56 U	J	D	0.56 U	J	D	0.55 U	J	D	0.54 U	J	D	0.53 U	J	D	0.53 U	J	D	0.51 U	J	D
Percent Solids	89.3 %			88.7 %			90.5 %			93.4 %			94.0 %			94.0 %			97.1 %		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrumen ction Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #01
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 7, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS002-SD-15-A			MS002-SD-24-A			MS003-SD-61-A			MS003-SD-11-A			MS003-SD-21-A			MS003-SD-32-A			MS003-SD-54-A		
Sample I.D.	MYL439			MYL440			MYL441			MYL442			MYL443			MYL444			MYL445		
Date of Collection	04/30/93			04/30/93			05/04/93			05/04/93			05/04/93			05/04/93			05/04/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	9710			14300			19500			11700			8460			26300			16300		
Antimony	6.4 U	R	A	6.5 U	R	A	7.0 U	R	A	6.7 U	R	A	6.4 U	R	A	6.9 U	R	A	6.6 U	R	A
Arsenic	10.9			16.5			22.5			6.4			2.8			15.2			5.7		
Barium	148			114			157			104			93.2			198			197		
Beryllium	0.34 L	J	C	0.44 L	J	C	0.54 L	J	C	0.39 L	J	C	0.28 L	J	C	0.68 L	J	C	0.53 L	J	C
Cadmium	2.1			1.3			0.81 L	J	C	0.43 U			0.41 U			0.45 U			0.47 L	J	C
Calcium	28100			5840			9270			5370			2250			8870			5900		
Chromium	8.3			10.9			12.9			11.1			8.9			14.7			12.9		
Cobalt	7.7 L	J	C	11.0			11.2 L	J	C	7.9 L	J	C	6.0 L	J	C	11.9			9.6 L	J	C
Copper	414			75.9			48.0			14.5			11.4			44.5			26.4		
Iron	17200			26000			26000			16700			11800			28100			18600		
Lead	566			201			65.0	J	F	6.4			5.2			37.6	J	F	16.5		
Magnesium	5390			8290			7350			4810			2300			8360			4860		
Manganese	691			820			829			421			363			724			552		
Mercury	6.8	J	E	2.3	J	E	16.4	J	E	0.11 U	J	EG	0.44	J	E	7.1	J	E	4.1	J	E
Nickel	6.8 L	J	C	9.1			9.7			9.2			6.6 L	J	C	10.8			9.9		
Potassium	3260			3280			4680			2300			1990			3000			3430		
Selenium	1.4			2.4			0.45 U	J	F	0.43 U	J	F	0.41 U	J	F	0.45 U	J	F	0.43 U	J	F
Silver	76.7	J	B	134	J	B	13.2	J	B	0.87 U	J	B	0.82 U	J	B	7.3	J	B	1.7 L	J	BC
Sodium	174 L	J	C	116 U			161 L	J	C	489 L	J	C	114 U			188 L	J	C	128 L	J	C
Thallium	0.41 U			0.42 U			0.45 U			0.43 U			0.41 U			0.45 U			0.43 U		
Vanadium	34.8			50.6			49.5			42.4			29.1			56.9			44.2		
Zinc	372			228			126			47.3			34.3			102			73.6		
Cyanide	0.52 U	J	D	0.52 U	J	D	0.56 U			0.54 U			0.51 U			0.56 U			0.53 U		
Percent Solids	97.0 %			95.7 %			89.1 %			92.1 %			97.4 %			89.6 %			93.7 %		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
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ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #01
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 7, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS003-SD-70-A			MS002-SD-35-A			DD001-SD-04-A			MS004-SD-13-A			WL001-SD-01-A			WL-006-SD-01-A			LAB BLANK		
Sample I.D.	MYL446			MYL447			MYL448			MYL449			MYL450			MYL451					
Date of Collection	05/04/93			05/05/93			05/07/93			05/07/93			05/10/93			05/10/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	16300			11300			8980			7760			836			4380			8.0 U		
Antimony	6.9 U	R	A	6.5 U	R	A	8.0 L	J	BC	6.8 U	R	A	7.7 U	R	A	6.2 U	R	A	6.2 U		
Arsenic	16.9			65.7			65.4			32.0			1.4 L	J	C	1.7 L	J	C	0.60 U		
Barium	158			148			70.3			71.4			17.2 L	J	C	54.4			0.80 U		
Beryllium	0.48 L	J	C	0.41 L	J	C	0.51 L	J	C	0.34 L	J	C	0.25 U			0.20 U			0.20 U		
Cadmium	0.45 U			1.7			0.80 L	J	C	2.0			0.50 U			0.40 U			0.40 U		
Calcium	8320			12700			18800			12200			686 L	J	C	2300			40.4 U		
Chromium	12.1			13.4			10.3			7.7			1.0 U			3.0			0.80 U		
Cobalt	9.9 L	J	C	21.5			6.7 L	J	C	6.9 L	J	C	1.0 U			3.0 L	J	C	0.80 U		
Copper	40.3			70.7			41.4			466			1.3 L	J	C	24.5			1.0 U		
Iron	22700			26500			18700			15600			1950			6710			1.1 L	J	C
Lead	33.4			116			172			238			1.6	J	F	54.2			0.40 U		
Magnesium	6680			6500			6550			5940			325 L	J	C	1600			40.6 U		
Manganese	673			875			1430			842			40.8			258			0.20 U		
Mercury	3.5	J	E	32.5	J	E	3.6	J	E	85.0	J	E	0.22	J	EG	7.5	J	E	0.10 U		
Nickel	9.1			9.2			8.6			6.6 L	J	C	1.5 U			2.6 L	J	C	1.2 U		
Potassium	2430			2910			2450			2470			151 L	J	C	1440			66.0 U		
Selenium	0.45 U			0.49 L	J	CF	0.41 U			0.83 L	J	C	0.50 U			0.40 U			0.40 U		
Silver	8.0	J	B	22.5	J	B	21.8	J	B	22.0	J	B	1.0 U	J	B	11.2	J	B	0.80 U		
Sodium	124 U			167 L	J	C	115 U			121 U			138 U			311 L	J	C	111 U		
Thallium	0.45 U			0.42 U			0.41 U			0.44 U			0.50 U			0.40 U			0.40 U		
Vanadium	50.0			56.4			29.1			27.6			3.1 L	J	C	14.7			0.80 U		
Zinc	107			178			243			194			3.2 L	J	C	45.1			0.40 U		
Cyanide	0.56 U			0.53 U			7.0			1.1			0.62 U			0.50 U			0.50 U		
Percent Solids	89.7 %			95.2 %			96.4 %			91.2 %			80.4 %			99.5 %			—		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comment Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrume ction Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #01
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 7, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	8.0			40.0																	
Antimony	6.2			12.0																	
Arsenic	0.60			2.0																	
Barium	0.80			40.0																	
Beryllium	0.20			1.0																	
Cadmium	0.60			1.0																	
Calcium	40.4			1000																	
Chromium	0.80			2.0																	
Cobalt	0.80			10.0																	
Copper	1.0			5.0																	
Iron	0.80			20.0																	
Lead	0.40			0.60																	
Magnesium	40.6			1000																	
Manganese	0.20			3.0																	
Mercury	0.10			0.10																	
Nickel	1.2			8.0																	
Potassium	66.0			1000																	
Selenium	0.40			1.0																	
Silver	0.80			2.0																	
Sodium	111			1000																	
Thallium	0.40			2.0																	
Vanadium	0.80			10.0																	
Zinc	0.40			4.0																	
Cyanide	0.50			0.50																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19908 Memo #01 LABORATORY AATS

SDG NO. MYL432 SITE NAME Carson River

SOW NO. ILM02.0 REVIEW COMPLETION DATE July 7, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES ____ WATER 20 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES	O	O	O	M
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	O	O	M	O
7. MATRIX SPIKE ANALYSIS	M/Z	O	O	O
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M/Z	M	M	M

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19908 Memo #01 LABORATORY AATS

SDG NO. MYL432 SITE NAME Carson River

SOW NO. ILM02.0 REVIEW COMPLETION DATE July 7, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: Antimony results in all of the samples except sample MYL448 are rejected due to the less than 30% matrix spike recovery obtained in QC sample MYL451. A CRDL standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

TPO ATTENTION: The measured temperature of all of the samples upon laboratory receipt was at 37°C, instead of 4°C as specified for soil samples. Note that the samples (MYL432 through MYL434) collected on April 27, 1993 were not received by the laboratory until May 12, 1993, causing the technical holding time for cyanide to be exceeded. Samples MYL435 through MYL437 were collected on April 28, 1993 and were received on May 12, 1993, the day when the technical holding time for cyanide expired.

In Reference to Case No(s).:

19908 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: July 1, 1993

Laboratory Name: AATS

Lab Contact: Steve Markham(918)251-2858

Region: IX

Regional Contact: Dina D. David, ESAT/ICF Technology

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
All samples in SDG No. MYL432.

Summary of Questions/Issues Discussed:

1. The year on the sample preparation date was 1990 instead of 1993.

2. Raw data for mercury in samples MYL433 and MYL435 indicate that the dilution factor was 200, however, the run log form shows a dilution factor of 1000. Which is the approriate dilution factor?

Summary of Resolution:

1. The laboratory corrected and resubmitted Form 13 page 67 through fax.

2. The laboratory contact said that the appropriate dilution factor should be 1000. The laboratory corrected and resubmitted raw data for mercury in the samples mentioned above.

Dina David
Signature

July 1, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: July 19, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	19908 Memo #02
SDG NO.:	MYL452
LABORATORY:	American Analytical & Technical Services (AATS)
ANALYSIS:	RAS Metals and Cyanide
SAMPLE NO.:	19 Soil Samples (See Case Summary)
COLLECTION DATE:	May 10 through 27, 1993
REVIEWER:	Dina D. David, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Ray Flores, TPO USEPA Region VI
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 19908 Memo #02
Site: Carson River
Laboratory: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF
Date: July 19, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL452 through MYL463 and MYL507 through MYL513

COLLECTION DATE: May 10 through 27, 1993
SAMPLE RECEIPT DATE: May 22 and 28, 1993

CONCENTRATION & MATRIX: 19 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: MYL452 (Cyanide) and MYL457 (Metals)
Duplicates: MYL452 (Cyanide) and MYL457 (Metals)
ICP Serial Dilution: MYL457

ANALYSIS: RAS Metals and Cyanide

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		June 6, 1993	June 7, 1993
GFAA:	Arsenic	June 6, 1993	June 8 through 13, 1993
	Lead	June 6, 1993	June 7 through 10, 1993
	Selenium	June 6, 1993	June 7 through 13, 1993
	Thallium	June 6, 1993	June 7 and 8, 1993
Mercury		June 7, 1993	June 8, 1993
Cyanide		May 27, and June 7, 1993	May 28, and June 8, 1993
Percent Solids		Not Applicable	June 6, 1993

TPO ACTION:

The results reported for antimony in samples MYL452 through MYL456, MYL461, MYL463, and MYL509 through MYL513 were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered in QC sample MYL457.

TPO ATTENTION:

According to the Inorganic Statement of Work, the laboratory is required to perform at least one laboratory QC sample for each SDG. The chain of custody specified two laboratory QC samples (MYL457 and MYL509) for metals and cyanide. Instead, the laboratory performed the QC analyses on sample MYL457 for metals and a non-designated sample MYL452 for cyanide. Due to oversight, the laboratory analyzed sample MYL452 for cyanide instead of QC samples MYL457 and MYL509.

METHOD NON-COMPLIANCE:

TPO ACTION: A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. The effect on the quality of the data is not known. However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

ADDITIONAL COMMENTS:

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	G
2. Sample Holding Times	No	F
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	No	D
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	No	E
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	

II. Validation Summary (Continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
12. Sample Quantitation	Yes	C
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in samples MYL452 through MYL456, MYL461, MYL463, and MYL509 through MYL513

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample number MYL457 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYL457 % Recovery	MYL457 % Bias
Antimony	10.7	-89.3

The results reported for antimony in the samples listed above were below the MDL and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 119% was obtained for antimony in QC sample number MYL457. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (10.7%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in samples MYL457 through MYL460, MYL462, MYL507, and MYL508
- Selenium in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and selenium in QC sample number MYL457 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL457 % Recovery	MYL457 % Bias
Antimony	10.7	-89.3
Selenium	35.6	-64.4

Results above the MDL are considered quantitatively uncertain. The results reported for antimony and selenium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 119% was obtained for antimony in QC sample number MYL457. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (10.7%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the MDL but below the CRDL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Mercury in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2x CRDL criteria for precision as listed below.

Analyte	MYL457 Lab. Dup. RPD
Mercury	57.8

The results reported for mercury in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

E. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic in sample MYL463
- Lead in samples MYL455 and MYL456
- Selenium in samples MYL452, MYL455 through MYL463, MYL507, MYL510 and MYL511
- Thallium in sample MYL462

Arsenic, lead, selenium, and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for arsenic, lead, selenium, and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Arsenic	MYL463	74.0	-26.0
Lead	MYL455	81.0	-19.0
	MYL456	83.0	-17.0
Selenium	MYL452	55.6	-44.4
	MYL455	64.8	-35.2
	MYL456	73.7	-26.3
	MYL457	49.0	-51.0
	MYL457 (Dup.)	46.6	-53.4
	MYL458	48.5	-51.5
	MYL459	45.7	-54.3
	MYL460	51.1	-48.9
	MYL461	44.7	-55.3
	MYL462	48.7	-51.3
	MYL463	83.7	-16.3

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYL507	48.9	-51.1
	MYL510	75.1	-24.9
	MYL511	80.2	-19.8
Thallium	MYL462	119.6	+19.6

The post-digestion spike recovery results for arsenic, lead, selenium, and thallium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The result reported for thallium in sample MYL462 may be biased high. The results reported for arsenic, lead and selenium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

In addition, the Laboratory Control Sample (LCS) post-digestion spike recovery results for lead (122%) and thallium (118%) did not meet the 85-115% criteria for accuracy.

F. Due to limited information concerning holding time criteria for soil samples, the 40 CFR 136 (Clean Water Act) technical holding time criteria are applied at the reviewer's discretion to these soil analyses. These soil analyses exceeded the 40 CFR 136 14-day technical holding time for cyanide as shown below. Since the technical holding time for cyanide in the soil samples were only exceeded by 2 to 4 days, and the samples were kept refrigerated, the quality of the data is not expected to be significantly affected.

Sample Number	Date Collected	Date Received	Date Analyzed	# of days Exceeded
MYL457	5/12/93	5/22/93	5/28/93	2
MYL460	5/12/93	5/22/93	5/28/93	2
MYL461	5/12/93	5/22/93	5/28/93	2
MYL462	5/12/93	5/22/93	5/28/93	2
MYL463	5/10/93	5/22/93	5/28/93	4
MYL510	5/21/93	5/28/93	6/07/93	3

Note that the 12-day contractual holding time upon sample receipt for cyanide was not exceeded by the laboratory.

The SW-846 technical holding times were not exceeded for the other analytes in any of the samples.

G. A CRDL standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the MDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The effect on the quality of the data is not known. However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #02
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 19, 1993

Analysis Type: Low Concentration Soil Samples for RAS Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS005-SD-59-A			DD001-SD-09-A			MS001-SD-65-B			MS006-SD-01-A			MS001-SD-64-A			MS005-SD-17-A			MS005-SD-39-A		
Sample I.D.	MYL452			MYL453			MYL454			MYL455			MYL456			MYL457			MYL458		
Date of Collection	05/20/93			05/14/93			05/18/93			05/14/93			05/18/93			05/12/93			05/13/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	17200			8420			9360			25100			9340			23800			17300		
Antimony	6.5 U	R	A	5.0 U	R	A	4.9 U	R	A	5.0 U	R	A	4.8 U	R	A	6.6 L	J	BC	7.6 L	J	BC
Arsenic	30.0			35.1			14.7			17.5			8.9			4.9			55.4		
Barium	169			81.9			161			214			155			397			140		
Beryllium	0.54 L	J	C	0.35 L	J	C	0.30 L	J	C	0.65 L	J	C	0.42 L	J	C	0.84 L	J	C	0.74 L	J	C
Cadmium	2.1			0.80 L	J	C	4.0			0.66 U			1.1			0.65 U			1.5		
Calcium	19600			4030			6580			8080			6580			9900			16700		
Chromium	17.4			11.4			7.2			13.1			10.0			8.9			19.0		
Cobalt	12.6 L	J	C	16.8			7.2 L	J	C	14.3			8.8 L	J	C	16.8			12.2 L	J	C
Copper	61.8			105			133			41.0			29.1			47.4			58.3		
Iron	24500			26600			14700			29500			13500			27800			27200		
Lead	116			154			122			31.0	J	E	26.0	J	E	40.6			319		
Magnesium	9050			5350			4130			9570			4140			6150			9790		
Manganese	1100			1450			463			770			398			1920			1660		
Mercury	33.6	J	D	1.8	J	D	220	J	D	3.5	J	D	2.2	J	D	3.5	J	D	10.4	J	D
Nickel	11.7			9.8			6.7 L	J	C	11.9			10.2			8.7			13.0		
Potassium	3710			1090			1300			2210			2860			4310			3360		
Selenium	0.85 U	J	BE	1.2	J	B	0.77 L	J	BC	0.66 U	J	BE	0.63 U	J	BE	0.65 U	J	BE	0.75 U	J	BE
Silver	19.4			30.4			23.4			4.9			3.0			4.9			15.3		
Sodium	3090			674 L	J	C	264 L	J	C	47.6 U			45.7 U			272 L	J	C	54.8 U		
Thallium	0.85 U			0.65 U			0.64 U			0.66 U			0.63 U			0.65 U			0.75 U		
Vanadium	53.6			27.4			29.7			55.3			34.1			63.0			51.5		
Zinc	194			171			303			78.0			80.4			94.1			287		
Cyanide	0.71 U			1.3			0.53 U			0.55 U			0.52 U			0.54 U		F	1.2		
Percent Solids	70.6 %			92.8 %			94.2 %			91.6 %			95.5 %			92.6 %			79.6 %		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument tion Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #02
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 19, 1993

Analysis Type: Low Concentration Soil Samples for RAS Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS006-ST-01-A			MS005-ST-17-A			MS005-SD-31-A			MS005-SD-27-A			WL005-SD-01-A			MS010-SD-31-A			MS012-SD-38-A		
Sample I.D.	MYL459			MYL460			MYL461			MYL462			MYL463			MYL507			MYL508		
Date of Collection	05/14/93			05/12/93			05/12/93			05/12/93			05/10/93			05/25/93			05/26/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	24600			25600			40000			19600			2080			25400			2280		
Antimony	6.3 L	J	BC	6.7 L	J	BC	5.3 U	R	A	21.3	J	B	4.7 U	R	A	6.1 L	J	BC	11.7 L	J	BC
Arsenic	17.4			6.0			19.9			20.6			1.4 L	J	CE	9.1			14.0		
Barium	206			367			313			2080			60.6			183			19.5 L	J	C
Beryllium	0.65 L	J	C	0.80 L	J	C	1.1 L	J	C	1.3			0.21 U			0.84 L	J	C	0.21 U		
Cadmium	0.68 L	J	C	0.64 U			0.74 L	J	C	1.6			0.62 U			2.6			8.6		
Calcium	7760			10000			12100			11800			10900			16800			1330		
Chromium	12.6			10.1			17.7			4.2			1.0 U			21.2			5.1		
Cobalt	13.9			16.9			17.1			25.9			1.8 L	J	C	15.2			1.2 U		
Copper	40.0			49.1			64.6			76.3			3.4 L	J	C	48.9			220		
Iron	28500			29800			40000			37800			4530			29900			13600		
Lead	29.3			59.4			44.4			15.6			2.0			45.8			887		
Magnesium	9260			6240			13300			7120			2270			9720			2060		
Manganese	742			1740			948			14000			80.5			397			154		
Mercury	3.3	J	D	3.2	J	D	6.2	J	D	0.57	J	D	0.10 U	J	DG	20.1	J	D	304	J	D
Nickel	12.7			8.3 L	J	C	16.7			6.0 L	J	C	3.2 L	J	C	17.2			2.7 L	J	C
Potassium	2190			4240			3820			4140			931 L	J	C	3590			375 L	J	C
Selenium	0.66 U	J	BE	0.64 U	J	BE	0.69 U	J	BE	0.70 U	J	BE	0.62 U	J	BE	0.79 U	J	BE	4.6	J	B
Silver	6.5			6.3			11.0			4.2			1.4 U			6.6			62.0		
Sodium	47.7 U			246 L	J	C	49.9 U			50.9 U			44.9 U			197 L	J	C	45.1 U		
Thallium	0.66 U			0.64 U			0.69 U			0.86 L	J	CE	0.62 U			0.79 U			0.62 U		
Vanadium	53.7			69.5			62.7			109			9.5 L	J	C	71.3			10.3 L	J	C
Zinc	75.6			114			114			106			9.3			213			727		
Cyanide	0.55 U			0.54 U		F	0.57 U		F	0.58 U		F	0.51 U		F	0.66 U			0.52 U		
Percent Solids	91.5 %			93.3 %			87.3 %			85.6 %			97.2 %			76.0 %			96.7		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #02
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 19, 1993

Analysis Type: Low Concentration Soil Samples for RAS Metals and Cyanide

Concentration in mg/Kg

Sample Location	MS012-SD-22-A			MS007-SD-18-B			MS011-SD-39-A			MS008-SD-06-A			MS009-SD-27-A			LAB BLANK			MDL		
Sample I.D.	MYL509			MYL510			MYL511			MYL512			MYL513								
Date of Collection	05/26/93			05/21/93			05/25/93			05/24/93			05/27/93								
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10100			7880			12300			7020			5310			8.8 U			8.8		
Antimony	5.8 U	R	A	5.6 U	R	A	4.7 U	R	A	5.3 U	R	A	4.6 U	R	A	4.6 U			4.6		
Arsenic	14.5			10.6			9.6			7.5			3.1			0.60 U			0.60		
Barium	108			78.1			103			59.3			52.9			1.4 U			1.4		
Beryllium	0.32 L	J	C	0.25 L	J	C	0.33 L	J	C	0.24 L	J	C	0.22 L	J	C	0.20 U			0.20		
Cadmium	2.9			0.95 L	J	C	1.3			0.87 L	J	C	0.61 U			0.60 U			0.60		
Calcium	5170			4520			6990			4010			2520			33.8 U			33.8		
Chromium	11.5			10.7			6.2			9.4			6.3			1.0 U			1.0		
Cobalt	9.0 L	J	C	7.3 L	J	C	10.0 L	J	C	7.1 L	J	C	5.5 L	J	C	1.2 U			1.2		
Copper	141			21.4			57.6			31.0			7.8			1.2 U			1.2		
Iron	18200			15700			17300			15400			9560			1.3 L	J	C	1.2		
Lead	207			27.7			43.1			31.5			3.1			0.20 U			0.20		
Magnesium	5070			3650			7420			3350			2070			34.2 U			34.2		
Manganese	449			350			424			227			217			0.20 U			0.20		
Mercury	252	J	D	4.5	J	D	6.8	J	D	3.7	J	D	0.25	J	DG	0.10 U			0.10		
Nickel	11.3			7.7 L	J	C	6.3 L	J	C	7.0 L	J	C	6.0 L	J	C	1.4 U			1.4		
Potassium	1580			916 L	J	C	4300			1450			1270			49.6 U			49.6		
Selenium	2.2	J	B	0.73 U	J	BE	0.62 U	J	BE	0.69 U	J	B	0.61 U	J	B	0.60 U			0.60		
Silver	20.5			7.3			8.7			14.5			1.4 U			1.4 U			1.4		
Sodium	55.1 U			52.9 U			45.0 U			49.8 U			44.0 U			43.6 U			43.6		
Thallium	0.76 U			0.73 U			0.62 U			0.69 U			0.61 U			0.60 U			0.60		
Vanadium	34.9			41.6			49.4			42.5			24.5			1.0 U			1.0		
Zinc	273			60.9			54.5			66.3			26.2			0.50 L	J	C	0.40		
Cyanide	0.63 U			0.61 U		F	0.52 U			0.57 U			0.50 U			0.50 U			0.50		
Percent Solids	79.1 %			82.4 %			96.9 %			87.5 %			99.1 %			—			—		

Val-Validity Refer to Data Qualifiers in Table 1B.
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument tion Limit for Waters, MDL-Method Detection Limit for Soils

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 19908 Memo #02
Site: Carson River
Lab.: American Analytical & Technical Services (AATS)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: July 19, 1993

Analysis Type: Low Concentration Soil Samples for RAS Metals and Cyanide

Concentration in mg/Kg

Sample I.D.	CRDL																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	40.0																				
Antimony	12.0																				
Arsenic	2.0																				
Barium	40.0																				
Beryllium	1.0																				
Cadmium	1.0																				
Calcium	1000																				
Chromium	2.0																				
Cobalt	10.0																				
Copper	5.0																				
Iron	20.0																				
Lead	0.60																				
Magnesium	1000																				
Manganese	3.0																				
Mercury	0.10																				
Nickel	8.0																				
Potassium	1000																				
Selenium	1.0																				
Silver	2.0																				
Sodium	1000																				
Thallium	2.0																				
Vanadium	10.0																				
Zinc	4.0																				
Cyanide	0.50																				

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19908 Memo #02 LABORATORY AATS

SDG NO. MYL452 SITE NAME Carson River

SOW NO. ILM02.0 REVIEW COMPLETION DATE July 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 19 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES	O	O	O	O
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	O	O	M	O
7. MATRIX SPIKE ANALYSIS	X	M	O	O
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	X	M	M	O

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 19908 Memo #02 LABORATORY AATS

SDG NO. MYL452 SITE NAME Carson River

SOW NO. ILM02.0 REVIEW COMPLETION DATE July 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 19 SOIL _____ OTHER

TPO ACTION: The results reported for antimony in samples MYL452 through MYL456, MYL461, MYL463, and MYL509 through MYL513 were below the MDL and are considered unacceptable as less than 30% of the matrix spike was recovered. A CRDL standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. The effect on the quality of the data is not known. However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

TPO ATTENTION: According to the Inorganic Statement of Work, the laboratory is required to perform at least one laboratory QC sample for each SDG. The chain of custody specified two laboratory QC samples (MYL457 and MYL509) for metals and cyanide. Instead, the laboratory performed the QC analyses on sample MYL452 for cyanide and sample MYL457 for metals. Due to oversight, the laboratory analyzed sample MYL452 for cyanide instead of QC samples MYL457 and MYL509.

AREAS OF CONCERN: Recovery result of 56.0% was obtained in the analysis of the CRDL standard for selenium.

In Reference to Case No(s).:

19908 Memo #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: July 7, 1993

Laboratory Name: AATS

Lab Contact: Steve Markham (918)251-2858

Region: IX

Regional Contact: Dina D. David, ESAT/ICF Technology

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
Samples MYL452, MYL454, MYL457, MYL462 and MYL509 in SDG No. MYL452.

Summary of Questions/Issues Discussed:

1. Analytical results were not reported on Form Is for manganese in sample MYL462 and for thallium in sample MYL454.
2. Cyanide results in samples MYL454 and MYL509 and thallium result in sample MYL509 were incorrectly calculated and reported on Form Is.
3. Sample IDs for samples MYL454 (MYL44 on raw data page 150) and MYL461 (MYL451 on raw data page 156) were incorrectly identified on the raw data.
4. The chain of custody specified two laboratory QC samples (MYL457 and MYL509) for metals and cyanide. Why did the laboratory used only one of the QC samples (MYL457) for metals and used a non-designated sample (MYL452) for cyanide?

Summary of Resolution:

1. Corrected and resubmitted Form Is for samples MYL454 and MYL462.
2. Corrected and resubmitted Form Is for samples MYL454 and MYL509.
3. Corrected and resubmitted raw data for samples MYL454 and MYL461.
4. The laboratory is only required to analyze one QC sample per SDG, thus, the laboratory only analyzed QC sample MYL457 for metals. Due to oversight, the laboratory mistakenly analyzed QC sample MYL452 for cyanide instead of QC samples MYL457 and MYL509.

In addition, the laboratory submitted Form 8 page 55, Form 14 pages 84 and 97, and raw GFAA data for samples MYL459 and MYL463.

Heredina David — July 19, 1993

Signature — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 1, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20097 Memo #02
SDG NO.:	MYL513
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals and Cyanide
SAMPLE NO.:	20 Soil Samples (See Case Summary)
COLLECTION DATE:	May 28 through June 23, 1993
REVIEWER:	Karen Pettit, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Steve Remaley, TPO USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 20097 Memo #02
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF
Date: September 1, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL513 through MYL523, MYL525 through MYL531, MYL534 and MYL535

COLLECTION DATE: May 28 through June 23, 1993
SAMPLE RECEIPT DATE: June 4 through 25, 1993

CONCENTRATION & MATRIX: Low Concentration Soil

FIELD QC:
Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYL513 and MYL514
(D2): MYL521 and MYL522

LABORATORY QC:
Matrix Spike: MYL515, MYL523, MYL526, and MYL535
Duplicates: MYL515, MYL523, MYL526, and MYL535
ICP Serial Dilution: MYL515, MYL523, MYL526, and MYL535

ANALYSIS: RAS Total Metals and Cyanide

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	July 15, 1993	July 22, and August 3, 1993
GFAA: Arsenic	July 15, 1993	July 31 through August 2, 1993
Selenium	July 15, 1993	July 29 through 31, 1993
Thallium	July 15, 1993	July 30 and 31, 1993
Mercury	July 15, 1993	July 15 through 19, 1993
Cyanide	July 6, 1993	July 6, 1993
Percent Solids	Not Applicable	July 15, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: According to the Inorganic Statement of Work, ILM02.1, the contractual holding times for mercury and cyanide are 26 days and 12 days, respectively, upon sample receipt by the laboratory.

The laboratory did not prepare and analyze eighteen samples for mercury and cyanide in this SDG within the contractual holding times. Consequently, the results reported for mercury and cyanide in the eighteen samples have been estimated as the SW-846 technical holding times for mercury and cyanide were exceeded by 3 to 24 days. Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria are applied at the reviewer's discretion to the above soil analyses.

SAMPLING ISSUES: None.

OTHER: The results reported for selenium in ten of the samples were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered in QC samples MYL515, MYL526 and MYL535.

TPO ATTENTION:

METHOD NON-COMPLIANCE: It was noted that silver was reported at a concentration greater than the CRDL in the initial calibration blank for the ICP run performed on July 22, 1993. According to SOW, ILM02.1, if the absolute value of the blank result exceeds the CRDL, the analysis should be terminated, the problem corrected, recalibration performed, and all samples reanalyzed since the last compliant blank. Although the appropriate calibration and rerun procedures were not conducted for this blank, there were no analytical samples between it and the next compliant blank.

SAMPLING ISSUES: None.

OTHER: According to the Inorganic Statement of Work, ILM02.1, the instrument detection limit (IDL) must be determined for each instrument used, within 30 days of the start of the contract analyses and at least quarterly (every 3 calendar months). The IDL studies for Mercury and GFAA analyses included in this case exceeded the 3 month limit by 2 to 16 days. It was determined through subsequent communication with the laboratory that IDL studies had been run prior to the analyses of this SDG. New Form X's as well as Form I's, III's, V's, and VI's were resubmitted for inclusion in this SDG. It was noted upon receipt of the corrected form I's, V's, and VI's that several samples on the resubmitted forms had incorrect data for arsenic and selenium. It was requested that the data be corrected and the forms be submitted again. The second set of Form I's, V's, and VI's were received on August 30, 1993.

The user should note that the mercury results reported for duplicate samples MYL523 and MYL526 were run at a concentration out of instrument calibration range and were reported as non-detects although there were obvious peaks in the raw data that were flagged by the analyst to be rerun. While the original samples were diluted and rerun, the duplicates were not. Thus, the 200 relative percent difference (RPD) reported for QC samples MYL523 and MYL526 are erroneous and misleading.

ADDITIONAL COMMENTS:

The laboratory analyzed all of the samples for lead by Inductively Coupled Plasma according to method 200.7 in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW).

The corrected analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. Laboratory QC samples and associated samples are listed below the data qualifiers in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	No	D
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	No	E
9. Field Duplicate Sample Analysis	No	I
10. GFAA QC Analysis	No	F
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	G
12. Sample Quantitation	Yes	C,H
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Selenium in samples MYL513 through MYL515, MYL517, MYL518, MYL527, MYL528, MYL531, MYL534 and MYL535

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery results for selenium in QC samples MYL515, MYL526, and MYL535 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for selenium is presented below and is based on an ideal recovery of 100%.

Analyte	QC Sample #	% Recovery	%Bias
Selenium	MYL515	24.0	-76.0
	MYL526	19.7	-80.3
	MYL535	16.0	-84.0

The results reported for selenium in the samples listed above were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in all of the samples
- Zinc in all of the samples except samples MYL515, MYL523, and MYL535
- Arsenic in samples MYL513, MYL514, MYL516 through MYL523, MYL525, MYL527 through MYL531, MYL534, and MYL535
- Mercury in samples MYL513, MYL514, MYL516 through MYL522, MYL525, MYL527 through MYL530, MYL534, and MYL535
- Selenium in samples MYL516, MYL519 through MYL522, MYL525, MYL526, MYL529, and MYL530

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony, arsenic, mercury, selenium, and zinc in QC sample numbers MYL515, MYL523, MYL526, and MYL535 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

QC Sample #	Analyte	% Recovery	% Bias
MYL515	Antimony	34.1	-65.9
MYL523	Antimony	49.6	-50.4
	Arsenic	9.9	-90.1
MYL526	Antimony	71.4	-28.6
	Selenium	19.7	-80.3
	Zinc	33.7	-66.3

QC Sample #	Analyte	% Recovery	% Bias
MYL535	Antimony	33.0	-67.0
	Arsenic	25.2	-74.8
	Mercury	150.6	+50.6

Results above the MDL are considered quantitatively uncertain. The results reported for antimony, arsenic, selenium, and zinc in samples listed above may be biased low, and where non-detected, false negatives may exist. The results reported for mercury may be biased high.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. Post-digestion spike recovery results of 105.1%, 76.1%, and 79.3% were obtained for antimony in QC sample numbers MYL515, MYL523, and MYL535, respectively. Since the post-digestion spike recoveries were acceptable, the low pre-digestion spike recovery results obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

A post-digestion spike recovery result of 128.5% was obtained for antimony in QC sample number MYL526. Since both the post and pre-digestion spikes did not meet the QC criteria, matrix effects may be present in the sample digestate which may enhance or depress the analyte signal during analysis.

A post-digestion spike recovery result of 91.5% was obtained for zinc in QC sample number MYL526. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery results obtained for zinc may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- Cyanide and mercury in samples MYL513 through MYL523 and MYL525 through MYL531

Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria, 14 days for cyanide and 28 days for mercury, are applied at the reviewer's discretion to the above soil analyses. The cyanide analysis was prepared and performed on July 6, 1993 and mercury was prepared and analyzed from July 15 through 19, 1993. These soil analyses exceeded the SW-846 technical holding times as shown below.

Sample Number	Date Collected	Date Received	# of days Exceeded
MYL513 and MYL514	05/28/93	06/04/93	24 (Cyanide) 20 (Mercury)
MYL515 and MYL516	06/01/93	06/04/93	21 (Cyanide) 17 (Mercury)
MYL517 and MYL518	06/02/93	06/04/93	20 (Cyanide) 16 (Mercury)
MYL519	06/03/93	06/11/93	19 (Cyanide) 15 (Mercury)
MYL520 through MYL522	06/07/93	06/11/93	15 (Cyanide) 11 (Mercury)
MYL523	06/09/93	06/11/93	13 (Cyanide) 9 (Mercury)
MYL525 and MYL526	06/11/93	06/18/93	11 (Cyanide) 7 (Mercury)
MYL527 and MYL528	06/14/930	06/18/93	7 (Cyanide) 4 (Mercury)
MYL529 through MYL531	06/15/93	06/18/93	6 (Cyanide) 3 (Mercury)

Sample results may be biased low and false negatives may exist.

The SW-846 technical holding times were not exceeded for the other analytes in all of the samples.

E. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic in all of the samples except MYL515, MYL523, and MYL535

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYL526 Lab. Dup. RPD
Arsenic	93.9

The results reported for arsenic in all of the samples except MYL515, MYL523, and MYL535 are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

F. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in samples MYL515*, MYL517*, MYL518*, MYL521 through MYL523, MYL528*, MYL531*, and MYL535*
- Thallium in samples MYL515, MYL523, MYL527 through MYL531, MYL534, and MYL535

Selenium and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for selenium and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYL515*	63.0	-37.0
	MYL517*	51.0	-49.0
	MYL518*	70.0	-30.0
	MYL521	51.0	-49.0
	MYL522	52.0	-48.0
	MYL523	69.0	-31.0
	MYL528*	83.0	-17.0
	MYL531*	40.0	-60.0
	MYL535*	54.0	-46.0
Thallium	MYL515	78.5	-21.5
	MYL523	73.0	-27.0
	MYL527	70.5	-29.5
	MYL528	83.0	-17.0
	MYL529	62.0	-38.0
	MYL530	64.0	-36.0
	MYL531	76.5	-23.5
	MYL534	61.0	-39.0
	MYL535	75.5	-24.5

The post-digestion spike recovery results for selenium and thallium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The results reported for selenium and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

The post-digestion analytical spike recovery result of 119.9% for arsenic in the laboratory control sample (LCS) also did not meet the 85-115% criteria for accuracy.

It should be noted that results for selenium in the samples denoted by an "*" were previously rejected. Please refer to Comment A.

G. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Aluminum in all of the samples except MYL515 and MYL526
- Barium in all of the samples except MYL515, MYL526, and MYL535
- Calcium in all of the samples except MYL526
- Copper in all of the samples except MYL515
- Iron in all of the samples except MYL526
- Lead in all of the samples except MYL515, MYL526, and MYL535
- Magnesium in all of the samples except MYL515, MYL523, and MYL526
- Manganese in all of the samples except MYL523 and MYL526
- Zinc in all of the samples except MYL515 and MYL535

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample numbers MYL515, MYL523, MYL526 and MYL535 did not meet the less than 10% criteria for the analytes shown below.

QC Sample #	Analyte	% Difference
MYL515	Calcium	12.7
	Iron	16.1
	Manganese	12.9
MYL523	Aluminum	10.6
	Barium	16.3
	Calcium	17.4
	Copper	11.3
	Iron	10.8
	Lead	10.1
	Zinc	30.9
MYL526	Copper	15.7
	Zinc	40.2
MYL535	Aluminum	10.8
	Calcium	30.7
	Copper	19.1
	Iron	14.8
	Magnesium	12.4
	Manganese	11.7

The results reported for aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, and zinc in the samples listed above are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

H. Due to poor analytical spike recoveries, the following samples were diluted and the quantitation limits for the analytes shown below have been raised.

- Arsenic in samples MYL516, MYL527, MYL531, MYL534 and MYL535
- Selenium in samples MYL513*, MYL514*, MYL515*, MYL518*, MYL519, MYL523, MYL525, MYL527*, MYL528*, and MYL534*

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires the analysis of analytical spikes. The samples listed above were diluted by a factor of ten because the spike recovery obtained in the original analysis was less than 40%. The low percent recovery obtained for selenium may be due to chemical or physical interferences. Dilution of the samples is performed to reduce any matrix interferences which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limits reported in Table 1A for selenium in the samples listed above were raised by the dilution factor.

Note that the results for arsenic in the diluted analyses of samples MYL516, MYL527, MYL531, MYL534 and MYL535 and selenium in the diluted analysis of samples MYL519 and MYL525 were between the MDL and the CRDL. Therefore these results, which are greater than the CRDL when multiplied by the dilution factor, have been flagged "L" in Table 1A (see Comment C).

It should be noted that results for selenium in the samples denoted by an "*" were previously rejected. Please refer to Comment A.

I. In the analysis of the field duplicate pairs, the following relative percent differences (RPDs) were obtained for the analytes listed below.

Analyte	MYL513 D1 MYL514 D1 RPD	MYL521 D2 MYL522 D2 RPD
Calcium	38.5	---
Copper	35.5	---
Mercury	80.2	145

The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±35 RPD or ±2X CRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20097 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: September 1, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	MS-013-SD-10-A			MS-013-ST-10-A			MS-014-SD-06-A			MS-015-SD-12-A			MS-016-SD-04-A			MS-017-SD-08-A			TP002-SD-05-A		
Sample I.D.	MYL513 D1			MYL514 D1			MYL515			MYL516			MYL517			MYL518			MYL519		
Date of Collection	5/28/93			5/28/93			6/1/93			6/1/93			6/2/93			6/2/93			6/3/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	13000	J	G	12800	J	G	11300			2250	J	G	6590	J	G	12800	J	G	8280	J	G
Antimony	13.0	J	B	10.2 U	J	B	10.5 U	J	B	10.0 U	J	B	9.5 U	J	B	9.9 U	J	B	16.2	J	B
Arsenic	19.8	J	BE	20.5	J	BE	8.0			9.7 L	J	BCEH	10.5	J	BE	10.8	J	BE	25.2	J	BE
Barium	223	J	G	243	J	G	103			13.4 L	J	CG	75.0	J	G	100	J	G	45.1	J	G
Beryllium	1.2			1.1			0.76 L	J	C	0.42 U			0.53 L	J	C	1.1			0.63 L	J	C
Cadmium	1.2			1.3			0.60 U			1.7			0.54 U			0.81 L	J	C	18.2		
Calcium	6840	J	GI	10100	J	GI	30300	J	G	3060	J	G	4220	J	G	7890	J	G	4540	J	G
Chromium	9.8			10.6			9.5			4.9			8.1			1.9 L	J	C	7.6		
Cobalt	15.1			13.7			9.0 L	J	C	3.6 L	J	C	8.3 L	J	C	3.6 L	J	C	5.1 L	J	C
Copper	935	J	GI	653	J	GI	23.2			83.4	J	G	22.6	J	G	41.3	J	G	1270	J	G
Iron	25700	J	G	27700	J	G	16300	J	G	6180	J	G	15400	J	G	10300	J	G	17900	J	G
Lead	291	J	G	272	J	G	23.5			153	J	G	34.0	J	G	139	J	G	1910	J	G
Magnesium	5730	J	G	5350	J	G	5990			1390	J	G	3350	J	G	3010	J	G	6880	J	G
Manganese	500	J	G	555	J	G	349	J	G	254	J	G	313	J	G	515	J	G	604	J	G
Mercury	321	J	BDI	751	J	BDI	0.08 U	J	D	263	J	BD	22.5	J	BD	110	J	BD	960	J	BD
Nickel	12.8			12.3			7.5 L	J	C	5.6 U			6.5 L	J	C	5.6 U			5.9 L	J	C
Potassium	2410			2500			2680			197 L	J	C	1020			2320			1000		
Selenium	3.2 U	R	AH	3.2 U	R	AH	3.1 U	R	AFH	0.36 L	J	BC	0.30 U	R	AF	2.8 U	R	AFH	5.2 L	J	BCH
Silver	125			94.0			0.70 U			13.5			3.9			32.4			97.3		
Sodium	123 L	J	C	137 L	J	C	466 L	J	C	51.8 L	J	C	240 L	J	C	624 L	J	C	214 L	J	C
Thallium	0.21 U			0.21 U			0.21 U	J	F	0.20 U			0.20 U			0.21 U			0.21 U		
Vanadium	37.0			39.0			57.0			9.3 L	J	C	43.9			14.6			23.8		
Zinc	166	J	BG	177	J	BG	38.0			143	J	BG	81.7	J	BG	102	J	BG	1500	J	BG
Cyanide	2.6 U	J	D	2.5 U	J	D	2.5	J	D	2.5 U	J	D	2.5 U	J	D	2.5 U	J	D	2.6 U	J	D
Percent Solids	93.6 %			95.3 %			95.6 %			98.1 %			99.1 %			97.5 %			95.5 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20097 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: September 1, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	TP004-SD-15-A			TP006-SD-04-A			TP006-ST-04-A			TP008-SD-10-A			TP007-SD-20-A			TP007-SD-15-A			TP011-SD-04-A		
Sample I.D.	MYL520			MYL521 D2			MYL522 D2			MYL523			MYL525			MYL526			MYL527		
Date of Collection	6/7/93			6/7/93			6/7/93			6/9/93			6/11/93			6/11/93			6/14/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10200	J	G	7000	J	G	7110	J	G	6910	J	G	6530	J	G	1670			13100	J	G
Antimony	16.7	J	B	9.9 U	J	B	9.8 U	J	B	13.7	J	B	17.0	J	B	9.6 U	J	B	10.0 U	J	B
Arsenic	24.5	J	BE	6.1	J	BE	6.9	J	BE	22.5	J	B	39.0	J	BE	8.8	J	E	16.2 L	J	BCEH
Barium	47.6	J	G	45.1	J	G	48.0	J	G	33.7 L	J	CG	32.1 L	J	CG	12.0 L	J	C	51.3	J	G
Beryllium	0.73 L	J	C	0.54 L	J	C	0.63 L	J	C	0.77 L	J	C	0.71 L	J	C	0.40 U			0.68 L	J	C
Cadmium	12.1			1.5			0.92 L	J	C	1.8			13.5			4.2			9.6		
Calcium	7480	J	G	1470	J	G	1450	J	G	1720	J	G	655 L	J	CG	218 L	J	C	3300	J	G
Chromium	9.5			9.3			8.6			6.5			5.7			1.8 L	J	C	10.6		
Cobalt	8.0 L	J	C	6.7 L	J	C	7.6 L	J	C	6.8 L	J	C	3.0 L	J	C	2.1 U			6.1 L	J	C
Copper	1270	J	G	109	J	G	103	J	G	549	J	G	341	J	G	78.1	J	G	474	J	G
Iron	20200	J	G	16200	J	G	15900	J	G	20900	J	G	17800	J	G	6170			20200	J	G
Lead	1630	J	G	226	J	G	225	J	G	3020	J	G	1020	J	G	476			1030	J	G
Magnesium	7290	J	G	4780	J	G	5040	J	G	3300			5080	J	G	1400			8420	J	G
Manganese	736	J	G	450	J	G	474	J	G	673			534	J	G	95.1			560	J	G
Mercury	845	J	BD	2.0	J	BDI	12.7	J	BDI	151	J	D	918	J	BD	311	J	D	169	J	BD
Nickel	7.8 L	J	C	5.6 L	J	C	5.5 U			5.7 U			6.3 U			5.4 U			6.1 L	J	C
Potassium	1150			627 L	J	C	574 L	J	C	620 L	J	C	769 L	J	C	359 L	J	C	1360		
Selenium	3.9	J	B	0.37 L	J	BCF	0.42 L	J	BCF	3.1 U	J	BFH	7.2 L	J	BHC	2.6	J	B	3.2 U	R	AH
Silver	77.2			15.7			17.4			245			138			84.5			79.6		
Sodium	188 L	J	C	66.1 L	J	C	69.4 L	J	C	82.0 L	J	C	99.4 L	J	C	42.4 L	J	C	246 L	J	C
Thallium	0.21 U			0.21 U			0.21 U			0.21 U	J	F	0.22 U			0.21 U			0.21 U	J	F
Vanadium	26.6			28.6			27.3			25.5			19.1			5.8 L	J	C	33.5		
Zinc	1020	J	BG	165	J	BG	141	J	BG	372	J	G	1180	J	BG	370	J	BG	817	J	BG
Cyanide	2.5 U	J	D	2.5 U	J	D	2.5 U	J	D	2.6 U	J	D	2.8 U	J	D	2.6 U	J	D	2.6 U	J	D
Percent Solids	95.6 %			95.7 %			95.7 %			93.2 %			89.8 %			96.5 %			94.7 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument D[illegible]ion Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20097 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: September 1, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	TP012-SD-08-A			TP013-SD-01-A			TP013-ST-01-A			T014-SD-16-A			TP015-SD-17-A			TP016-SD-10-A			LAB BLANK		
Sample I.D.	MYL528			MYL529 D3			MYL530 D3			MYL531			MYL534			MYL535					
Date of Collection	6/14/93			6/15/93			6/15/93			6/15/93			6/22/93			6/23/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	11900	J	G	18400	J	G	16600	J	G	8910	J	G	7700	J	G	14000	J	G	8.3 U		
Antimony	10.5 U	J	B	15.3	J	B	10.9 U	J	B	10.7 U	J	B	9.8 U	J	B	9.9 U	J	B	10.1 U		
Arsenic	10.3	J	BE	15.8	J	BE	14.3	J	BE	17.6 L	J	BCEH	18.2 L	J	BCEH	17.6 L	J	BCH	0.26 U		
Barium	37.9 L	J	CG	224	J	G	176	J	G	161	J	G	34.0 L	J	CG	130			0.36 U		
Beryllium	0.70 L	J	C	1.4			0.97 L	J	C	0.74 L	J	C	0.56 L	J	C	1.2			0.42 U		
Cadmium	9.9			0.98 L	J	C	1.3			0.61 U			3.2			0.62 L	J	C	0.58 U		
Calcium	2880	J	G	34000	J	G	34400	J	G	3210	J	G	8800	J	G	2250	J	G	9.0 U		
Chromium	9.1			28.8			26.7			5.7			8.9			12.4			0.88 U		
Cobalt	7.4 L	J	C	10.3			8.7 L	J	C	3.6 L	J	C	7.0 L	J	C	13.1			2.3 U		
Copper	292	J	G	44.4	J	G	49.2	J	G	9.0	J	G	94.7	J	G	53.3	J	G	0.54 U		
Iron	17100	J	G	22900	J	G	21400	J	G	26600	J	G	18600	J	G	29800	J	G	3.0 U		
Lead	563	J	G	93.6	J	G	90.9	J	G	26.3	J	G	362	J	G	83.1			5.5 U		
Magnesium	8020	J	G	17500	J	G	16300	J	G	2010	J	G	6200	J	G	4160	J	G	6.6 U		
Manganese	615	J	G	901	J	G	849	J	G	24.0	J	G	402	J	G	546	J	G	1.1 U		
Mercury	5.0	J	BD	3.8	J	BD	3.6	J	BD	0.10 U	J	D	11.0	J	B	0.57	J	B	0.10 U		
Nickel	9.8			17.7			15.2			6.0 U			7.5 L	J	C	9.0			5.7 U		
Potassium	1220			1650			1230			3470			973			1550			86.6 U		
Selenium	3.2 U	R	AFH	4.2	J	B	2.3	J	B	0.34 U	R	AF	2.9 U	R	AH	0.31 U	R	AF	0.30 U		
Silver	55.3			71.8			65.1			0.72 U			134			0.66 U			0.68 U		
Sodium	160 L	J	C	89.3 L	J	C	104 L	J	C	355 L	J	C	111 L	J	C	109 L	J	C	0.32 U		
Thallium	0.21 U	J	F	0.20 U	J	F	0.20 U	J	F	0.25 L	J	CF	0.20 U	J	F	0.21 U	J	F	0.20 U		
Vanadium	34.1			47.8			42.1			16.5			20.8			69.2			1.7 U		
Zinc	745	J	BG	136	J	BG	161	J	BG	8.0	J	BG	817	J	BG	76.3			3.7 U		
Cyanide	2.6 U	J	D	2.7 U	J	D	2.7 U	J	D	2.9 U	J	D	19.1			2.5 U			2.5 U		
Percent Solids	92.7 %			91.5 %			91.4 %			86.9 %			94.5 %			94.8 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A - Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20097 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: September 1, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	8.28			40.0																	
Antimony	10.1			12.0																	
Arsenic	0.26			2.0																	
Barium	0.36			40.0																	
Beryllium	0.42			1.0																	
Cadmium	0.58			1.0																	
Calcium	9.02			1000																	
Chromium	0.88			2.0																	
Cobalt	2.3			10.0																	
Copper	0.54			5.0																	
Iron	3.0			20.0																	
Lead	5.5			0.60																	
Magnesium	6.6			1000																	
Manganese	1.1			3.0																	
Mercury	0.10			0.10																	
Nickel	5.7			8.0																	
Potassium	86.6			1000																	
Selenium	0.30			1.0																	
Silver	0.68			2.0																	
Sodium	5.9			1000																	
Thallium	0.20			2.0																	
Vanadium	1.7			10.0																	
Zinc	3.7			4.0																	
Cyanide	2.5			2.5																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

Listed below are the Laboratory Quality Control (QC) samples and the samples associated with them.

QC sample	Associated Samples
MYL515	MYL513 through MYL518
MYL523	MYL519 through MYL523
MYL526	MYL525 through MYL531
MYL535	MYL534 and MYL535

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20097 Memo #02 LABORATORY Associated Labs., Inc. (ALI)

SDG NO. MYL513 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 1, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES ____ WATER 20 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	M	M
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	O	M	O	O
7. MATRIX SPIKE ANALYSIS	M	Z/M	M	O
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M	Z/M	M	M

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20097 Memo #02 LABORATORY Associated Labs., Inc. (ALI)

SDG NO. MYL513 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 1, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: The results reported for selenium in ten of the samples were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered in QC samples MYL515, MYL526 and MYL535.

According to the Inorganic Statement of Work, ILM02.1, the contractual holding times for mercury and cyanide are 26 days and 12 days, respectively, upon sample receipt by the laboratory. The laboratory did not prepare and analyze eighteen samples for mercury and cyanide in this SDG within the contractual holding times. Consequently, the results reported for mercury and cyanide in the eighteen samples have been estimated as the SW-846 technical holding times for mercury and cyanide were exceeded by 3 to 24 days. Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria are applied at the reviewer's discretion to the above soil analyses.

TPO ATTENTION: It was noted that silver was reported at a concentration greater than the IDL in the initial calibration blank for the ICP run performed on July 22, 1993. According to SOW, ILM02.1, if the absolute value of the blank result exceeds the CRDL, the analysis should be terminated, the problem corrected, recalibration performed, and all samples reanalyzed since the last compliant blank. Although the appropriate calibration and rerun procedures were not conducted for this blank, there were no analytical samples between it and the next compliant blank. There were no sample data affected.

According to the Inorganic Statement of Work, ILM02.1, the instrument detection limit (IDL) must be determined for each instrument used, within 30 days of the start of the contract analyses and at least quarterly (every 3 calendar months). The IDL studies for Mercury and GFAA analyses included in this case exceeded the 3 month limit by 2 to 16 days. It was determined through subsequent communication with the laboratory that IDL studies had been run prior to the analyses of this SDG. New Form X's as well as Form I's, III's, V's, and VI's were resubmitted for inclusion in this SDG. It was noted upon receipt, that several of the resubmitted forms had incorrect data for some of the graphite furnace analytes. It was requested that the data be corrected and the forms be submitted again. The second set of Form I's, V's, and VI's were received on August 30, 1993.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20097 Memo #02 LABORATORY Associated Labs., Inc. (ALI)

SDG NO. MYL513 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 1, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ATTENTION: The user should note that the mercury results reported for duplicate samples MYL523 and MYL526 were run at a concentration out of instrument calibration range and were reported as non-detects although there were obvious peaks in the raw data that were flagged by the analyst to be rerun. While the original samples were diluted and rerun, the duplicates were not. Thus, the 200 relative percent difference reported for QC samples MYL523 and MYL526 are erroneous and misleading.

In Reference to Case No(s).:

20097 Memo #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 19 through 27, 1993

Laboratory Name: Associated Laboratories, Inc. (ALI)

Lab Contact: Tito Parola

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL513 through MYL523, MYL525 through MYL531, MYL534 and MYL535

Summary of Questions/Issues Discussed:

1. The IDL's submitted with the Case were dated April 15, 1993. The IDL studies for Mercury and GFAA analyses included in this case exceeded the 3 month limit by 2 to 16 days. It was requested that new IDL studies be submitted as updated IDL studies were done prior to these analyses.
2. It was noted upon receipt of the corrected form I's, V's, and VI's that several samples on the resubmitted forms had incorrect data for arsenic and selenium. It was requested that the data be corrected and the forms be submitted again.

Summary of Resolution:

1. The Form X's were received on August 23, 1993 by fax.
2. The second set of Form I's, V's, and VI's were received on August 30, 1993.

Karen L. Pettit
Signature

9/1/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

20097 Memo #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 23 through 31, 1993

Laboratory Name: Associated Laboratories, Inc. (ALI)

Lab Contact: Mary Truong

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL513 through MYL523, MYL525 through MYL531, MYL534 and MYL535

Summary of Questions/Issues Discussed:

1. The changes in the updated IDL's necessitate updates on Form I, III, V, and VI. It was requested that they be corrected and submitted.
2. Mary called to verify my request for the second set of corrected forms. She promised them on August 30, 1993.
3. It was found that the sample result for selenium on Form 5A for MYL526 was incorrect. The results should have been quantitated from MSA data, they were from the calibration curve. A corrected form was requested. She promised to fax it on August 31.

Summary of Resolution:

1. All of the requested forms were received on August 24, 1993 by fax.
2. The second set of corrected forms were received on August 30, 1993.

Karen L. Pettit — Signature

9/1/93 — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 16, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20292 Memo #02
SDG NO.:	MYL532
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals and Cyanide
SAMPLE NO.:	9 Soil Samples (See Case Summary)
COLLECTION DATE:	June 28 through 30, 1993, and July 7, 9, 12 and 13, 1993
REVIEWER:	Blake Brown, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region IX

TPO: [ ]FYI [X]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 20292 Memo #02
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF
Date: September 16, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL532, MYL533, and MYL537 through MYL543

COLLECTION DATE: June 28 through 30, 1993, and July 7, 9, 12 and 13, 1993

SAMPLE RECEIPT DATE: July 2 and 17, 1993

CONCENTRATION & MATRIX: 9 Low Concentration Soil Samples

FIELD QC:
Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYL538 and MYL539

LABORATORY QC:
Matrix Spike: MYL533 and MYL542
Duplicates: MYL533 and MYL542
ICP Serial Dilution: MYL533 and MYL542

ANALYSIS: RAS Total Metals and Cyanide

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		July 27, 1993	August 23, 1993
GFAA:	Arsenic	July 27, 1993	August 23, 1993
	Lead	July 27, 1993	August 23, 1993
	Selenium	July 27, 1993	August 23, 1993
	Thallium	July 27, 1993	August 22, 1993
Mercury		July 29 and 30, 1993, and August 3, 1993	July 29 and 30, 1993, and August 3, 1993
Cyanide		July 16, 1993	July 16, 1993
Percent Solids		Not Applicable	July 27, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

- METHOD NON-COMPLIANCE: Technical holding times were exceeded for mercury and cyanide in samples MYL532, MYL533 and MYL537. This is not expected to affect the quality of the data because the holding times were not exceeded by more than 4 days and all samples were maintained at 4 °C.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

Lead was analyzed by GFAA for samples MYL538 and MYL539. All other samples in this SDG were analyzed by ICP. All results reported for lead in the samples analyzed by ICP were greater than 5X the instrument detection limit (IDL) for ICP.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	G
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	No	C
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	No	D
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	E
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony and selenium in all of the samples
- Lead, silver and thallium in samples MYL532, and MYL537 through MYL543

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and selenium in QC sample number MYL533, and antimony, lead, selenium, silver and thallium in QC sample number MYL542 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL533 % Recovery	MYL533 % Bias
Antimony	33.7	-66.3
Selenium	45.0	-55.0

Analyte	MYL542 % Recovery	MYL542 % Bias
Antimony	30.3	-69.7
Lead	1052	+952
Selenium	31.1	-68.9
Silver	137.6	+37.6
Thallium	72.8	-27.2

Results above the MDL are considered quantitatively uncertain. The results reported for antimony, selenium and thallium were all below the MDL and false negatives may exist. The results reported for lead and silver in the samples listed above may be biased high.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 120.6% was obtained for antimony in QC sample number MYL533. Post-digestion spike recovery results of 111.7% and 90.1% were obtained for antimony and lead in QC sample number MYL542. Since the post-digestion spike recoveries were acceptable for antimony and lead in both QC samples, the low pre-digestion spike recovery results of 33.7% and 30.3% obtained for antimony and the high pre-digestion spike recovery of 1052% obtained for lead may indicate sample non-homogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, enhancing or depressing the analytical results.

C. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Copper and silver in samples MYL532, and MYL537 through MYL543

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYL542 RPD
Copper	86.8
Silver	41.9

The results reported for copper and silver in the samples listed above are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

D. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in all of the samples
- Thallium in samples MYL537, MYL538, MYL540 through MYL543

Selenium and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for selenium and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for selenium and thallium is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYL532	46.0	-54.0
	MYL533	76.0	-24.0
	MYL533 Dup.	68.0	-32.0
	MYL537	41.0	-59.0
	MYL538	76.0	-24.0
	MYL539	49.0	-51.0
	MYL540	52.0	-48.0
	MYL541	48.0	-52.0
	MYL542	49.0	-51.0
	MYL543	47.0	-53.0
Thallium	MYL537	83.5	-16.5
	MYL538	82.0	-18.0
	MYL540	77.5	-22.5
	MYL541	83.0	-17.0
	MYL542	79.5	-20.5
	MYL542 Dup.	81.0	-19.0
	MYL543	82.0	-18.0

The post-digestion spike recovery results for selenium and thallium in the samples listed above show an analytical deficiency. The results reported for selenium and thallium in the samples listed above were below the MDL and false negatives may exist.

Post-digestion analytical spike recovery results of 68.0% for selenium in duplicate sample MYL533 and 81.0% for thallium in duplicate sample MYL542 also did not meet the 85-115% criteria for accuracy.

E. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Aluminum in samples MYL532, MYL533, MYL537 through MYL541, and MYL543
- Calcium in all of the samples
- Copper in samples MYL532, MYL533, MYL537 through MYL541, and MYL543
- Iron in all of the samples
- Lead in samples MYL532, MYL537, and MYL540 through MYL543
- Magnesium in MYL532, MYL533, MYL537 through MYL541, and MYL543
- Manganese in all of the samples
- Sodium in samples MYL532, and MYL537 through MYL543
- Zinc in samples MYL532, and MYL537 through MYL543

A five fold dilution of the laboratory QC samples are performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample

numbers MYL533 and MYL542 did not meet the less than 10% criteria for the analytes shown below.

Analyte	MYL533 % Difference	MYL542 % Difference
Aluminum	10.6	---
Calcium	15.2	10.7
Copper	18.2	---
Iron	14.4	11.8
Lead	---	18.7
Magnesium	11.6	---
Manganese	11.9	10.1
Sodium	---	33.8
Zinc	---	22.6

The results reported for aluminum, calcium, copper, iron, lead, magnesium, manganese, sodium and zinc in the samples listed above are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample nonhomogeneity or sample matrix effects.

F. Due to poor analytical spike recoveries, the following samples were diluted and the quantitation limit for the analyte shown below has been raised.

- Selenium in samples MYL533 and MYL538

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires the analysis of analytical spikes. The samples listed above were diluted by a factor of ten because the spike recoveries obtained in the original analyses were less than 40%. The low percent recoveries obtained for selenium may be due to chemical or physical interferences. Dilution of the samples is performed to reduce any matrix interferences which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limits reported in Table 1A for selenium in samples MYL533 and MYL538 listed above were raised by the dilution factor.

G. The technical holding times were exceeded for mercury and cyanide in samples MYL532, MYL533 and MYL537. All sample results were below the IDL. Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria are applied at the reviewer's discretion to these soil analyses. These soil analyses exceeded the SW-846 technical holding times of 28 days for mercury and 14 days for cyanide as shown below.

Sample Number	Date Collected	Date Received	Date Analyzed	# of days Exceeded
MYL532	06/30/93	07/02/93	07/29/93	1 (Mercury)
MYL532	06/30/93	07/02/93	07/16/93	2 (Cyanide)
MYL533	06/28/93	07/02/93	07/29/93	2 (Mercury)
MYL533	06/28/93	07/02/93	07/16/93	4 (Cyanide)
MYL537	06/29/93	07/02/93	07/29/93	2 (Mercury)
MYL537	06/29/93	07/02/93	07/16/93	3 (Cyanide)

The technical holding times were not exceeded by more than 4 days for any sample. This is not expected to affect the quality of the data because all samples were maintained at 4 °C.

The SW-846 technical holding times were not exceeded for the other analytes in all of the other samples.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 16, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	MS-021-SD-07-A			MS-019-SD-08-A			MS-019-SD-19-A			MS-024-ST-10-A			MS-024-SD-10-A			MS-026-SD-06-A			MS-027-SD-01-A		
Sample I.D.	MYL532			MYL533			MYL537			MYL538 D1			MYL539 D1			MYL540			MYL541		
Date of Collection	06/30/93			06/28/93			06/29/93			07/07/93			07/07/93			07/09/93			07/12/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	18000	J	E	25700	J	E	23000	J	E	30600	J	E	32100	J	E	11500	J	E	5930	J	E
Antimony	9.6 U	J	B	9.7 U	J	B	9.3 U	J	B	10.4 U	J	B	10.8 U	J	B	11.7 U	J	B	10.8 U	J	B
Arsenic	21.8			63.8			10.9			20.1			22.2			22.8			16.1		
Barium	74.3			112			149			163			171			47.2			16.8 L	J	A
Beryllium	1.1			1.7			1.0			1.5			1.4			0.79 L	J	A	0.57 L	J	A
Cadmium	0.55 U			0.56 U			0.54 U			0.59 U			0.62 U			0.67 U			0.62 U		
Calcium	5000	J	E	6780	J	E	7780	J	E	7880	J	E	8430	J	E	11900	J	E	4080	J	E
Chromium	17.7			11.5			13.4			8.4			9.3			9.4			6.7		
Cobalt	15.4			17.0			17.6			16.0			17.1			10.4 L	J	A	6.0 L	J	A
Copper	23.8	J	CE	31.4	J	E	43.6	J	CE	28.0	J	CE	30.3	J	CE	52.9	J	CE	30.4	J	CE
Iron	26200	J	E	36600	J	E	23600	J	E	32000	J	E	35800	J	E	22800	J	E	15200	J	E
Lead	36.0	J	BE	30.7			48.8	J	BE	18.0	J	B	17.3	J	B	60.0	J	BE	56.7	J	BE
Magnesium	11200	J	E	9570	J	E	8510	J	E	11700	J	E	12600	J	E	6860	J	E	4440	J	E
Manganese	686	J	E	1240	J	E	880	J	E	908	J	E	965	J	E	492	J	E	573	J	E
Mercury	0.85		G	0.12		G	1.5		G	0.83			0.68			77.5			0.22		
Nickel	11.4			13.4			11.8			5.8			6.3 L	J	A	8.6 L	J	A	6.4 L	J	A
Potassium	3470			2640			4760			2340			2570			1280			1350		
Selenium	0.30 U	J	BD	2.9 U	J	BDF	0.29 U	J	BD	2.9 U	J	BDF	0.31 U	J	BD	0.33 U	J	BD	0.33 U	J	BD
Silver	3.6	J	BC	4.3			5.1	J	BC	6.5	J	BC	5.2	J	BC	40.4	J	BC	23.9	J	BC
Sodium	160 L	J	AE	185 L	J	A	207 L	J	AE	146 L	J	AE	174 L	J	AE	161 L	J	AE	106 L	J	AE
Thallium	0.31 U	J	B	0.31 U			0.31 U	J	BD	0.31 U	J	BD	0.33 U	J	B	0.35 U	J	BD	0.35 U	J	BD
Vanadium	68.9			62.7			57.1			66.4			75.8			45.4			22.2		
Zinc	49.5	J	E	76.0			89.4	J	E	75.3	J	E	80.1	J	E	119	J	E	96.2	J	E
Cyanide	2.4 U		G	2.5 U		G	2.4 U		G	NA			NA			NA			NA		
Percent Solids	99.7 %			97.6 %			99.4 %			93.9 %			89.9 %			86.0 %			89.7 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
NA-Not Analyzed

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 16, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	MS-027-SD-09-A			MS-029-SD-03-A			LAB BLANK			MDL			CRDL								
Sample I.D.	MYL542			MYL543																	
Date of Collection	07/12/93			07/13/93																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	11200			9760	J	E	8.3 U			8.3			40.0								
Antimony	9.8 U	J	B	9.6 U	J	B	10.1 U			10.1			12.0								
Arsenic	21.1			13.1			0.26 U			0.26			2.0								
Barium	228			41.0			0.36 U			0.36			40.0								
Beryllium	1.1			0.84 L	J	A	0.42 U			0.42			1.0								
Cadmium	1.7			0.55 U			0.58 U			0.58			1.0								
Calcium	17900	J	E	6670	J	E	9.0 U			9.0			1000								
Chromium	9.1			7.5			0.88 U			0.88			2.0								
Cobalt	9.3 L	J	A	7.1 L	J	A	2.3 U			2.3			10.0								
Copper	585	J	C	31.6	J	CE	1.6 L	J	A	0.54			5.0								
Iron	20700	J	E	16700	J	E	3.0 U			3.0			20.0								
Lead	290	J	BE	35.9	J	BE	5.5 U			5.5			0.60								
Magnesium	4760			6360	J	E	6.6 U			6.6			1000								
Manganese	640	J	E	635	J	E	1.1 U			1.1			3.0								
Mercury	0.70			0.24			0.10 U			0.10			0.10								
Nickel	6.9 L	J	A	8.5			5.7 U			5.7			8.0								
Potassium	1690			1090			86.6 U			86.6			1000								
Selenium	0.29 U	J	BD	0.28 U	J	BD	0.30 U			0.30			1.0								
Silver	9.7	J	BC	24.7	J	BC	0.68 U			0.68			2.0								
Sodium	315 L	J	AE	108 L	J	AE	5.9 U			5.9			1000								
Thallium	0.31 U	J	BD	0.30 U	J	BD	0.32 U			0.32			2.0								
Vanadium	37.5			28.6			1.7 U			1.7			10.0								
Zinc	335	J	E	83.8	J	E	3.7 U			3.7			4.0								
Cyanide	NA			NA			2.5 U			2.5			0.50								
Percent Solids	99.5 %			99.9 %			—			—			—								

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument tion Limit for Waters, MDL-Method Detection Limit for Soils.
NA-Not Analyz

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20292 Memo #02 LABORATORY ALI

SDG NO. MYL532 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 16, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES _____ WATER 9 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	O	O
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	M	O	O	O
7. MATRIX SPIKE ANALYSIS	M	M	O	O
8. METHOD OF STANDARD ADDITION (MSA)		N/A		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M	M	O	O

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO ATTENTION: Technical holding times were exceeded for mercury and cyanide in samples MYL532, MYL533 and MYL537. This is not expected to affect the quality of the data because the holding times were not exceeded by more than 4 days and all samples were maintained at 4 °C.

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 23, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20292 Memo #03
SDG NO.:	MYL934
LABORATORY:	Associated Laboratories, Inc (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	3 Soil Samples and 12 Groundwater Samples (See Case Summary)
COLLECTION DATE:	July 15, 16, 19 through 21, 1993
REVIEWER:	Blake Brown, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region IX

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 20292 Memo #03
Site: Carson River
Laboratory: Associated Laboratories, Inc (ALI)
Reviewer: Blake Brown, ESAT/ICF
Date: September 23, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL546 through MYL548 (Soils)
MYL934 through MYL945 (Waters)

COLLECTION DATE: July 15, 16, 19 through 21, 1993
SAMPLE RECEIPT DATE: July 17 and 23, 1993

CONCENTRATION & MATRIX: 3 Low Concentration Soil Samples and 12 Low Concentration Groundwater Samples

FIELD QC: Field Blanks (FB): MYL941
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYL938 and MYL939
(D2): MYL942 and MYL943

LABORATORY QC: Matrix Spike: MYL548 (Soils), MYL944 (Waters)
Duplicates: MYL548 (Soils), MYL944 (Waters)
ICP Serial Dilution: MYL548 (Soils), MYL944 (Waters)

ANALYSIS: RAS Total Metals

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		August 4, 1993	August 25, 1993
GFAA:	Arsenic	August 4, 1993	August 30 and 31, 1993
	Lead	August 4, 1993	August 31, 1993
	Selenium	August 4, 1993	August 30, and September 1, 1993
	Thallium	August 4, 1993	August 30, 1993
Mercury		August 9, 1993	August 9, 1993
Percent Solids		Not Applicable	August 5, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: A post-spike was not performed for antimony. According to the Statement of Work (SOW) (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria.

The matrix spike recovery result for antimony in QC sample number MYL548 was 35.4%, resulting in the estimation of antimony in samples MYL546 through MYL548.

SAMPLING ISSUES: None.

OTHER: Selenium was rejected in all of the samples except MYL546 due to matrix spike recovery of less than 30%.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

The laboratory analyzed all soil samples in this sample delivery group (SDG) for lead by ICP. All groundwater samples were analyzed for lead by GFAA. All results reported for lead in the samples analyzed by ICP were greater than 5X the IDL for ICP. Calibration and preparation blank results for lead by ICP were marginally above the ICP IDL of 27.4 ug/L, but well below the 5 X ICP IDL (137 ug/L) criteria for reporting lead by ICP.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,C
8. Laboratory Duplicate Sample Analysis	Yes	

II. Validation Summary (Continued)

The data were evaluated based on the following parameters:

9.	Field Duplicate Sample Analysis	Yes	
10.	GFAA QC Analysis	No	D
	a. Duplicate Injections		
	b. Analytical Spikes		
	c. Method of Standard Addition		
11.	ICP Serial Dilution Analysis	No	E
12.	Sample Quantitation	Yes	B,F
13.	Sample Result Verification	Yes	

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Selenium in all of the samples except MYL546

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for selenium in QC sample numbers MYL548 (soils) and MYL944 (waters) did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for selenium is presented below and is based on an ideal recovery of 100%.

Analyte	MYL944 Waters % Recovery	MYL944 Waters % Bias	MYL548 Soils % Recovery	MYL548 Soils % Bias
Selenium	19.0	-81.0	19.0	-81.0

The results reported for selenium in all of the samples except MYL546 were below the instrument detection limit (IDL) or method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

B. The following results are estimated and are flagged "J" in Table 1A.

- All results above the instrument detection limit or the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the instrument detection limit (IDL) for waters or the method detection limit (MDL) for soils but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

C. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic and lead in samples MYL934 through MYL945
- Antimony in samples MYL546 through MYL548
- Selenium in sample MYL546
- Thallium in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for arsenic, lead, antimony, selenium, and thallium in QC sample numbers MYL548 (soils) and MYL944 (waters) did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL944 Waters % Recovery	MYL944 Waters % Bias
Arsenic	69.8	-30.2
Lead	32.0	-68.0
Thallium	30.4	-69.6

Analyte	MYL548 Soils % Recovery	MYL548 Soils % Bias
Antimony	35.4	-64.6
Selenium	19.0	-81.0
Thallium	39.9	-60.1

Results above the IDL or MDL are considered quantitatively uncertain. The results reported for arsenic, lead, antimony, selenium and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

The laboratory did not perform a post-digestion spike on antimony. According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria.

D. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic in samples MYL937 through MYL939, and MYL942 through MYL944
- Lead in samples MYL935 through MYL939
- Selenium in samples MYL547, MYL934 through MYL939, MYL942 and MYL944

- Thallium in samples MYL546 through MYL548, MYL934 through MYL940, and MYL942 through MYL945

Arsenic, lead, selenium and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for arsenic, lead, selenium and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Arsenic	MYL937	79.0	-21.0
	MYL938	70.5	-29.5
	MYL939	67.5	-32.5
	MYL942	82.5	-17.5
	MYL943	82.5	-17.5
	MYL944	79.5	-20.5
	MYL944 Dup.	75.0	-25.0
Lead	MYL935	73.5	-26.5
	MYL936	70.0	-30.0
	MYL937	42.0	-58.0
	MYL938	75.5	-24.5
	MYL939	80.5	-19.5
	MYL944 Dup.	75.0	-25.0
Selenium	MYL547	75.0	-25.0
	MYL548 Dup.	58.0	-42.0
	MYL934	75.0	-25.0
	MYL935	77.0	-23.0
	MYL936	70.0	-30.0
	MYL937	42.0	-58.0
	MYL938	73.0	-27.0
	MYL939	84.0	-16.0
	MYL942	78.0	-22.0
	MYL944	77.0	-23.0
	MYL944 Dup.	74.0	-26.0
Thallium	MYL546	44.0	-56.0
	MYL547	60.0	-40.0
	MYL548	45.5	-54.5
	MYL548 Dup.	58.0	-42.0
	MYL934	66.5	-33.5
	MYL935	69.0	-31.0
	MYL936	77.5	-22.5
	MYL937	58.0	-42.0
	MYL938	62.5	-37.5
	MYL939	57.0	-43.0
	MYL940	55.0	-45.0
	MYL942	61.5	-38.5

Analyte	Sample Number	% Recovery	% Bias
Thallium	MYL943	54.5	-45.5
	MYL944	44.5	-55.5
	MYL944 Dup.	50.0	-50.0
	MYL945	52.5	-47.5

The post-digestion spike recovery results for arsenic, lead, selenium and thallium in the samples listed above show an analytical deficiency. Results above the IDL or MDL are considered quantitatively uncertain. The results reported for arsenic, lead, selenium and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

It should be noted that the results for selenium in the samples listed above were previously rejected. Please refer to Comment A.

E. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Aluminum, calcium, copper, iron, lead, magnesium, manganese, silver and zinc in samples MYL546 through MYL548

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample number MYL548 did not meet the less than 10% criteria for the analytes shown below.

Analyte	MYL548 % Difference
Aluminum	10.5
Calcium	13.7
Copper	12.3
Iron	15.3
Lead	19.3
Magnesium	11.5
Manganese	13.4
Silver	11.7
Zinc	18.1

The results reported for the analytes listed above in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

F. Due to poor analytical spike recoveries, the following samples were diluted and the quantitation limits for the analytes shown below have been raised.

- Arsenic in sample MYL548
- Lead in samples MYL934 through MYL940, and MYL942 through MYL944.
- Selenium in samples MYL548, MYL934 through MYL940, and MYL942 through MYL944

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Arsenic, lead and selenium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires the analysis of analytical spikes. All of the samples above, except arsenic in sample MYL548, were diluted by a factor of ten because the spike recovery obtained in the original analysis was less than 40%. Sample MYL548 was analyzed for arsenic using the method of standard additions (MSA), and was diluted by a factor of fifty. The low percent recovery obtained for arsenic, lead and selenium may be due to chemical or physical interferences. Dilution of the samples is performed to reduce any matrix interferences which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limits reported in Table 1A for arsenic, lead and selenium in the samples listed above were raised by the dilution factor.

Note that the result for arsenic in the analysis of diluted sample MYL548 was between the IDL and the CRDL. Therefore this result, which is greater than the CRDL when multiplied by the dilution factor, has been flagged "L" (see Comment C).

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 23, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	TP-007-SD-14-B			MS-023-SD-09-A			MS-031-SD-06-A			Lab Blank			MDL			CRDL					
Sample I.D.	MYL546			MYL547			MYL548														
Date of Collection	7/21/93			7/20/93			7/19/93														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3660	J	E	13600	J	E	17700	J	E	8.3 U			8.3			40.0					
Antimony	9.9 U	J	C	9.8 U	J	C	16.8	J	C	10.1 U			10.1			12.0					
Arsenic	10.5			26.1			95.9 L	J	BF	0.44 U			0.44			2.0					
Barium	15.5 L	J	B	101			149			0.36 U			0.36			40.0					
Beryllium	0.41 U			1.1			1.8			0.42 U			0.42			1.0					
Cadmium	19.4			0.56 U			1.3			0.58 U			0.58			1.0					
Calcium	3950	J	E	5760	J	E	19700	J	E	9.0 U			9.0			1000					
Chromium	6.7			9.4			15.2			2.0			0.88			2.0					
Cobalt	2.2 U			10.4			16.2			2.3 U			2.3			10.0					
Copper	5.3	J	E	30.8	J	E	70.1	J	E	0.93 L	J	B	0.54			5.0					
Iron	12100	J	E	21400	J	E	31100	J	E	3.0 U			3.0			20.0					
Lead	953	J	E	49.4	J	E	434	J	E	7.2 L	J	B	5.4			0.60					
Magnesium	2670	J	E	3860	J	E	9820	J	E	6.8 L	J	B	6.6			1000					
Manganese	194	J	E	443	J	E	1310	J	E	1.1 U			1.1			3.0					
Mercury	315			13.0			4.7			0.10 U			0.10			0.10					
Nickel	5.6 U			6.8 L	J	B	11.5			5.7 U			5.7			8.0					
Potassium	525 L	J	B	3900			3170			86.6 U			86.6			1000					
Selenium	2.0	J	C	0.3 U	R	AD	3.0 U	R	AF	0.30 U			0.30			1.0					
Silver	132	J	E	28.4	J	E	45.7	J	E	0.68 U			0.68			2.0					
Sodium	288 L	J	B	119 L	J	B	202 L	J	B	5.9 U			5.9			1000					
Thallium	0.36 L	J	BCD	0.32 U	J	CD	0.40 L	J	BCD	0.32 U			0.32			2.0					
Vanadium	14.5			39.8			61.4			1.7 U			1.7			10.0					
Zinc	1620	J	E	65.9	J	E	293	J	E	3.7 U			3.7			4.0					
Percent Solids	96.4 %			98.9 %			98.1 %			N/A			N/A			N/A					

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 23, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW002GW-09			DW002GW-10			DW002GW-11			DW002GW-12			DW002GW-13			DW002GD-13			DW002GW-14		
Sample I.D.	MYL934			MYL935			MYL936			MYL937			MYL938 D1			MYL939 D1			MYL940		
Date of Collection	7/15/93			7/15/93			7/15/93			7/15/93			7/15/93			7/15/93			7/15/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U		
Antimony	50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U		
Arsenic	2.2 U	J	C	2.2 U	J	C	2.2 U	J	C	4.7 L	J	BCD	2.8 L	J	BCD	3.5 L	J	BCD	2.2 U	J	C
Barium	10.8 L	J	B	70.0 L	J	B	17.2 L	J	B	58.8 L	J	B	28.7 L	J	B	28.0 L	J	B	31.4 L	J	B
Beryllium	2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U		
Cadmium	2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U		
Calcium	145000			96800			178000			94600			131000			130000			174000		
Chromium	5.7 L	J	B	8.2 L	J	B	6.9 L	J	B	7.3 L	J	B	8.1 L	J	B	7.8 L	J	B	8.2 L	J	B
Cobalt	11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U		
Copper	2.7 L	J	B	12.4 L	J	B	181			7.7 L	J	B	4.0 L	J	B	3.5 L	J	B	44.0		
Iron	28.7 L	J	B	50.0 L	J	B	15.0 U			49.0 L	J	B	61.6 L	J	B	43.5 L	J	B	15.0 U		
Lead	11.0 U	J	CF	11.0 U	J	CDF	11.0 U	J	CDF	11.0 U	J	CDF	11.0 U	J	CDF	11.0 U	J	CDF	11.0 U	J	CF
Magnesium	28600			13700			32100			16300			13600			13500			33400		
Manganese	5.4 U			5.4 U			5.4 U			13.8 L	J	B	5.4 U			5.4 U			25.7		
Mercury	0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U		
Nickel	28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U		
Potassium	3140 L	J	B	4510 L	J	B	4840 L	J	B	3840 L	J	B	8380			8500			5920		
Selenium	15.0 U	R	ADF	15.0 U	R	ADF	15.0 U	R	ADF	15.0 U	R	ADF	15.0 U	R	ADF	15.0 U	R	ADF	15.0 U	R	AF
Silver	3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U		
Sodium	78400			43900			87400			48700			88300			87200			78000		
Thallium	1.6 U	J	CD	1.6 U	J	CD	1.6 U	J	CD	1.6 U	J	CD	1.6 U	J	CD	1.7 L	J	BCD	1.6 U	J	CD
Vanadium	13.5 L	J	B	9.7 L	J	B	9.8 L	J	B	9.4 L	J	B	9.1 L	J	B	9.8 L	J	B	9.6 L	J	B
Zinc	55.0			833.0			84.3			34.9			977			969			28.4		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument tion Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applica.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 23, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW002GW-15			DW003GW-01			DW003GD-01			DW-003GW-02			DW003GW-03			Lab Blank			IDL		
Sample I.D.	MYL941 FB			MYL942 D2			MYL943 D2			MYL944			MYL945								
Date of Collection	7/15/93			7/16/93			7/16/93			7/16/93			7/16/93								
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4		
Antimony	50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6		
Arsenic	2.2 U	J	C	2.2 U	J	CD	2.2 U	J	CD	2.2 U	J	CD	2.2 U	J	C	2.2 U			2.2		
Barium	1.8 U			23.0 L	J	B	23.0 L	J	B	15.8 L	J	B	1.8 U			1.8 U			1.8		
Beryllium	2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1		
Cadmium	2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9		
Calcium	499 L	J	B	179000			188000			151000			249 L	J	B	45.1 U			45.1		
Chromium	6.8 L	J	B	8.1 L	J	B	5.8 L	J	B	10.4			7.4 L	J	B	7.3 L	J	B	4.4		
Cobalt	11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3		
Copper	3.1 L	J	B	33.5			34.1			11.6 L	J	B	2.7 U			2.7 U			2.7		
Iron	24.1 L	J	B	28.9 L	J	B	15.0 U			390.0			19.7 L	J	B	15.0 U			15.0		
Lead	1.1 U	J	C	11.0 U	J	CF	11.0 U	J	CF	11.0 U	J	CF	1.1 U	J	C	1.1 U			1.1		
Magnesium	106 L	J	B	30700			32200			28700			69.9 L	J	B	52.9 L	J	B	33.2		
Manganese	5.4 U			25.7 U			25.7 U			38.0			5.4 U			5.4 U			5.4		
Mercury	0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20		
Nickel	28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5		
Potassium	636 L	J	B	5790 L	J	B	5960 L	J	B	5390			713 L	J	B	433 U			433		
Selenium	4.5 U	R	A	15.0 U	R	ADF	15.0 U	R	AF	15.0 U	R	ADF	1.5 U	R	A	1.5 U			1.5		
Silver	3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4		
Sodium	500 L	J	B	54300			57100			73600			450 L	J	B	29.4 U			29.4		
Thallium	1.6 U	J	C	1.6 U	J	CD	1.6 U	J	CD	2.1 L	J	BCD	2.5 L	J	BCD	1.6 U			1.6		
Vanadium	8.5 U			8.5 U			8.5 U			8.5 U			8.5 U			8.5 U			8.5		
Zinc	18.3 U			18.3 U			18.7 L	J	B	1930			18.3 U			18.3 U			18.3		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: September 23, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location Sample I.D. Date of Collection	CRDL																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	200																				
Antimony	60.0																				
Arsenic	10.0																				
Barium	200																				
Beryllium	5.0																				
Cadmium	5.0																				
Calcium	5000																				
Chromium	10.0																				
Cobalt	50.0																				
Copper	25.0																				
Iron	100																				
Lead	3.0																				
Magnesium	5000																				
Manganese	15.0																				
Mercury	0.20																				
Nickel	40.0																				
Potassium	5000																				
Selenium	5.0																				
Silver	10.0																				
Sodium	5000																				
Thallium	10.0																				
Vanadium	50.0																				
Zinc	20.0																				

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument ion Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20292 Memo #03 LABORATORY ALI

SDG NO. MYL934 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 23, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES 12 WATER 3 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	O	
2. CALIBRATION	O	O	O	
3. BLANKS	O	O	O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	
6. DUPLICATE ANALYSIS	O	O	O	
7. MATRIX SPIKE ANALYSIS	X	Z/M	O	
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	
11. SAMPLE VERIFICATION	O	O	O	
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M	Z/M	O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20292 Memo #03 LABORATORY ALI

SDG NO. MYL934 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 23, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES 12 WATER 3 SOIL _____ OTHER

TPO ACTION: A post-spike was not performed for antimony. According to the Statement of Work (SOW) (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. The matrix spike recovery result for antimony in QC sample numbers MYL548 was 35.4%, resulting in the estimation of antimony in samples MYL546 through MYL548.

Selenium was rejected in all of the samples due to matrix spike recoveries of less than 30%.

TPO ATTENTION: None.

AREA OF CONCERN: The ICP Contract Required Detection Limit (CRDL) standards for lead recoveries were 159% and 39.5%. This wide variation in recoveries between the inital and final standards may indicate uncertainty in results near the lead ICP detection limit.

In Reference to Case No(s).:

20292 Memo #03

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 20 and 21, 1993

Laboratory Name: Associated Laboratories, Inc (ALI)

Lab Contact: Carlo Zhou

Region: IX

Regional Contact: Blake Brown ESAT/ICF

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL546 through MYL548 (Soils) MYL934 through MYL945 (Waters)

Summary of Questions/Issues Discussed:

1. Why wasn't a post-spike analyzed for antimony? The matrix spike recovery for antimony was 35.4%, outside the 75-125% control limits.

2. Form XIV need to be resubmitted. The ICP results for lead were incorrectly marked as being reported.

3. Why weren't the ICP CCB's for lead rerun, since they were above the CRDL?

Summary of Resolution:

1. The laboratory was aware of the problem, but it was too late to analyze for an antimony post-spike.

2. The form was regenerated and submitted to SMO. A copy was faxed to ICF and was inserted into the data package.

3. Laboratory oversight.

Blake M. Brown — Signature

9/22/93 — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: October 19, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7762Y-01 Memo #04
SDG NO.:	SY7115
LABORATORY:	Oak Ridge Research Institute (ORRI)
ANALYSIS:	SAS Mercury Speciation
SAMPLE NO.:	10 Soil Samples (See Case Summary)
COLLECTION DATE:	September 9, 1992 and July 15, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Tom B. Bennett, Jr. , TPO USEPA Region IV
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: SAS 7762Y-01 Memo #04
Site: Carson River
Laboratory: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF
Date: October 19, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY7115 through SY7119 and SY7125 through SY7129

COLLECTION DATE: September 9, 1992 and July 15, 1993
SAMPLE RECEIPT DATE: July 16 and 27, 1993

CONCENTRATION & MATRIX: 5 Low and 5 Medium Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: SY7117 and SY7129
Duplicates: SY7117 and SY7129
Matrix Spike Duplicates: SY7117 and SY7129

ANALYSIS: SAS Mercury Speciation

Analyte	Sample Preparation and Digestion Date	Analysis Date
Total Mercury	August 9, 1993	August 19, 1993
Elemental Mercury	August 9-15, 1993	August 19, 1993
Mercuric Sulfide	August 9, 1993	August 24, 1993
Methyl Mercury	August 12, 1993	August 13 and 14, 1993
Percent Solids	Not Applicable	August 19, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes in all of the samples.

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: For this Special Analytical Services (SAS) contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork were not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory used matrix spike concentrations of approximately 0.1-3X the QC sample concentrations in an effort to provide relevant data.
- LCS results were only provided for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, or methyl mercury.
- Form X (instrument detection limits) was provided, but only gives information on the CRDL. Note that no IDL studies have been performed.

The percent solids were incorrectly calculated in the original data package. As a result, all of the sample and QC results forms required correction and resubmission.

Only the results for the initial calibration verification (ICV) standards and first continuing calibration verification (CCV) standards were reported on the QC form for ICVs and CCVs (equivalent of Form IIA). However, all of the CCVs were compliant. For mercuric sulfide CCVs were only performed every 16 samples. Continuing calibration blanks (CCBs) were analyzed every 10 samples. No CCV or CCB was analyzed at the end of the methyl mercury analytical run on August 13, 1993.

SAMPLING ISSUES: None

OTHER: None

ADDITIONAL COMMENTS:

The contract required detection limits (CRDLs) specified in the laboratory SOP (which was used for the SAS contract) are 7 ppb for total mercury, elemental mercury, and mercuric sulfide, and 30 ppb for methyl mercury. These detection limits were effective for the analysis of the final extracts. The CRDLs in mg/kg for the original soil samples vary depending upon the percent solids result for the sample, the sample mass, and the volume of extract used. The CRDLs reported in Table 1A are for the largest volumes of extract used, and are thus the lowest CRDLs applicable to each analysis. Thus, the CRDLs set forth in the SAS CRF were not effective for these soil samples.

Results which are less than the CRDL have been reported by the laboratory for mercuric sulfide. The validator has added the "L" qualifier to these results. The results for methyl mercury, which the laboratory reported as "<CRDL," are reported in Table 1A as the calculated value in mg/kg of the CRDL for the soil sample corrected for percent solids, the sample mass, and the volume of extract used, with the "U" qualifier.

In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150°C to drive off the elemental mercury is subtracted from the result for total mercury without heating. In the calculations for elemental mercury, the laboratory quantitated and subtracted results for the reanalysis of the total mercury after heating even when these results were less than the CRDL.

The results for inorganic mercury are calculated by subtracting the results for elemental mercury, mercuric sulfide, and methyl mercury from the results for total mercury. Therefore, these calculated results are the largest values possible for inorganic mercury. For these calculations, methyl mercury results below the CRDL are considered to be zero.

Note that samples SY7125 through SY7129, which were received by the laboratory on July 27, 1993, were collected on September 12, 1992, and archived by the samplers until shipment on July 26, 1993.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for mercury speciation, the SOP submitted by the laboratory for this SAS contract, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	C
2. Sample Holding Times	No	B
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	C
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	

(Continued Next Page)

II. Validation Summary (Continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A,D
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the laboratory detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the laboratory detection limit but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Note that no detection limit studies have been performed by the laboratory, and that the laboratory quantitated and reported results less than the CRDL for mercuric sulfide, and used results less than the CRDL in the calculations for elemental mercury and inorganic mercury. Results less than the CRDL were not reported for methyl mercury.

B. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- All of the analytes in all of the samples

The soil analyses for samples SY7115 through SY7119 exceeded the 12-day (from sample collection) technical holding time stated in the SAS CRF by 17 to 28 days, and exceeded the 10-day (from laboratory receipt) contractual holding time stated in the SAS CRF by 16 to 27 days.

The soil analyses for samples SY7125 through SY7129, which were archived by the samplers from collection on September 12, 1992 until shipment on July 26, 1993, exceeded the 12-day (from sample collection) technical holding time stated in the SAS CRF by 321 to 328 days, and exceeded the 10-day (from laboratory receipt) contractual holding time stated in the SAS CRF by 7 to 18 days.

Sample results may be biased low and false negatives may exist.

C. Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which are for total mercury. These results were within the 75-125% criteria stated in the SAS CRF.

D. In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150 °C is subtracted from the result for total mercury (without heating). The results in samples SY7115 through SY7119 for total mercury after heating were less than the CRDLs for these samples (see Comment A).

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #04
Site: Carson River
Lab.: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: October 19, 1993

Analysis Type: Low and Medium Concentration Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg (Dry Weight Basis)

Concentration	Low			Low			Low			Low			Low			Medium			Medium		
Station Location	MS-021-SL-04-A			MS-025-SL-05-A			MS-026-SL-06-A			MS-027-SL-04-A			MS-028-SL-03-A			MW-3			MW-4		
Sample I.D.	SY7115			SY7116			SY7117			SY7118			SY7119			SY7125			SY7126		
Date of Collection	07/15/93			07/15/93			07/15/93			07/15/93			07/15/93			09/12/92			09/12/92		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	16.3	J	B	18.9	J	B	36.6	J	B	3.2	J	B	9.0	J	B	759	J	B	646	J	B
Elemental Mercury	15.8	J	BD	18.7	J	BD	36.2	J	BD	3.0	J	BD	9.0	J	BD	447	J	B	499	J	B
Mercuric Sulfide	2.9 L	J	AB	4.4	J	B	6.4	J	B	1.2 L	J	AB	3.1	J	B	55.2	J	B	44.5	J	B
Methyl Mercury	0.062 U	J	B	0.062 U	J	B	0.061 U	J	B	0.061 U	J	B	0.063 U	J	B	0.074 U	J	B	0.079 U	J	B
Inorganic Mercury	0.0	J	B	0.0	J	B	0.0	J	B	0.0	J	B	0.0	J	B	<257	J	B	<103	J	B
Percent Solids	97.6 %			97.5 %			99.1 %			98.3 %			95.9 %			81.2 %			75.7 %		

Concentration	Medium			Medium			Medium														
Station Location	MW-7			MW-8			MW-10														
Sample I.D.	SY7127			SY7128			SY7129			Lab Blank			CRDL*								
Date of Collection	09/12/92			09/12/92			09/12/92														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	351	J	B	748	J	B	2420	J	B	1.8 U			1.8								
Elemental Mercury	226	J	B	689	J	B	675	J	B	1.8 U			1.8 **								
Mercuric Sulfide	56.2	J	B	134	J	B	626	J	B	7.0 U			2.8								
Methyl Mercury	0.105 U	J	B	0.081 U	J	B	0.082 U	J	B	0.060 U			0.060								
Inorganic Mercury	<68.8	J	B	0.0	J	B	<1120	J	B	N/A			N/A								
Percent Solids	57.2 %			74.3 %			73.4 %			—			—								

* CRDLs for Largest Volumes of Extracts Analyzed. (Total Mercury: 1.0 mL; Elemental Mercury: 1.0 mL; Mercuric Sulfide: 0.025 mL; Methyl Mercury: 0.002 mL). Will Vary for each Sample.

** This is the CRDL for the analyses for total mercury after heating to drive off elemental mercury, which is then subtracted from total mercury to give elemental mercury.

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable: Results are derived by subtraction of other results.

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #04 LABORATORY ORRI

SDG NO. SY7115 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE October 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 10 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			M	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			O	
7. MATRIX SPIKE ANALYSIS			O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO ACTION: The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes in all of the samples.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #04 LABORATORY ORRI

SDG NO. SY7115 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE October 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES ____ WATER 10 SOIL ____ OTHER

TPO ATTENTION: For this Special Analytical Services (SAS) contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork were not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory used matrix spike concentrations of approximately 0.1-3X the QC sample concentrations in an effort to provide relevant data.
- LCS results were only provided for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, or methyl mercury.
- Form X (instrument detection limits) was provided, but only gives information on the CRDL. Note that no IDL studies have been performed.

The percent solids were incorrectly calculated in the original data package. As a result, all of the sample and QC results forms required correction and resubmission.

Only the results for the initial calibration verification (ICV) standards and first continuing calibration verification (CCV) standards were reported on the QC form for ICVs and CCVs (equivalent of Form IIA). However, all of the CCVs were compliant. For mercuric sulfide CCVs were only performed every 16 samples. Continuing calibration blanks (CCBs) were analyzed every 10 samples. No CCV or CCB was analyzed at the end of the methyl mercury analytical run on August 13, 1993.

In Reference to Case No(s).:

SAS 7762Y-01 Memo #04

TRL #1

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 28 and 30, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nat Revis and Tanya Osborne

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY7115 through SY7119 and SY7125 through SY7129

Summary of Questions/Issues Discussed:

1. In the calculations for percent solids, the sample boat weight was not subtracted from the gross wet and dry sample weights. All of the percent solids results are incorrect. As a result, all of the corrected sample weights (except for elemental mercury) are incorrect, and all of the sample results are incorrect. Please recalculate the percent solids, corrected sample weights, sample, and QC sample results, and correct and resubmit all relevant raw data worksheets and forms. This would include pages 1, 6-9, 28-32, 59, and 60 of the data package.
2. Only the initial and first continuing calibration verification standard (ICV and CCV) results were reported on the QC results form for ICVs and CCVs. Please fill in the results for all of the remaining CCVs.

Summary of Resolution:

1,2. (9/28/93) The laboratory will make the corrections and fill in the CCVs. (9/30/93) The laboratory is working on the corrections and will FAX them tomorrow (10/01/93). See TRL #2.

Signature

September 9, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #04

TRL #2

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: October 5, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY7115 through SY7119 and SY7125 through SY7129

Summary of Questions/Issues Discussed:

1. I am having difficulty deciphering the corrections FAXed 10/01/93. Please use the original pages of raw data and simply cover the right hand columns with the final results and fill in the corrected final results. Thus, I can replace the original pages with the corrected pages, and all of the data will be on the corrected pages. Also, please send corrected replacements for the sample and QC sample results in finished (typed) format. I did not receive several of the pages needed. The pages which I require are pages 1, 6-9, 28-32, 59, and 60 of the data package.

Summary of Resolution:

1. ICF/ESAT received copies of the corrected raw data and sample and QC results by FAX on 10/06/93.

Chris Davis
Signature

October 6, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #04

TRL #3

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: October 7, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY7115 through SY7119 and SY7125 through SY7129

Summary of Questions/Issues Discussed:

1. I did not receive pages 1 or 28 of the data package in the FAXed corrections received 10/06/93. Please send these pages.

Summary of Resolution:

1. ICF/ESAT received copies of the corrected pages 1 and 28 of the data package by FAX on 10/08/93.

Signature

October 8, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #04

TRL #4

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: October 13, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY7115 through SY7119, and SY7125 through SY7129

Summary of Questions/Issues Discussed:

1. Thank you for the previous corrections. There are only two very small corrections to be made:
   1) Sample SY7116, HgS; should be 4.4163 on page 1 (Form I), not 6.4163. This result was correctly calculated in the Raw Data.
   2) Sample SY7117, HgS; should be 6.4444 on page 1 (Form I), not 6.5191. In the Raw Data (page 30), the result was accidently divided by the corrected sample weight for sample SY7116.

   Please correct and resubmit pages 1 and 30 of the data package, and FAX me a copy at (415) 882-3199. Thanks a lot.

Summary of Resolution:

1. ICF/ESAT received copies of the corrected pages 1 and 30 of the data package by FAX on 10/15/93.

Chris Davis
Signature

October 15, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

Data Validation Report

Case No.: 20856 Memo#01
Site: Carson River
Laboratory: Southwest Labs of Oklahoma (SWOK)
Reviewer: Chris Davis, ESAT/ICF
Date: November 12, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYM595 through MYM602

COLLECTION DATE: September 14, 15, 16, 21, and 22, 1993
SAMPLE RECEIPT DATE: September 24, 1993

CONCENTRATION & MATRIX: 8 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (Dl): None

LABORATORY QC: Matrix Spike: MYM601
Duplicates: MYM601
ICP Serial Dilution: MYM601

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	October 4, 1993	October 6, 8, and 12, 1993
Mercury	October 5, 1993	October 5, 1993
Percent Solids	Not Applicable	October 4, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.1), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the instrument detection limits (IDL), whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

SAMPLING ISSUES: None.

OTHER: The results for antimony in six samples were rejected due to a 19.4% recovery of the matrix spike.

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: August 19, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	NVD980813646
CERCLIS I.D. NO.:	R6
CASE/SAS NO.:	20097 Memo #01
SDG NO.:	MYL536
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	Ras Total Metals and Cyanide
SAMPLE NO.:	1 Soil Sample: MYL536
COLLECTION DATE:	June 22, 1993
REVIEWER:	Karen Pettit, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Steve Remaley, TPO USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 20097 Memo #01
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF
Date: August 19, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL536

COLLECTION DATE: June 22, 1993
SAMPLE RECEIPT DATE: June 25, 1993

CONCENTRATION & MATRIX: Low Concentration Soil

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None

LABORATORY QC: Matrix Spike: MYL536
Duplicates: MYL536
ICP Serial Dilution: MYL536

ANALYSIS: Ras Total Metals and Cyanide

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	July 16, 1993	July 22 and 26, 1993
GFAA: Arsenic	July 16, 1993	July 21 and 22, 1993
Lead	July 16, 1993	July 22 and 26, 1993
Selenium	July 16, 1993	July 20 and 22, 1993
Thallium	July 16, 1993	July 21, 1993
Mercury	July 20, 1993	July 20, 1993
Cyanide	June 30, 1993	June 30, 1993
Percent Solids	Not Applicable	July 16, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: The raw data for the ICP calibration performed on July 22, 1993 was not included in the data package. It was reported lost. According to the Inorganic Statement of Work, ILM02.1, for each reported value, the contractor shall include all raw data used to obtain that value including instrument standardization data. This is not expected to affect the quality of the data as the system performance

checks, including initial and continuing calibration verification standards, contract required detection limit (CRDL) standards, and duplicate sample analyses, were within the acceptable limits.

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: According to the Inorganic Statement of Work, ILM02.1, the instrument detection limit (IDL) must be determined for each instrument used, within 30 days of the start of the contract analyses and at least quarterly (every 3 calendar months). The IDL studies included with this case exceeded the 3 month limit by 5 to 7 days. It was determined through subsequent communication with the laboratory that IDL studies had been run prior to the analyses of this SDG. New Form X's were submitted for inclusion with this SDG.

ADDITIONAL COMMENTS:

The corrected analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	

II. Validation Summary (continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
10. GFAA QC Analysis	Yes	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	C
12. Sample Quantitation	Yes	A,D
13. Sample Result Verification	Yes	

N/A - Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony, barium, beryllium, cadmium, chromium, cobalt, nickel, selenium, thallium, and vanadium in sample MYL536

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony, barium, beryllium, cadmium, chromium, cobalt, nickel, selenium, thallium, and vanadium in QC sample number MYL536 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL536 % Recovery	MYL536 % Bias
Antimony	-11.6	-112
Barium	0.1	-99.9
Beryllium	-0.7	-101
Cadmium	-4.4	-104

Analyte	MYL536 % Recovery	MYL536 % Bias
Chromium	0.0	-100
Cobalt	-1.1	-101
Nickel	-2.7	-103
Selenium	-133	-233
Thallium	62.6	-37.4
Vanadium	-0.3	-100

Results above the MDL are considered quantitatively uncertain. The results reported for antimony, barium, beryllium, cadmium, chromium, cobalt, nickel, selenium, thallium, and vanadium in sample MYL536 may be biased low, and where non-detected, false negatives may exist. The low matrix spike recoveries may indicate severe matrix interference or an analytical deficiency.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. The percent recovery for each analyte for this spike is presented below.

Analyte	MYL536 % Recovery
Antimony	94.7
Barium	358
Beryllium	74.9
Cadmium	88.3
Chromium	85.4
Cobalt	917
Nickel	86.2
Vanadium	80.6

Since the post-digestion spike recoveries were acceptable for antimony, beryllium, cadmium, chromium, nickel, and vanadium, the low pre-digestion spike recovery results obtained for these analytes may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical results.

Both the post and pre-digestion spikes for barium, beryllium, and cobalt did not meet the QC criteria. Matrix effects may be present in the sample digestate which may enhance or depress the analyte signal during analysis.

The user should note that in the analysis for thallium, sample MYL536 was diluted by a factor of 10 to mitigate matrix interference (see comment D), whereas matrix spike sample MYL536-S was analyzed undiluted.

C. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Aluminum, calcium, iron, lead, magnesium, manganese, silver sodium, and zinc in the sample MYL536

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample number MYL536 did not meet the less than 10% criteria for the analytes shown below.

Analyte	MYL536 % Difference
Aluminum	10.8
Calcium	18.5
Iron	17.8
Lead	17.3
Magnesium	13.2
Manganese	15.2
Silver	18.1
Sodium	30.9
Zinc	32.6

The results reported for aluminum, calcium, iron, lead, magnesium, manganese, silver, sodium, and zinc in sample MYL536 are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

D. Due to poor analytical spike recoveries, the following sample was diluted and the quantitation limit for the analyte shown below has been raised.

- Thallium in sample MYL536

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Thallium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires the analysis of analytical spikes. Sample MYL536 was diluted by a factor of ten because the spike recovery obtained in the original analysis was less than 40%. The low percent recovery obtained for thallium may be due to chemical or physical interferences. Dilution of the sample is performed to reduce any matrix interference which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limit reported in Table 1A for thallium in sample MYL536 was raised by the dilution factor.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20097 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: August 19, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	TP-017-SD-10-A			Lab Blank			MDL			CRDL											
Sample I.D.	MYL536																				
Date of Collection	06/22/93																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	18100	J	C	8.3 U			8.3			40.0											
Antimony	11.8 L	J	AB	10.1 U			10.1			12.0											
Arsenic	627			0.44 U			0.44			2.0											
Barium	78.2	J	B	0.36 U			0.36			40.0											
Beryllium	1.4	J	B	0.42 U			0.42			1.0											
Cadmium	7.3	J	B	0.58 U			0.58			1.0											
Calcium	6230	J	C	14.5 L	J	A	9.0			1000											
Chromium	17.5	J	B	0.88 U			0.88			2.0											
Cobalt	11.8	J	B	2.3 U			2.3			10.0											
Copper	915			0.54 U			0.54			5.0											
Iron	32800	J	C	3.0 U			3.0			20.0											
Lead	1520	J	C	5.5 U			5.5			0.60											
Magnesium	11100	J	C	6.6 U			6.6			1000											
Manganese	1080	J	C	1.1 U			1.1			3.0											
Mercury	369			0.10 U			0.10			0.10											
Nickel	22.0	J	B	5.7 U			5.7			8.0											
Potassium	1880			138 L	J	A	86.6			1000											
Selenium	4.9	J	B	0.30 U			0.30			1.0											
Silver	115	J	C	0.68 U			0.68			2.0											
Sodium	872 L	J	AC	5.9 U			5.9			1000											
Thallium	3.3 U	J	BD	0.32 U			0.32			2.0											
Vanadium	44.5	J	B	1.7 L	J	A	1.7			10.0											
Zinc	880	J	C	3.7 U			3.7			4.0											
Cyanide	2.7 U			2.5 U			2.5			2.0											
Percent Solids	93.6 %			—			—			—											

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20097 Memo #01 LABORATORY Associated Laboratory,Inc.(ALI)

SDG NO. MYL536 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE August 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 1 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	O	O
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	O	O	O	O
7. MATRIX SPIKE ANALYSIS	M	M	O	O
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		O		
13. OVERALL ASSESSMENT	M	M	O	O

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20097 Memo #01 LABORATORY Associated Laboratory,Inc.(ALI)

SDG NO. MYL536 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE August 19, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 1 SOIL _____ OTHER

TPO ACTION: The raw data for the ICP calibration performed on July 22, 1993 was not included in the data package. It was reported lost. According to the Inorganic Statement of Work, ILM02.1, for each reported value, the contractor shall include all raw data used to obtain that value including instrument standardization data. This is not expected to affect the quality of the data due to the fact that the system performance checks including initial and continuing calibration verification standards, contract required detection limit (CRDL) standards, and duplicate sample analyses, were within the acceptable limits.

TPO ATTENTION: According to the Inorganic Statement of Work, ILM02.1, the instrument detection limit (IDL) must be determined for each instrument used, within 30 days of the start of the contract analyses and at least quarterly (every 3 calendar months). The IDL information included with this data exceeded the 3 month limit by 5 to 7 days. It was determined through subsequent communication with the laboratory that IDL studies had been run prior to the analyses of this SDG. It was requested that new Form X's be submitted for inclusion with this SDG.

In Reference to Case No(s).:

20097 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 16, 1993

Laboratory Name: Associated Laboratory, Inc. (ALI)

Lab Contact: Tito Parola

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL536

Summary of Questions/Issues Discussed:

1. The raw data for ICP calibration on July 22, 1993 was not included in data package.
2. The IDL data from the IDL study run on July 15, 1993 needs to be entered on Form X. Also please submit other IDL studies that might pertain to this SDG.

Summary of Resolution:

1. Mr. Parola will fax calibration data as soon as possible.
2. All IDL data that pertains to this SDG will be sent.
3. Mr. Parola referred my request to Mary Truong. See TRL for August 17, 1993.

Karen Pettit
Signature

8/19/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

20097 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 17, 1993

Laboratory Name: Associated Laboratory, Inc. (ALI)

Lab Contact: Mary Truong

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL536

Summary of Questions/Issues Discussed:

1. The raw data for ICP calibration on July 22, 1993 was not included in the data package.
2. The IDL data from the IDL studies run in July need to be entered on Form X. Also please submit other IDL studies that might pertain to this SDG.
3. In reply to her second call, it was requested that all appropriate Forms be corrected to reflect the most recent IDL study results.

Summary of Resolution:

1. Ms. Truong reported that the calibration data was lost.
2. All IDL data, on Form X, that pertains to this SDG was faxed.
3. All Forms I, III, V, and VI were corrected to agree with new IDL's.
4. ICF/ESAT received copies of Forms I, III, V, VI, and X on August 17, 1993.

Karen Pettit
Signature

8/19/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 9, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20614 Memo #01
SDG NO.:	MYL947
LABORATORY:	Weyerhaeuser Analytical and Testing Services (WEYER)
ANALYSIS:	RAS Total Metals and Cyanide
SAMPLE NO.:	11 Soil Samples (See Case Summary)
COLLECTION DATE:	August 16 through September 1, 1993
REVIEWER:	Karen Pettit, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Bruce Woods, TPO USEPA Region X
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

Data Validation Report

Case No.: 20614 Memo #01
Site: Carson River
Laboratory: Weyerhaeuser Analytical and Testing Services (WEYER)
Reviewer: Karen Pettit, ESAT/ICF
Date: November 9, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL947 through MYL949, MYM397 through MYM400, and MYM403 through MYM406

COLLECTION DATE: August 16 through September 1, 1993
SAMPLE RECEIPT DATE: August 27, 1993 and September 3, 1993

CONCENTRATION & MATRIX: Low Concentraton Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYL948 and MYL949

LABORATORY QC: Matrix Spike: MYM397
Duplicates: MYM397
ICP Serial Dilution: MYM397

ANALYSIS: RAS Total Metals and Cyanide

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		September 28, 1993	October 4, 1993
GFAA:	Arsenic	September 28, 1993	October 4 and 5, 1993
	Lead	September 28, 1993	October 5, 1993
	Selenium	September 28, 1993	October 5, 1993
	Thallium	September 28, 1993	October 4, 1993
Mercury		September 21 and 24, 1993	September 22 and 24, 1993
Cyanide		August 30, 1993	August 30, 1993
Percent Solids		Not Applicable	September 28 through 29, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: The results for antimony in all of the samples are rejected because of matrix spike recovery results outside method QC limits. The

results reported for antimony in all of the samples were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: According to the Inorganic Statement of Work, ILM02.1, the contractual holding time for mercury is 26 days from sample receipt by the laboratory. The technical holding time is 28 days from the sampling date. The result for six of the samples exceeded the 28-day technical holding time by one to eight days. Sample MYM400, which marginally exceeded the technical holding time by one day, was not estimated. Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criterion for waters is applied at the reviewer's discretion to soil analyses. It should be noted that there was a three to eleven day period between the sampling date and the sample arrival time at the laboratory.

OTHER: Mercury result for sample MYM398 was calculated with an incorrect dilution factor. The laboratory, when contacted, agreed that there had been an error made. They corrected the appropriate forms and faxed them on November 2, 1993.

ADDITIONAL COMMENTS:

The laboratory analyzed nine of the samples in this sample delivery group (SDG) for lead by ICP. Although the instrument detection limit (IDL) for lead by ICP was above the RAS contract required detection limit (CRDL) specified for lead in the Statement of Work (SOW), the lead concentration in the samples was greater than 5X IDL for lead by ICP.

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the MDL and CRDL were 138 mg/Kg and 1000 mg/Kg, respectively. Since the true value for potassium in the LCS was less that the MDL, the result obtained for potassium was reported as non-detected.

Four of the samples in this SDG were not analyzed for cyanide. When the last shipment of samples arrived on September 3, 1993. No cyanide analyses was specified on the chain of custody. The Sample Management Office (SMO) was contacted by the laboratory and SMO informed the laboratory not to analyze that shipment of samples for cyanide.

The corrected analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	No	D
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	No	E
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	No	F
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	C
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in all of the samples

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample MYM397 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYM397 % Recovery	MYM397 % Bias
Antimony	24.4	-75.6

The results reported for antimony in all of the samples were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix

spike recovery indicates an analytical deficiency and false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 75.3% was obtained for antimony in QC sample MYM397. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (24.4%) obtained for antimony may indicate poor laboratory technique, sample nonhomogeneity, or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Barium, copper, selenium, vanadium, and zinc in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for barium, copper, selenium, vanadium, and zinc in QC sample MYM397 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYM397 % Recovery	MYM397 % Bias
Barium	72.0	-28.0
Copper	65.2	-34.8
Selenium	70.0	-30.0
Vanadium	73.8	-26.2
Zinc	69.3	-30.7

Results above the MDL are considered quantitatively uncertain. The results reported for barium, copper, selenium, vanadium, and zinc in all of the samples may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. Post-digestion spike recovery results of 100.1% for barium, 109.8% for copper, 97.7% for vanadium, and 108.8% for zinc were obtained in QC sample MYM397. Since the post-digestion spike recovery results were acceptable, the low pre-digestion spike recovery results obtained for barium (72.0%), copper (65.2%), vanadium (73.8%), and zinc (69.3%) may indicate poor laboratory technique, sample nonhomogeneity, or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- Mercury in samples MYL947 through MYL949, MYM397, and MYM398

Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criterion for waters is applied at the reviewer's discretion to soil analyses. These soil analyses exceeded the SW-846, 28-day, technical holding time for mercury as shown below.

Sample Number	Date Collected	Date Received	Date Analyzed	#ofdays Exceeded
MYL947	08/18/93	08/27/93	09/21/93	6
MYL948	08/20/93	08/27/93	09/21/93	4
MYL949	08/20/93	08/27/93	09/21/93	4
MYM397	08/16/93	08/27/93	09/21/93	8
MYM398	08/18/93	08/27/93	09/21/93	6

Sample results may be biased low and false negatives may exist.

It should be noted that there was a three to eleven day period between the sampling date and the sample arrival time at the laboratory. Sample MYM400 marginally exceeded the technical holding time by one day, and is not expected to significantly affect the result for mercury.

The SW-846 technical holding times were not exceeded for the other analytes in any of the samples.

E. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Barium and iron in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYM397 Lab. Dup. RPD
Barium	35.7
Iron	44.9

The results reported for barium and iron in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

F. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in samples MYL947, MYM397, MYM403, MYM405, and MYM406
- Thallium in samples MYL949, MYM397, MYM398, and MYM403

Selenium and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for selenium and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYL947	76.0	-24.0
	MYM397	78.5	-21.5
	MYM403	74.0	-26.0
	MYM405	79.0	-21.0
	MYM406	70.0	-30.0
Thallium	MYL949	83.0	-17.0
	MYM397	79.0	-21.0
	MYM398	82.8	-17.2
	MYM403	75.8	-24.2

The post-digestion spike recovery results for selenium and thallium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The results reported for selenium and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

The post-digestion analytical spike recovery result of 67.5% for selenium in the laboratory control sample (LCS) and results of 77.0% for selenium and 81.0% for thallium in the laboratory duplicate sample, MYM397 also did not meet the 85-115% criteria for accuracy.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20614 Memo #01
Site: Carson River
Lab.: Weyerhaeuser Analytical & Testing Services (WEYER)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: November 9, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	MS-001-SD-92-A			MS-002-ST-80-A			MS-002-SD-80-A			MS-004-SD-27-A			MS-004-SD-34-A			AF-001-SD-08-A			TP-019-SD-03-A		
Sample I.D.	MYL947			MYL948 D1			MYL949 D1			MYM397			MYM398			MYM399			MYM400		
Date of Collection	8/18/93			8/20/93			8/20/93			8/16/93			8/18/93			8/25/93			8/24/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	12400			9590			9160			14200			9470			14400			8620		
Antimony	4.5 U	R	A	4.4 U	R	A	4.4 U	R	A	4.1 U	R	A	5.0 U	R	A	4.3 U	R	A	4.1 U	R	A
Arsenic	8.6			18.5			19.0			10.6			5.5 L	J	C	10.7			3.6		
Barium	96.5	J	BE	73.7	J	BE	74.7	J	BE	267	J	BE	293	J	BE	50.1	J	BE	28.2 L	J	BCE
Beryllium	0.31 L	J	C	0.30 L	J	C	0.33 L	J	C	0.39 L	J	C	0.23 L	J	C	0.43 L	J	C	0.19 L	J	C
Cadmium	0.89 U			3.0			3.6			0.99			1.0 U			0.85 U			1.4		
Calcium	7440			11700			9960			15200			12200			1730			2020		
Chromium	12.4			8.3			8.7			14.4			10.4			16.3			11.6		
Cobalt	7.3 L	J	C	6.5 L	J	C	7.5 L	J	C	10.9			4.8 L	J	C	7.3 L	J	C	2.4 L	J	C
Copper	26.5	J	B	183	J	B	183	J	B	101	J	B	52.0	J	B	70.5	J	B	73.0	J	B
Iron	20100	J	E	19300	J	E	20100	J	E	35000	J	E	18800	J	E	21800	J	E	9360	J	E
Lead	28.4			154			171			394			429			113			70.6		
Magnesium	4290			4480			4280			6650			3580			5150			6190		
Manganese	377			607			649			527			269			701			375		
Mercury	19.4	J	DG	226	J	DG	211	J	DG	34.5	J	DG	13.9	J	DG	0.92			3.9		
Nickel	14.4			11.7			6.2 L	J	C	14.0			6.0 L	J	C	9.2			6.0 L	J	C
Potassium	1700			1980			2420			3410			1560			1330			1010		
Selenium	0.28 L	J	BCF	1.1	J	B	1.1	J	B	0.47 L	J	BCF	0.36 L	J	BC	1.0	J	B	0.44 L	J	BC
Silver	7.0			45.2			48.8			14.0			2.9			37.5			54.4		
Sodium	921 L	J	C	326 L	J	C	293 L	J	C	758 L	J	C	450 L	J	C	73.4 L	J	C	38.3 L	J	C
Thallium	0.17 U			0.17 U			0.14 U	J	F	0.18 U	J	F	0.14 U	J	F	0.17 U			0.15 U		
Vanadium	57.8	J	B	44.2	J	B	45.8	J	B	60.3	J	B	43.1	J	B	37.9	J	B	20.1	J	B
Zinc	90.2	J	B	333	J	B	347	J	B	280	J	B	453	J	B	162	J	B	103	J	B
Cyanide	0.52 U			0.50 U			0.51 U			0.62 U			0.63			1.0			0.50 U		
Percent Solids	96.0 %			98.9 %			98.8 %			80.9 %			95.5 %			98.9 %			99.1 %		

N/A- Not Applicable
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrum[illegible] Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20614 Memo #01
Site: Carson River
Lab.: Weyerhaeuser Analytical & Testing Services (WEYER)
Reviewer: Karen Pettit, ESAT/ICF Technology, Inc.
Date: November 9, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals and Cyanide

Concentration in mg/Kg

Station Location	FP-004-SD-06-A			FP-003-SD-08-A			FP-002-SD-08-A			AF-001-SD-25-A			Lab Blank			MDL			CRDL		
Sample I.D.	MYM403			MYM404			MYM405			MYM406			ICP / GFAA*			ICP / GFAA*					
Date of Collection	9/0193			8/31/93			8/31/93			8/27/93											
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	20000			7220			16800			25900			1.8 U			1.8			40.0		
Antimony	3.6 U	R	A	4.0 U	R	A	4.3 U	R	A	4.6 U	R	A	4.8 U			4.8			12.0		
Arsenic	11.9			5.5			9.7			8.2			0.16 U			0.16			2.0		
Barium	161	J	BE	66.5	J	BE	133	J	BE	211	J	BE	0.06 U			0.06			40.0		
Beryllium	0.52 L	J	C	0.23 L	J	C	0.38 L	J	C	0.58 L	J	C	0.06 U			0.06			1.0		
Cadmium	0.72 U			0.79 U			0.85 U			2.5			0.96 U			0.96			1.0		
Calcium	10000			3690			7460			6790			2.5 U			2.5			1000		
Chromium	16.1			8.9			20.6			18.4			0.38 U			0.38			2.0		
Cobalt	9.7			6.3 L	J	C	9.6			13.5			0.42 U			0.42			10.0		
Copper	41.3	J	B	9.8	J	B	15.1	J	B	155	J	B	0.82 U			0.82			5.0		
Iron	23200	J	E	16600	J	E	26300	J	E	31000	J	E	1.3 U			1.3			20.0		
Lead	36.4			7.3			8.2			192			4.2 U / 0.44U			4.2 / 0.44			0.60		
Magnesium	5970			2830			4670			8570			4.3 U			4.3			1000		
Manganese	607			295			341			823			0.10 U			0.10			3.0		
Mercury	23.0	J	G	2.4			1.8			40.4	J	G	0.05 U			0.05			0.10		
Nickel	12.5			6.9			9.6			11.0			4.0 U			4.0			8.0		
Potassium	3910			484 L	J	C	1200			3880			138 U			138			1000		
Selenium	0.19 L	J	BCF	0.13 U	J	B	0.13 U	J	BF	0.60 L	J	BCF	0.14 U			0.14			1.0		
Silver	7.3			0.48 U			0.51 U			18.2			0.58 U			0.58			2.0		
Sodium	1500			385 L	J	C	1300			552 L	J	C	3.3 U			3.3			1000		
Thallium	0.16 L	J	CF	0.16 U			0.16 U			0.17 U			0.18 U			0.18			2.0		
Vanadium	65.9	J	B	50.8	J	B	84.1	J	B	69.6	J	B	0.56 U			0.56			10.0		
Zinc	119	J	B	37.3	J	B	54.8	J	B	239	J	B	0.57 L	J	C	0.32			4.0		
Cyanide	N/A			N/A			N/A			N/A			0.50 U			0.50			0.50		
Percent Solids	96.9 %			99.5 %			96.4 %			98.8 %			N/A			N/A			N/A		

N/A- Not Applicable
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

* For lead analysis only by ICP and GFAA.
D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20614 Memo #01 LABORATORY WEYER

SDG NO. MYL947 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE November 9, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 11 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	M	O
2. CALIBRATION	O	O	O	O
3. BLANKS	O	O	O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	O
6. DUPLICATE ANALYSIS	M	O	O	O
7. MATRIX SPIKE ANALYSIS	M/Z	M	O	O
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O	O	O	O
11. SAMPLE VERIFICATION	O	O	O	O
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M/Z	M	M	O

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20614 Memo #01 LABORATORY WEYER

SDG NO. MYL947 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE November 9, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 11 SOIL _____ OTHER

TPO ACTION: The results for antimony in all of the samples are rejected because of matrix spike recovery results outside method QC limits. The results reported for antimony in all of the samples were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered.

TPO ATTENTION: According to the Inorganic Statement of Work, ILM02.1, the contractual holding time for mercury is 26 days from sample receipt by the laboratory. The technical holding time is 28 days from the sampling date. The result for six of the samples exceeded the 28-day technical holding time by one to eight days. The sample which marginally exceeded the technical holding time by one day was not estimated. Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criterion for water is applied at the reviewer's discretion to soil analyses. It should be noted that there was a three to eleven day period between the sampling date and the sample arrival time at the laboratory.

Mercury result for sample MYM398 was calculated with an incorrect dilution factor. The laboratory, when contacted, agreed that there had been an error made. They corrected the appropriate forms and faxed them on November 2, 1993.

AREAS OF CONCERN: A low initial CRI standard recovery of 42.8% and a final CRI standard recovery of 48.2% for lead were reported for the analyses in this SDG. A low CRA standard recovery of 50.0% for mercury on the September 21, 1993 analytical run and 75.0% for mercury on the September 24, 1993 analytical run were reported for the analyses in this SDG. While there are no criteria established for CRDL standard recoveries, low recoveries indicate uncertainty for sample results near the CRDL.

In Reference to Case No(s).:

20614 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: November 2 and 3, 1993

Laboratory Name: WEYER

Lab Contact: Kari Doxsee

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL947 through MYL949, MYM397 through MYM400 and MYM403 through MYM406

Summary of Questions/Issues Discussed:

1. On Form IV the true value of zinc in the ICSA was listed as 216 ug/L. The true value of the solution used is 71 ug/L. Would you please correct Form IV?

2. Mercury result for sample MYM398 was calculated with a dilution factor of 13.7. Form XIV lists the dilution factor as 13.7. A note on the mercury raw data sheet by the sample number listed the dilution factor as 8.7. Which is correct? Please resubmit Form I and Form XIV to reflect the correct information.

3. The Form I received on November 2, 1993 was unclear. Another call to the laboratory was made to request a clarification of the dilution technique on November 3, 1993.

In Reference to Case No(s).:

20614 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: November 2 and 3, 1993

Laboratory Name: WEYER

Lab Contact: Kari Doxsee

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: ____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL947 through MYL949, MYM397 through MYM400 and MYM403 through MYM406

Summary of Resolution:

1. Form I, IV, and XIV were faxed on November 2, 1993.

2. An explanation was received via fax concerning the calculation of the mercury results for sample MYM398 on November 3, 1993. See the attached response.

Karen Pettit
Signature

11/9/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

INORGANICS LABORATORY RESPONSE

This letter is in response to an 11/3/93 telephone call from Ms. Karen Pettit at the EPA / Region IX.

The call was in regard to the following EPA DATA PACKAGE:

Case No. 20614
SDG# MYL947

Ms. Pettit called to ask that the mercury result calculated for sample MYM398 be checked.

Sample MYM398 was digested to be analyzed for mercury on 9/23/93 at 21:00 hours (page 258 of the CLP Data Package).

Sample MYM398 was successfully analyzed for mercury on 9/24/93 at 22:10 hours (page 256 of the CLP Data Package).

Sample MYM398 was analyzed for mercury at a dilution of 15 ml in a total of 130.5 ml. The dilution factor is, therefore, 8.7.

The mercury concentration determined on the diluted sample MYM398 is 3.04 ug/L. Multiplying by the dilution factor 8.7 gives a mercury concentration of 26.5 ug/L.

The mercury concentration of sample MYM398, based on a digestion mass of 0.20 grams (rounded from 0.205 grams), a 100 ml final volume, and a percent solids of 95.5%, is 13.9 mg/Kg.

The dilution factor of 8.7 used for the determination of mercury in sample MYM398, and given on the resubmitted Form XIV-IN (page 074) is correct.

The calculated mercury concentration of 13.9 mg/Kg for sample MYM398 given on the resubmitted Form I-IN (page 006) is correct.

In Reference to Case No(s).:

20614 Memo #01

TRL #2

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: November 4, 1993

Laboratory Name: WEYER

Lab Contact: Art Hedly

Region: IX

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYL947 through MYL949, MYM397 through MYM400 and MYM403 through MYM406

Summary of Questions/Issues Discussed:

1. Another call was made on November 4, 1993 to clarify the information received on November 3, 1993. Why was 130.5 mL used as the final volume for the dilutions? What was the final volume for the calibration standards?

Summary of Resolution:

1. On November 4, 1993 I spoke with Mr. Hedley who explained that when the laboratory calculated the final volume for the dilutions performed, the reagents used were included in the volume to make 130.5 mL. The concentration of the standards was calculated on the volume before the reagents were used (100 mL). When all of the standards and undiluted samples were analyzed, the concentrations were calculated using 100 mL as the final volume. The same amount of reagents were added to all samples, diluted or undiluted.

Karen Pettit
Signature

11/9/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 12, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20856 Memo #01
SDG NO.:	MYM595
LABORATORY:	Southwest Labs of Oklahoma (SWOK)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	8 Soil Samples (MYM595 through MYM602)
COLLECTION DATE:	September 14, 15, 16, 21, and 22, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Ray Flores, TPO USEPA Region VI
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-9299/20856M01.RPT

Data Validation Report

Case No.: 20856 Memo#01
Site: Carson River
Laboratory: Southwest Labs of Oklahoma (SWOK)
Reviewer: Chris Davis, ESAT/ICF
Date: November 12, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYM595 through MYM602

COLLECTION DATE: September 14, 15, 16, 21, and 22, 1993
SAMPLE RECEIPT DATE: September 24, 1993

CONCENTRATION & MATRIX: 8 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: MYM601
Duplicates: MYM601
ICP Serial Dilution: MYM601

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	October 4, 1993	October 6, 8, and 12, 19
Mercury	October 5, 1993	October 5, 1993
Percent Solids	Not Applicable	October 4, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.1), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the instrument detection limits (IDL), whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

SAMPLING ISSUES: None.

OTHER: The results for antimony in six samples were rejected due to a 19.4% recovery of the matrix spike.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

The laboratory analyzed all of the samples for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW). The IDL for arsenic, lead, selenium, and thallium were at or below the RAS CRDL specified for these analytes in the Statement of Work SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs and CRDLs for arsenic, lead, selenium, and thallium as well as the expected analyte concentrations in the soil samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentration.

According to the Inorganic Statement of Work (SOW), an Interference Check Sample (ICS) is run for each ICP instrument used. The check sample is run to verify interelement and background correction factors for each element analyzed. An ICS analysis consists of consecutively analyzing an interferent solution (A) and a solution (AB) containing interferents plus analytes for all wavelengths to be analyzed. If the interference check sample is not available from the EPA, an independent check sample shall be prepared with analyte concentrations at specified levels listed in the SOW (E-19). The interference check sample used for the ICAP61E Trace Analyzer contained lead at a true value of 4712 ug/L, not 1000 ug/L, as specified in the SOW.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	E
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	No	D
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	C
13. Sample Result Verification	Yes	

N/A - Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in samples MYM595 through MYM597 and MYM600 through MYM602

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample MYM601 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYM601 % Recovery	MYM601 % Bias
Antimony	19.4	-80.6

The results reported for antimony in samples MYM595 through MYM597 and MYM560 through MYM602 were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 77.8% was obtained for antimony in QC sample MYM601. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (19.4%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in samples MYM598 and MYM599

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony in QC sample MYM601 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYM601 % Recovery	MYM601 % Bias
Antimony	19.4	-80.6

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in samples MYM598 and MYM599 may be biased low.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 77.8% was obtained for antimony in QC sample MYM601. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (19.4%) obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because of ICP interference check sample (ICS) results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony and cadmium in samples MYM598 and MYM599

The ICP ICS solutions A and AB are analyzed to determine the effects of high concentrations of interfering elements on each analyte determined by ICP. Solution A consists of the interferents, and Solution AB consists of the analytes mixed with the interferents. The results for antimony in samples MYM598 and MYM599 may be biased high and the results for cadmium in samples MYM598 and MYM599 may be biased low and false negatives may exist. The true and measured values for the ICP ICS analytes, as well as the IDL and CRDL values for the analytes listed above are presented below in mg/kg.

Analyte	ICSA True	ICSA Initial	ICSA Final	IDL	CRDL
Antimony	0.0	10.0	10.0	4.0	12.0
Cadmium	0.0	-1.4	-1.2	0.2	1.0

When positive results are observed for elements which are not present in the ICS solution, then the possibility of false positives or high biased results exists for samples with comparable or higher levels of interferents. When negative results are observed for elements which are not present in the ICS solution, then the possibility of false negatives or low biased results exists when comparable or higher levels of interferents are present in the sample.

E. A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.1), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20856 Memo #01
Site: Carson River
Lab.: Southwest Labs of Oklahoma (SWOK)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: November 12, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	TP020-SD-07-A			TP021-SD-08-A			MS035-SD-03-A			MS040-SD-04-A			MS040-SD-13-A			MS041-SD-02-A			MS044-SD-04-A		
Sample I.D.	MYM595			MYM596			MYM597			MYM598			MYM599			MYM600			MYM601		
Date of Collection	09/14/93			09/16/93			09/21/93			09/15/93			09/15/93			09/16/93			09/22/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	14800			9140			7650			24400			19200			331			10600		
Antimony	4.2 U	R	A	4.1 U	R	A	4.1 U	R	A	6.1 L	J	BCD	5.3 L	J	BCD	4.0 U	R	A	4.1 U	R	A
Arsenic	13.9			18.8			6.3			15.7			11.0			0.74 L	J	C	10.4		
Barium	122			42.7			74.4			108			132			3.1 L	J	C	49.9		
Beryllium	0.21 U			0.31 L	J	C	0.24 L	J	C	0.21 U			0.36 L	J	C	0.29 L	J	C	0.27 L	J	C
Cadmium	0.42 U			0.41 U			0.54 L	J	C	0.42 U	J	D	0.41 U	J	D	0.40 U			0.41 U		
Calcium	7310			536 L	J	C	1470			5530			13500			377000			9030		
Chromium	9.1			12.5			9.1			16.1			22.1			0.80 U			11.4		
Cobalt	2.2 L	J	C	5.8 L	J	C	5.5 L	J	C	5.7 L	J	C	6.4 L	J	C	0.80 U			5.9 L	J	C
Copper	27.1			56.0			181			66.4			74.8			0.40 U			53.4		
Iron	27600			28500			15700			37400			38000			308			16500		
Lead	107			73.2			387			239			110			0.84			103		
Magnesium	6930			1900			2200			12300			10700			2030			7020		
Manganese	301			607			275			670			488			25.0			691		
Mercury	1.1			0.27			0.46			0.43			1.2			0.10 U			0.10 U		
Nickel	3.3 L	J	C	6.9 L	J	C	5.4 L	J	C	6.8 L	J	C	9.5			2.5 L	J	C	7.7 L	J	C
Potassium	1550			1050			1020			3070			3380			65.5 U			1040		
Selenium	4.4			1.8			1.8			3.1			3.5			0.80 U			0.95 L	J	C
Silver	27.1			24.6			12.0			21.8			15.3			0.60 U			22.2		
Sodium	495 L	J	C	7270			154 L	J	C	576 L	J	C	567 L	J	C	59.9 U			122 L	J	C
Thallium	0.85 U			0.82 U			0.81 U			0.84 U			0.83 U			0.80 U			0.82 U		
Vanadium	41.4			33.2			21.6			59.0			47.4			1.8 L	J	C	28.6		
Zinc	53.6			82.9			234			90.5			112			15.1			115		
Percent Solids	94.6 %			97.6 %			98.5 %			95.6 %			96.6 %			99.5 %			97.6 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20856 Memo #01
Site: Carson River
Lab.: Southwest Labs of Oklahoma (SWOK)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: November 12, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS044-SD-14-A			Lab Blank			MDL			CRDL											
Sample I.D.	MYM602																				
Date of Collection	09/22/93																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	9650			14.8 U			14.8			40.0											
Antimony	4.0 U	R	A	4.0 U			4.0			12.0											
Arsenic	11.7			0.60 U			0.60			2.0											
Barium	49.9			1.6 U			1.6			40.0											
Beryllium	0.25 L	J	C	0.20 U			0.20			1.0											
Cadmium	0.40 U			0.40 U			0.40			1.0											
Calcium	5680			48.0 U			48.0			1000											
Chromium	9.6			0.80 U			0.80			2.0											
Cobalt	5.1 L	J	C	0.80 U			0.80			10.0											
Copper	30.9			0.40 U			0.40			5.0											
Iron	14600			1.8 L	J	C	1.0			20.0											
Lead	42.9			0.40 U			0.40			0.60											
Magnesium	6320			34.6 U			34.6			1000											
Manganese	750			0.20 U			0.20			3.0											
Mercury	0.11			0.10 U			0.10			0.10											
Nickel	6.3 L	J	C	1.6 U			1.6			8.0											
Potassium	824 L	J	C	65.2 U			65.2			1000											
Selenium	0.81 U			0.80 U			0.80			1.0											
Silver	38.6			0.60 U			0.60			2.0											
Sodium	124 L	J	C	59.6 U			59.6			1000											
Thallium	0.81 U			0.80 U			0.80			2.0											
Vanadium	31.1			0.40 U			0.40			10.0											
Zinc	71.7			0.40 U			0.40			4.0											
Percent Solids	99.2 %			N/A			N/A			N/A											

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrur Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not A ble

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20856 Memo #01 LABORATORY SWOK

SDG NO. MYM595 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE November 12, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 8 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	X			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	Z/X		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	Z/X		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO ACTION: The results for antimony in six samples were rejected due to a 19.4% recovery of the matrix spike.

A contract required detection limit (CRDL) standard was not analyzed during the analysis of the samples for mercury. Therefore, the linearity near the CRDL for mercury could not be verified. According to the SOW (ILM02.1), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). However, the laboratory did use a standard at the CRDL in the calibration of the instrument.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20856 Memo#01 LABORATORY SWOK

SDG NO. MYM595 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE November 12, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES ____ WATER 8 SOIL ____ OTHER

TPO ATTENTION: None.

AREAS OF CONCERN: The laboratory analyzed all of the samples for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW). The IDL for arsenic, lead, selenium, and thallium were at or below the RAS CRDL specified for these analytes in the Statement of Work SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs and CRDLs for arsenic, lead, selenium, and thallium as well as the expected analyte concentrations in the soil samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentration.

According to the Inorganic Statement of Work (SOW), an Interference Check Sample (ICS) is run for each ICP instrument used. The check sample is run to verify interelement and background correction factors for each element analyzed. An ICS analysis consists of consecutively analyzing an interferent solution (A) and a solution (AB) containing interferents plus analytes for all wavelengths to be analyzed. If the interference check sample is not available from the EPA, an independent check sample shall be prepared with analyte concentrations at specified levels listed in the SOW (E-19). The interference check sample used for the ICAP61E Trace Analyzer contained lead at a true value of 4712 ug/L, not 1000 ug/L, as specified in the SOW.

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 9, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20744 Memo #01
SDG NO.:	MYM407
LABORATORY:	Weyerhaeuser Analytical & Testing Services (WEYER)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	7 Soil Samples (See Case Summary)
COLLECTION DATE:	September 2, 3, 7, 8 and 9, 1993
REVIEWER:	Blake Brown, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Bruce Woods, TPO USEPA Region X
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: 20744 Memo #01
Site: Carson River
Laboratory: Weyerhaeuser Analytical & Testing Services (WEYER)
Reviewer: Blake Brown, ESAT/ICF
Date: November 9, 1993

I. Case Summary

SAMPLE INFORMATION SAMPLE #: MYM407 through MYM411, MYM451 and MYM452

COLLECTION DATE: September 2, 3, 7, 8 and 9, 1993
SAMPLE RECEIPT DATE: September 10, 1993

CONCENTRATION & MATRIX: 7 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYM407 and MYM408

LABORATORY QC: Matrix Spike: MYM409
Duplicates: MYM409
ICP Serial Dilution: MYM409

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals*	September 30, 1993	October 7, 1993
GFAA: Arsenic	September 30, 1993	October 13, 1993
Selenium	September 30, 1993	October 13, 1993
Thallium	September 30, 1993	October 11, 1993
Mercury	September 24, 1993	September 24, 1993
Percent Solids	Not Applicable	September 30 and October 1, 1993

*The laboratory analyzed all samples in this sample delivery group (SDG) for lead by ICP. All results reported for lead in the samples analyzed by ICP were greater than 5X the instrumental detection limit (IDL) for ICP.

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: Antimony was rejected in samples MYM407, MYM408, MYM409 and MYM451 due to a matrix spike recovery of less than 30%.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the method detection limit (MDL) and contract required detection limit (CRDL) were 138 mg/Kg and 1000 mg/Kg, respectively. Since the true value for potassium in the LCS was less than the MDL, the result obtained for potassium was reported as non-detected.

Recovery results of 165.0% (initial run) and 165.1% (final run) were obtained for cadmium in the analysis of the CRDL standard. While there are no criteria established for the CRDL standard recovery, the high recoveries obtained for cadmium may indicate a possible high in samples with results near the CRDL.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	Yes	

II. Validation Summary (Continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	No	D
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	E
12. Sample Quantitation	Yes	C,F
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in samples MYM407, MYM408, MYM409 and MYM451

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample number MYM409 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony is presented below and is based on an ideal recovery of 100%.

Analyte	MYM409 % Recovery	MYM409 % Bias
Antimony	24.0	-76.0

The results reported for antimony in the samples listed above were below the MDL and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 89.8% was obtained for antimony in QC sample number MYM409. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result of 24.0% obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in samples MYM410, MYM411 and MYM452
- Selenium in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and selenium in QC sample number MYM409 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony and selenium is presented below and is based on an ideal recovery of 100%.

Analyte	MYM409 % Recovery	MYM409 % Bias
Antimony	24.0	-76.0
Selenium	-67.8	-167.8

Results above MDL are considered quantitatively uncertain. The results reported for antimony and selenium in the samples listed above may be biased low.

According to the SOW (ILM02.0), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 89.8% was obtained for antimony in QC sample number MYM409. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result of 24.0% obtained for antimony may indicate poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

It should be noted that the initial sample result for QC sample MYM409 was determined by GFAA for selenium with a ten-fold dilution, whereas the matrix spike sample was analyzed undiluted.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in sample MYM451

Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery result for selenium in sample MYM451 did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for selenium is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYM451	61.5	-38.5

The post-digestion spike recovery result for selenium in sample MYM451 shows an analytical deficiency. The result reported for selenium in sample MYM451 may be biased low.

The post-digestion analytical spike recovery result of 69.5% for selenium in the laboratory control sample (LCS) also did not meet the 85-115% criteria for accuracy.

E. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Silver in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample number MYM409 did not meet the 10% criteria for the analyte shown below.

Analyte	MYM409 % Difference
Silver	10.6

The results reported for silver in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

F. Due to poor analytical spike recoveries, the following samples were diluted and the quantitation limits for the analytes shown below have been raised.

- Selenium in samples MYM408, MYM409 and MYM410

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires the analysis of analytical spikes. The samples listed above were diluted by a factor of ten because the spike recovery obtained in the original analysis was less than 40%. The low percent recovery obtained for selenium may be due to chemical or physical interferences. Dilution of the samples is performed to reduce any matrix interferences which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limits reported in Table 1A for selenium in the samples listed above were raised by the dilution factor.

Note that the results for selenium in the diluted analyses of samples MYM408, MYM409 and MYM410 were between the IDL and the CRDL. Therefore these results, which are greater than the CRDL when multiplied by the dilution factor, have been flagged "L" (see comment C).

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20744 Memo #01
Site: Carson River
Lab.: Weyerhaeuser Analytical & Testing Services (WEYER)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: November 9, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-033-SD-09-A			MS-033-ST-09-A			MS-033-SD-20-A			MS-033-SD-30-A			MS-034-SD-15-A			MS-033-SD-39-A			MS-033-SD-52-A		
Sample I.D.	MYM407 D1			MYM408 D1			MYM409			MYM410			MYM411			MYM451			MYM452		
Date of Collection	09/02/93			09/02/93			09/03/93			09/07/93			09/08/93			09/09/93			09/09/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	23800			31200			28900			17200			1760			18500			4100		
Antimony	4.9 U	R	A	4.8 U	R	A	4.4 U	R	A	8.2 L	J	BC	8.1 L	J	BC	3.9 U	R	A	4.6	J	B
Arsenic	8.6			7.6			13.3			11.2			10.6			8.6			2.9		
Barium	195			238			294			109			88.9			81.9			14.9		
Beryllium	0.38 L	J	C	0.48 L	J	C	0.69 L	J	C	0.33 L	J	C	0.06 U			0.35 L	J	C	0.06		
Cadmium	5.6			4.8			3.5			15.6			0.94 L	J	C	0.78 U			0.92		
Calcium	3960			4610			5720			16800			614 L	J	C	3360			612		
Chromium	9.4			11.0			22.0			20.6			2.0			15.3			5.6		
Cobalt	10.8			12.8			16.9			9.5			3.5 L	J	C	9.3			0.59		
Copper	203			213			204			169			221			91.3			58.5		
Iron	28000			30400			34000			24100			28900			27600			7160		
Lead	352			370			650			461			1300			127			237		
Magnesium	8130			8900			7760			6340			144 L	J	C	8540			2530		
Manganese	749			831			942			743			4.4			591			174		
Mercury	5.8			5.6			24.0			2.9			1800			15.7			0.08		
Nickel	15.9			15.1			16.6			12.3			5.9 L	J	C	11.2			6.2		
Potassium	2450			3710			4870			1760			2900			1710			410		
Selenium	2.7	J	B	3.0 L	J	BCF	2.5 L	J	BCF	5.1 L	J	BCF	15.0	J	B	0.52 L	J	BCD	0.96 L	J	BC
Silver	76.7	J	E	82.4	J	E	42.4	J	E	118	J	E	121	J	E	18.3	J	E	24.9	J	E
Sodium	325 L	J	C	443 L	J	C	240 L	J	C	237 L	J	C	235 L	J	C	125 L	J	C	37.4		
Thallium	0.17 L	J	C	0.17 U			0.17 L	J	C	0.15 U			0.18 L	J	C	0.18 U			0.15		
Vanadium	42.6			51.6			56.8			43.2			3.2 L	J	C	47.5			12.0		
Zinc	374			399			435			3610			44.0			142			92.6		
Percent Solids	97.1 %			97.1 %			97.1 %			94.6 %			95.1 %			95.3 %			98.1 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instr[illegible] Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20744 Memo #01
Site: Carson River
Lab.: Weyerhaeuser Analytical & Testing Services (WEYER)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: November 9, 1993

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	LAB BLANK			MDL			CRDL														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	1.8 U			1.8			40.0														
Antimony	4.8 U			4.8			12.0														
Arsenic	0.18 U			0.18			2.0														
Barium	0.06 U			0.06			40.0														
Beryllium	0.06 U			0.06			1.0														
Cadmium	0.96 U			0.96			1.0														
Calcium	2.5 U			2.5			1000														
Chromium	0.38 U			0.38			2.0														
Cobalt	0.42 U			0.42			10.0														
Copper	0.82 U			0.82			5.0														
Iron	1.3 U			1.3			20.0														
Lead	4.2 U			4.2			0.60														
Magnesium	4.3 U			4.3			4.3														
Manganese	0.10 U			0.10			3.0														
Mercury	0.05 U			0.05			0.10														
Nickel	4.0 U			4.0			8.0														
Potassium	138 U			138			1000														
Selenium	0.18 U			0.18			1.0														
Silver	0.58 U			0.58			2.0														
Sodium	7.9 L	J	C	3.3			1000														
Thallium	0.18 U			0.18			2.0														
Vanadium	0.56 U			0.56			10.0														
Zinc	0.50 L	J	C	0.32			4.0														

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20744 Memo #01 LABORATORY WEYER

SDG NO. MYM407 SITE NAME Carson River

SOW NO. ILM02.0 REVIEW COMPLETION DATE November 9, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES _____ WATER 7 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	O	
2. CALIBRATION	O	O	O	
3. BLANKS	O	O	O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	
6. DUPLICATE ANALYSIS	O	O	O	
7. MATRIX SPIKE ANALYSIS	Z	M	O	
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	
11. SAMPLE VERIFICATION	O	O	O	
12. GFAA ANALYTICAL SPIKE		X		
13. OVERALL ASSESSMENT	Z/M	M	O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO ACTION: Antimony was rejected in samples MYM407, MYM408, MYM409 and MYM451 due to a matrix spike recovery of less than 30%.

TPO ATTENTION: None.

AREAS OF CONCERN: None.

In Reference to Case No(s).:

20744 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: November 4, 1993

Laboratory Name: WEYER

Lab Contact: Kari Doxsee

Region: IX

Regional Contact: Blake Brown ESAT/ICF

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
MYM407 through MYM411, MYM451 and MYM452

Summary of Questions/Issues Discussed:

1. The true value for zinc in the ICP Interference Check Sample (ICS) solution A was reported as 216 μg/L, which is incorrect. The actual ICS solution A true value for zinc should be 71 μg/L. Form IV needs to be regenerated.

Summary of Resolution:

2. Corrected Form IV was faxed to ICF on November 5, 1993.

Blake M. Brown
Signature

11/5/93
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: January 12, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	21020 Memo #02
SDG NO.:	MYM622
LABORATORY:	IT Analytical Services-St. Louis (ITMO)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	9 Soil Samples (MYM622 through MYM630)
COLLECTION DATE:	October 14, 15, and 19 through 21, 1993
REVIEWER:	Fernando S. Contreras, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Larry Marchin, TPO USEPA Region VII
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ICF KAISER

Data Validation Report

Case No.: 21020 Memo #02
Site: Carson River
Laboratory: IT Analytical Services-St. Louis (ITMO)
Reviewer: Fernando S. Contreras, ESAT/ICF
Date: January 12, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYM622 through MYM630

COLLECTION DATE: October 14, 15, and 19 through 21, 1993
SAMPLE RECEIPT DATE: October 22, 1993

CONCENTRATION & MATRIX: 9 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None

LABORATORY QC: Matrix Spike: MYM623
Duplicates: MYM623
ICP Serial Dilution: MYM623

ANALYSIS: RAS Total Metals

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		November 10 and 17, 1993	November 15 through 18, and 30, 1993
GFAA:	Arsenic	November 10 and 17, 1993	November 19 and 22, 1993
	Lead	November 10 and 17, 1993	November 17 through 21, 1993
	Selenium	November 10 and 17, 1993	November 18 and 19, 1993
	Thallium	November 10 and 17, 1993	November 16, 1993
Mercury		November 10 and 11, 1993	November 10 and 11, 1993
Percent Solids		Not Applicable	November 17 through, 18, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

METHOD NON-COMPLIANCE: The result reported for lead in sample MYM628 was estimated as the Method of Standard Additions (MSA) spike levels did not satisfy the 50%, 100% and 150% of the sample concentration requirements for MSA. The sample was spiked at 10 ug/L, 20 ug/L, and 30 ug/L for lead regardless of the initial sample concentration.

SAMPLING ISSUES: None.

OTHER: According to the Inorganic Statement of Work (ILM03.0), for all found values of the ICP Interference Check Sample (ICS) solutions A and AB, the laboratory should report the concentration (positive, negative, or zero) of each analyte at each wavelength used for analysis by ICP. The laboratory analyzed all of the samples in this Sample Delivery Group (SDG) for cobalt, iron, nickel, silver, sodium, and zinc on separate analytical runs, however, the laboratory only reported the results for the above analytes in the ICP ICS solutions A and AB, and no interferent results were reported on Form 4.

ADDITIONAL COMMENTS:

In the analysis of the laboratory control sample (LCS), the true value for potassium in the LCS was 50.0 mg/Kg, while the method detection limit (MDL) and contract required detection limit (CRDL) were 434 mg/Kg and 1000 mg/Kg, respectively. Since the true value for potassium in the LCS was less than the MDL, the result obtained for potassium was reported as non-detected.

Low CRDL Standard (CRA) recoveries of 58.7%, 61.3%, 52.3%, and 50.7% were reported for lead. While there are no criteria established for CRA recoveries, the low CRA recoveries may indicate analytical uncertainties, low bias, or false negatives for sample results near the CRDL. No sample results for lead were detected near the CRDL.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM03.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	No	C,D
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	E
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic and silver in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for arsenic and

silver in QC sample MYM623 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte are presented below and are based on an ideal recovery of 100%.

Analyte	MYM623 % Recovery	MYM623 % Bias
Arsenic	45.3	-54.7
Silver	19.6	-80.4

Results above the MDL are considered quantitatively uncertain. The results reported for arsenic and silver in all of the samples may be biased low.

C. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in samples MYM623, MYM626, MYM628, MYM629, and MYM630

Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for selenium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for selenium are presented below and are based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYM623	67.6	-32.4
	MYM626	72.0	-28.0
	MYM628	77.4	-22.6
	MYM629	78.6	-21.4
	MYM630	78.1	-21.9

The post-digestion spike recovery results for selenium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The results reported for selenium in the samples listed above may be biased low, and where non-detected, a false negative may exist.

D. The following result is estimated because of improper Method Standard Addition (MSA) spike levels. The result is estimated and is flagged "J" in Table 1A.

- Lead in sample MYM628

The MSA is the addition of 3 increments of a standard solution to sample aliquots of the same size. The spike levels are approximately 50%, 100%, and 150% of the sample concentration. Measurements are made on the original sample and on each addition.

The absorbance of each solution is determined and then plotted on the vertical (y) axis of a graph, with the concentrations of the known standards plotted on the horizontal (x) axis. When the resulting line is extrapolated back to zero absorbance, the intercept on the negative horizontal axis is the concentration of the sample. This technique compensates for a sample constituent that enhances or depresses the analyte signal thus producing a slope different from that of a calibration standard prepared in reagent water. The result reported for lead in sample MYM628 is considered estimated and quantitatively questionable because the spike levels used by the laboratory were approximately 30%, 50%, and 80% of the intial sample concentration after correction for dilution.

The sample is listed below with the actual percentages of spike added for lead.

Analyte	Sample #	Initial Sample Conc. in ug/L	Percent Spike Added at 10 ug/L	20 ug/L	30 ug/L
Lead	MYM628	72.6	28%	55%	83%

It should be noted that sample MYM628 was diluted by a factor of two for lead.

E. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Silver and zinc in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYM623 did not meet the less than 10% criteria for the analytes shown below.

Analyte	MYM623 % Difference
Silver	16.4
Zinc	10.8

The results reported for silver and zinc in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 21020 Memo #02
Site: Carson River
Lab.: IT Analytical Services-St. Louis (ITMO)
Reviewer: Fernando S. Contreras, ESAT/ICF KAISER
Date: January 12, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-053-SD-20-A			MS-050-SD-09-A			MS-056-SD-11-A			MS-055-SD-01-A			MS-053-SD-02-A			MS-049-SD-05-A			MS-048-SD-01-A		
Sample I.D.	MYM622			MYM623			MYM624			MYM625			MYM626			MYM627			MYM628		
Date of Collection	10/20/93			10/19/93			10/21/93			10/21/93			10/20/93			10/15/93			10/14/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6300			5570			4320			6160			5730			5190			9370		
Antimony	21.8			7.4 U			11.7 L	J	A	12.1 L	J	A	7.4 U			12.4 L	J	A	7.4 U		
Arsenic	15.3	J	B	14.1	J	B	2.6	J	B	21.2	J	B	18.3	J	B	21.9	J	B	20.8	J	B
Barium	46.8			35.5 L	J	A	35.2 L	J	A	135			18.5 L	J	A	13.9 L	J	A	38.3 L	J	A
Beryllium	0.51 U			0.51 U			0.49 U			0.60 L	J	A	0.51 U			0.53 U			0.51 U		
Cadmium	2.5			0.60 L	J	A	6.9			1.4			0.60 L	J	A	3.0			0.70 L	J	A
Calcium	14100			4120			1680			15600			11300			54500			5180		
Chromium	11.2			7.1			7.2			9.4			10.9			5.4			9.9		
Cobalt	8.0 L	J	A	5.2 L	J	A	5.5 L	J	A	6.6 L	J	A	7.9 L	J	A	3.8 L	J	A	8.7 L	J	A
Copper	53.4			33.4			164			31.4			21.7			72.2			29.5		
Iron	23000			14300			20000			17700			14400			12900			21300		
Lead	166			40.9			453			274			50.3			157			30.8	J	D
Magnesium	4690			4940			3960			2730			5240			4920			7980		
Manganese	1480			513			293			1690			371			1020			746		
Mercury	0.39			0.14			341			1.8			0.15			43.7			0.15		
Nickel	8.1 L	J	A	7.3 L	J	A	4.6 L	J	A	8.9			9.2			3.9 U			9.8		
Potassium	462 U			458 U			1090			1380			457 U			477 U			630 L	J	A
Selenium	2.0			0.53 L	J	AC	4.1			0.17 U			0.24 L	J	AC	1.5			0.17 U	J	C
Silver	29.3	J	BE	36.0	J	BE	43.9	J	BE	10.9	J	BE	2.2	J	BE	117	J	BE	14.9	J	BE
Sodium	246 L	J	A	73.7 L	J	A	114 L	J	A	76.4 L	J	A	62.8 L	J	A	57.1 L	J	A	66.9 L	J	A
Thallium	0.15 U			0.15 U			0.14 U			0.44 L	J	A	0.15 U			0.15 U			0.15 U		
Vanadium	20.4			18.0			15.7			13.8			9.6 L	J	A	16.0			22.7		
Zinc	369	J	E	74.7	J	E	665	J	E	594	J	E	50.5	J	E	352.0	J	E	103	J	E
Percent Solids	93.9 %			94.8 %			97.6 %			95.9 %			94.9 %			91.0 %			95.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 21020 Memo #02
Site: Carson River
Lab.: IT Analytical Services-St. Louis (ITMO)
Reviewer: Fernando S. Contreras, ESAT/ICF KAISER
Date: January 12, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-047-SD-08-A			MS-046-SD-05-A			Lab Blank			MDL			CRDL								
Sample I.D.	MYM629			MYM630																	
Date of Collection	10/14/93			10/14/93																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6360			12900			15.7 U			15.7			40.0								
Antimony	13.6			14.7			7.0 U			7.0			12.0								
Arsenic	21.6	J	B	160	J	B	0.26 U			0.26			2.0								
Barium	27.2 L	J	A	71.6			0.14 U			0.14			40.0								
Beryllium	0.51 U			0.52 U			0.48 U			0.48			1.0								
Cadmium	0.58 U			2.3			0.54 U			0.54			1.0								
Calcium	1720			15900			1.8 U			1.8			1000								
Chromium	8.9			4.6			0.72 L	J	A	0.60			2.0								
Cobalt	4.2 L	J	A	13.1			0.76 U			0.76			10.0								
Copper	18.3			47.0			0.48 U			0.48			5.0								
Iron	19200			33700			2.2 L	J	A	1.2			20.0								
Lead	52.3			21.5			0.14 U			0.14			0.60								
Magnesium	5010			8960			1.0 U			1.0			1000								
Manganese	531			823			0.14 U			0.14			3.0								
Mercury	0.24			16.0			0.05 U			0.05			0.10								
Nickel	4.9 L	J	A	6.6 L	J	A	3.6 U			3.6			8.0								
Potassium	821 L	J	A	1080 L	J	A	434 U			434			1000								
Selenium	0.42 L	J	AC	0.19 L	J	AC	0.16 U			0.16			1.0								
Silver	3.7	J	BE	30.7	J	BE	0.68 U			0.68			2.0								
Sodium	107 L	J	A	166 L	J	A	6.2 U			6.2			1000								
Thallium	0.15 U			0.78 L	J	A	0.14 U			0.14			2.0								
Vanadium	13.2			38.2			0.55 L	J	A	0.50			10.0								
Zinc	66.9	J	E	105	J	E	1.3 L	J	A	0.52			4.0								
Percent Solids	93.7 %			91.7 %			N/A			N/A			N/A								

N/A-Not Applicable
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instru· Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 21020 Memo #02 LABORATORY ITMO

SDG NO. MYM622 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE January 12, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Fernando S. Contreras

NO. OF SAMPLES _____ WATER 9 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	O	
2. CALIBRATION	O	O	O	
3. BLANKS	O	O	O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	
6. DUPLICATE ANALYSIS	O	O	O	
7. MATRIX SPIKE ANALYSIS	X	M	O	
8. METHOD OF STANDARD ADDITION (MSA)		M		
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O	O	O	
11. SAMPLE VERIFICATION	O	O	O	
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M	M	O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 21020 Memo #02 LABORATORY ITMO

SDG NO. MYM622 SITE NAME Carson River

SOW NO. ILMO3.0 REVIEW COMPLETION DATE January 12, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Fernando S. Contreras

NO. OF SAMPLES ____ WATER 9 SOIL ____ OTHER

TPO ACTION: None.

TPO ATTENTION: The result reported for lead in sample MYM628 was estimated as the Method of Standard Additions (MSA) spike levels did not satisfy the 50%, 100% and 150% of the sample concentration requirements for MSA. The sample was spiked at 10 ug/L, 20 ug/L, and 30 ug/L for lead regardless of the initial sample concentration.

According to the Inorganic Statement of Work (ILMO3.0), for all found values of the ICP Interference Check Sample (ICS) solutions A and AB, the laboratory should report the concentration (positive, negative, or zero) of each analyte at each wavelength used for analysis by ICP. The laboratory analyzed all of the samples in this Sample Delivery Group (SDG) for cobalt, iron, nickel, silver, sodium, and zinc on separate analytical runs, however, the laboratory only reported the results for the above analytes in the ICP ICS solutions A and AB, and no interferent results were reported on Form 4.

AREAS OF CONCERN: Low CRDL Standard (CRA) recoveries of 58.7%, 61.3%, 52.3%, and 50.7% were reported for lead. While there are no criteria established for CRA recoveries, the low CRA recoveries may indicate analytical uncertainties, low bias, or false negatives for sample results near the CRDL. No sample results for lead were detected near the CRDL.

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: January 7, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	21020 Memo #01
SDG NO.:	MYM754
LABORATORY:	IT Analytical Services - St.Louis (ITMO)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	13 Soil Samples (See Case Summary)
COLLECTION DATE:	October 21, 22, 25, 26, 28 and 29, and November 1 through 4, 1993
REVIEWER:	Blake Brown, ESAT/ICF Kaiser

If there are any questions, please contact Margie D. Weiner (ESAT/ICF Kaiser) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Larry Marchin, TPO USEPA Region VII
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-9441/21020M01.RPT

Data Validation Report

Case No.: 21020 Memo #01
Site: Carson River
Laboratory: IT Analytical Services - St.Louis (ITMO)
Reviewer: Blake Brown, ESAT/ICF Kaiser
Date: January 7, 1994

I. Case Summary

SAMPLE INFORMATION. SAMPLE #: MYM754 through MYM763, and MYM766 through MYM768

COLLECTION DATE: October 21, 22, 25, 26, 28 and 29, and November 1 through 4, 1993

SAMPLE RECEIPT DATE: October 29 and November 5, 1993

CONCENTRATION & MATRIX: 13 Low Concentration Soil Samples

FIELD QC:
Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYM763 and MYM766

LABORATORY QC:
Matrix Spike: MYM768
Duplicates: MYM768
ICP Serial Dilution: MYM768

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals*	November 24, 1993 and December 8, 1993	December 1, 2 & 8, 1993
GFAA: Arsenic	November 24, 1993	November 29, 1993
Lead	November 24, 1993	December 3, 1993
Selenium	November 24, 1993	November 30, 1993
Thallium	November 24, 1993	November 29, 1993
Mercury	November 22 & 23, 1993	November 22 & 23, 1993
Percent Solids	Not Applicable	December 9, 1993

* See Additional Comments

TPO ACTION:

METHOD NON-COMPLIANCE: No matrix spike or laboratory duplicate was analyzed for lead by graphite furnace atomic absorption (GFAA). Lead was analyzed by ICP in samples MYM754 through MYM759, MYM762 and MYM768,

and analyzed by GFAA in samples MYM760, MYM761, MYM763, MYM766 and MYM767. The EPA Contract Laboratory Program Inorganic Statement of Work (SOW), ILM03.0 specifies that if two analytical methods are used to obtain the reported values for the same element within a sample delivery group (SDG), matrix spike and duplicate samples shall be analyzed by each method used. A matrix spike and laboratory duplicate were analyzed for lead by ICP. The matrix specific precision and accuracy could not be ascertained for lead samples analyzed by GFAA. It should be noted that in both designated QC samples the lead concentration was greater than 4X the spike concentration. Therefore, even if both designated samples were analyzed as spiked samples by GFAA, neither would be subject to the matrix spike QC limits.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

*Lead was analyzed by ICP in samples MYM754 through MYM759, MYM762 and MYM768. The reported results for lead in the samples were greater than 5X the instrument detection limit (IDL) for ICP. Lead was analyzed by GFAA for samples MYM760, MYM761, MYM763, MYM766 and MYM767.

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the method detection limit (MDL) and contract required detection limit (CRDL) were 434 mg/Kg and 1000 mg/Kg, respectively. Since the true value for potassium in the LCS was less than the MDL, the result obtained for potassium was reported as non-detected.

The matrix spike level used for mercury was 0.51 mg/Kg, rather than 1.0 mg/Kg as specified in the SOW.

Recovery results of 52.0% for lead and 50.0% for mercury were obtained in the analysis of the CRDL standard. While there are no criteria established for the CRDL standard recovery, the low recoveries obtained for lead and mercury may indicate a possible low bias in samples with results near the CRDL. It should be noted that two other CRDL standards were analyzed for mercury and were acceptable.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (SOW), ILM03.0, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	F
2. Sample Preservation and Holding Times	No	C
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	No	D
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	No	E
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Cadmium, mercury, selenium and zinc in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for cadmium, mercury, selenium and zinc in QC sample number MYM768 did not meet

the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYM768 % Recovery	MYM768 % Bias
Cadmium	70.4	-29.6
Mercury	139.8	+39.8
Selenium	-26.4	-126.4
Zinc	18.5	-81.5

Results above the MDL are considered quantitatively uncertain. The results reported for mercury in all of the samples may be biased high. The results reported for cadmium, selenium and zinc in all of the samples may be biased low, and where non-detected, false negatives may exist.

Sample MYM768 was analyzed for selenium by the method of standard additions (MSA), whereas the spiked sample was quantitated from the calibration curve. If the sample result for selenium in sample MYM768 is taken from the GFAA calibration curve rather than from the MSA, and is used to calculate the percent spike recovery, a result of 66.6%R is obtained. It is the validator's opinion that the -26.4%R value reported on Form V is due to the analysis of sample and spike by different analytical protocols, and not solely due to sample matrix effects. Therefore, the non-detected sample results for selenium are estimated, not rejected.

According to the SOW, when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. Post-digestion spike recovery results of 103.4%, and 89.8% were obtained for cadmium and zinc, respectively, in QC sample number MYM768. Since the post-digestion spike recoveries were acceptable, the low pre-digestion spike recovery results of 70.4% and 18.5% obtained for cadmium and zinc, repectively, may indicate sample non-homogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

A 74.2% recovery was obtained for antimony in the matrix spike analysis of QC sample MYM768. This percent recovery, though marginally below the 75-125% criteria for accuracy, is not expected to affect the results reported for antimony in all of the samples. It should be noted that a post-digestion spike recovery result of 82.6% was obtained for antimony in QC sample number MYM768. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result of 74.2% obtained for antimony may indicate sample non-homogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

Note that the matrix spike level used for mercury was 0.51 mg/Kg, rather than 1.0 mg/Kg as specified in the SOW.

C. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- Mercury in samples MYM754 through MYM757

Due to limited information concerning holding time criteria for soil samples, the SW-846 technical holding time criteria are applied at the reviewer's discretion to these soil analyses. These soil analyses exceeded the SW-846 technical holding time of 28 days for mercury as shown below.

Sample Number	Date Collected	Date Received	Date Analyzed	# of days Exceeded
MYM754	10/21/93	10/29/93	11/23/93	5
MYM755	10/22/93	10/29/93	11/22/93	3
MYM756	10/25/93	10/29/93	11/23/93	1
MYM757	10/25/93	10/29/93	11/23/93	1

Sample results may be biased low.

The SW-846 technical holding times were not exceeded for the other analytes in all of the other samples.

D. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Silver in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYM768 RPD
Silver	46.7

The results reported for silver in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

E. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Selenium in samples MYM755, MYM756, MYM757, MYM763 and MYM766

Selenium was analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the

individual analytical determination. The analytical spike recovery results for selenium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for selenium is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Selenium	MYM755	70.5	-29.5
	MYM756	71.8	-28.2
	MYM757	58.2	-41.8
	MYM763	47.1	-52.9
	MYM766	52.0	-48.0

The post-digestion spike recovery results for selenium in the samples listed above show an analytical deficiency. Results above the MDL are considered quantitatively uncertain. The results reported for selenium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

The post-digestion analytical spike recovery result of 120.3% for thallium in the laboratory control sample (LCS) also did not meet the 85-115% criteria for accuracy.

F. No matrix spike or laboratory duplicate was analyzed for lead by GFAA. Lead was analyzed by ICP in samples MYM754 through MYM759, MYM762 and MYM768, and analyzed by GFAA in samples MYM760, MYM761, MYM763, MYM766 and MYM767. The SOW specifies that if two analytical methods are used to obtain the reported values for the same element within a sample delivery group (SDG), matrix spike and duplicate samples shall be analyzed by each method used. A matrix spike and laboratory duplicate were analyzed for lead by ICP. The matrix specific precision and accuracy could not be ascertained for lead samples analyzed by GFAA. It should be noted that in both designated QC samples the lead concentration was greater than 4X the spike concentration. Therefore, even if both designated samples were analyzed as spiked samples by GFAA, neither would be subject to the matrix spike QC limits.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 21020 Memo #01
Site: Carson River
Lab.: IT Analytical Services - St. Louis (ITMO)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: January 7, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-057-SD-01-A			MS-057-SD-10-A			MS-059-SD-05-A			MS-060-SD-10-A			MS-043-SD-06-A			MS-062-SD-06-A			FA-004-SD-01-A		
Sample I.D.	MYM754			MYM755			MYM756			MYM757			MYM758			MYM759			MYM760		
Date of Collection	10/21/93			10/22/93			10/25/93			10/25/93			10/26/93			10/26/93			10/28/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	7830			18200			15500			19300			13500			25100			9440		
Antimony	15.2		B	7.3 U		B	7.9 U		B	7.6 U		B	14.2		B	7.7 U		B	8.9 L	J	AB
Arsenic	14.9			47.3			16.1			8.1			17.4			14.5			11.0		
Barium	31.0 L	J	A	116			245			534			178			261			123		
Beryllium	0.50 U			0.90 L	J	A	0.81 L	J	A	0.87 L	J	A	0.50 U			1.1			0.65 L	J	A
Cadmium	20.0	J	B	1.1	J	B	1.7	J	B	3.2	J	B	0.87 L	J	AB	0.59 U	J	B	0.55 U	J	B
Calcium	14700			19200			11500			47800			4290			12100			6970		
Chromium	8.7			16.1			18.7			15.1			7.0			20.1			9.6		
Cobalt	6.3 L	J	A	21.4			18.2			17.5			12.2			19.3			8.9 L	J	A
Copper	665			58.6			96.3			109			95.2			57.2			21.6		
Iron	20800			46200			35500			34500			51500			47600			16500		
Lead	1210			60.6			302			4790			212			70.8			7.6		F
Magnesium	8820			11700			9670			10600			5950			14000			4920		
Manganese	916			843			1410			1430			389			1300			599		
Mercury	746	J	BC	8.2	J	BC	13.3	J	BC	46.1	J	BC	11.1	J	B	0.50	J	B	3.1	J	B
Nickel	7.2 L	J	A	14.7			12.2			12.4			6.3 L	J	A	12.7			8.6		
Potassium	863 L	J	A	2810			3310			5470			3560			2420			2890		
Selenium	5.0	J	B	0.17 U	J	BE	0.26 L	J	ABE	0.17 U	J	BE	2.2	J	B	0.17 U	J	B	0.24 L	J	AB
Silver	134	J	D	11.7	J	D	29.1	J	D	46.5	J	D	9.6	J	D	1.6 L	J	AD	0.70 U	J	D
Sodium	74.1 L	J	A	239 L	J	A	311 L	J	A	533 L	J	A	275 L	J	A	227 L	J	A	1490		
Thallium	0.15 U			0.32 L	J	A	0.16 U			0.15 U			0.25 L	J	A	0.15 U			0.20 L	J	A
Vanadium	19.6			57.0			49.4			45.2			30.5			77.6			46.5		
Zinc	1540	J	B	582	J	B	261	J	B	552	J	B	94.8	J	B	124	J	B	52.1	J	B
Percent Solids	95.8 %			96.1 %			89.4 %			92.8 %			95.8 %			91.9 %			97.6 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comm efer to the Corresponding Section in the Narrative for each letter.
IDL-Instrume ection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 21020 Memo #01
Site: Carson River
Lab.: IT Analytical Services - St. Louis (ITMO)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: January 7, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA-016-SD-01-A			FA-010-SD-03-A			FA-012-SD-01-A			FA-012-ST-01-A			FA-017-SD-04-A			CM-001-SD-03-A			LAB BLANK		
Sample I.D.	MYM761			MYM762			MYM763 D1			MYM766 D1			MYM767			MYM768			GFAA / ICP*		
Date of Collection	10/29/93			11/01/93			11/02/93			11/02/93			11/03/93			11/04/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	4090			17800			24000			23800			8430			3600			15.7 U		
Antimony	11.0 L	J	AB	14.6 L	J	AB	15.1 L	J	AB	14.2 L	J	AB	10.8 L	J	AB	24.0		B	7.0 U		
Arsenic	3.4			17.4			17.7			18.2			4.7			37.9			0.24 U		
Barium	72.1			297			295			295			130			48.2			0.14 U		
Beryllium	0.57 U			1.2 L	J	A	1.5			1.5			0.51 L	J	A	0.49 U			0.48 U		
Cadmium	2.0	J	B	3.0	J	B	0.69 U	J	B	0.70 U	J	B	0.55 U	J	B	7.9	J	B	0.54 U		
Calcium	9600			26800			19200			17800			5690			4340			1.8 U		
Chromium	4.0			15.0			18.4			18.9			9.9			3.6			0.60 U		
Cobalt	4.6 L	J	A	15.0			18.0			17.6			8.9 L	J	A	9.5 L	J	A	0.76 U		
Copper	17.0			198			72.7			74.4			23.7			259			0.50 L	J	A
Iron	7420			29000			34000			35000			16100			14400			1.2 U		
Lead	10.4		F	153			26.3		F	29.6		F	13.1		F	52.8			0.70 U / 7.9 U		
Magnesium	4000			12200			15700			15700			4930			3280			1.0 U		
Manganese	507			856			1000			1060			571			589			0.19 L	J	A
Mercury	3.8	J	B	323	J	B	36.9	J	B	31.8	J	B	6.0	J	B	1.1	J	B	0.05 U		
Nickel	6.8 L	J	A	13.5			18.5			15.0			8.2			9.0			3.6 U		
Potassium	4830			5120			7990			7830			2960			821 L	J	A	434 U		
Selenium	0.19 U	J	B	1.6	J	B	0.48 L	J	ABE	0.36 L	J	ABE	0.16 U	J	B	6.0	J	B	0.16 U		
Silver	0.80 U	J	D	13.5	J	D	2.5 L	J	AD	2.6	J	D	1.2 L	J	AD	64.9	J	D	0.68 U		
Sodium	2080			8790			26800			26900			834 L	J	A	66.2 L	J	A	18.7 L	J	A
Thallium	0.17 U			0.23 L	J	A	0.29 L	J	A	0.37 L	J	A	0.14 U			0.19 L	J	A	0.14 U		
Vanadium	16.2			62.1			80.2			83.2			41.7			12.4			0.50 U		
Zinc	47.1	J	B	232	J	B	138	J	B	138	J	B	56.7	J	B	375	J	B	0.72 L	J	A
Percent Solids	84.5 %			79.0 %			77.8 %			77.6 %			98.3 %			97.5 %			N/A		

* GFAA / ICP IDL Values for Lead
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 21020 Memo #01
Site: Carson River
Lab.: IT Analytical Services - St. Louis (ITMO)
Reviewer: Blake Brown, ESAT/ICF Technology, Inc.
Date: January 7, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL GFAA / ICP*			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	15.7			40.0																	
Antimony	7.0			12.0																	
Arsenic	0.24			2.0																	
Barium	0.14			40.0																	
Beryllium	0.48			1.0																	
Cadmium	0.54			1.0																	
Calcium	1.8			1000																	
Chromium	0.60			2.0																	
Cobalt	0.76			10.0																	
Copper	0.48			5.0																	
Iron	1.2			20.0																	
Lead	0.70 / 7.9			0.60																	
Magnesium	1.0			1000																	
Manganese	0.14			3.0																	
Mercury	0.10			0.10																	
Nickel	3.6			8.0																	
Potassium	434			1000																	
Selenium	0.16			1.0																	
Silver	0.68			2.0																	
Sodium	6.2			1000																	
Thallium	0.14			2.0																	
Vanadium	0.50			10.0																	
Zinc	0.52			4.0																	
Percent Solids	N/A			N/A																	

* GFAA / ICP IDL Values for Lead
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Commen' fer to the Corresponding Section in the Narrative for each letter.
IDL-Instrumen ction Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 21020 Memo #01 LABORATORY ITMO

SDG NO. MYM754 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE January 7, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES _____ WATER 13 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O	O	M	
2. CALIBRATION	O	O	O	
3. BLANKS	O	O	O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	
6. DUPLICATE ANALYSIS	X	M	O	
7. MATRIX SPIKE ANALYSIS	M	M	M	
8. METHOD OF STANDARD ADDITION (MSA)		O		
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O	O	O	
11. SAMPLE VERIFICATION	O	O	O	
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	M	M	M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 21020 Memo #01 LABORATORY ITMO

SDG NO. MYM754 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE January 7, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Blake Brown

NO. OF SAMPLES _____ WATER 13 SOIL _____ OTHER

TPO ACTION: No matrix spike or laboratory duplicate was analyzed for lead by GFAA. Lead was analyzed by ICP in samples MYM754 through MYM759, MYM762 and MYM768, and analyzed by GFAA in samples MYM760, MYM761, MYM763, MYM766 and MYM767. The SOW specifies that if two analytical methods are used to obtain the reported values for the same element within a sample delivery group (SDG), matrix spike and duplicate samples shall be analyzed by each method used. A matrix spike and laboratory duplicate were analyzed for lead by ICP. The matrix specific precision and accuracy could not be ascertained for lead samples analyzed by GFAA. It should be noted that in both designated QC samples the lead concentration was greater than 4X the spike concentration. Therefore, even if both designated samples were analyzed as spiked samples by GFAA, neither would be subject to the matrix spike QC limits.

TPO ATTENTION: None.

AREAS OF CONCERN: None.

ICF KAISER
ENVIRONMENT & ENERGY GROUP

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FILE COPY

MEMORANDUM AUG 1994

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdw for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: August 30, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #01
SDG NO.:	MYP191
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP191 through MYP210)
COLLECTION DATE:	August 2, 1994
REVIEWER:	Dina D. David, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #01
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: August 30, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP191 through MYP210

COLLECTION DATE: August 2, 1994
SAMPLE RECEIPT DATE: August 6, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP200 and MYP201

LABORATORY QC: Matrix Spike: MYP210
Duplicates: MYP210
ICP Serial Dilution: MYP210

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 8, 1994	August 9 through 12, 1994
Mercury	August 8 and 9, 1994	August 8 and 9, 1994
Percent Solids	Not Applicable	August 8, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	G
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	

(continued on the next page)

II. Validation Summary (continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	No	C
9. Field Duplicate Sample Analysis	No	F
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	D
12. Sample Quantitation	No	A,E
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony and silver in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and silver in QC sample MYP210 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte are presented below and are based on an ideal recovery of 100%.

Analyte	MYP210 % Recovery	MYP210 % Bias
Antimony	64.3	-35.7
Silver	36.2	-63.8

Results above the MDL are considered quantitatively uncertain. The results reported for antimony and silver in all of the samples may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 132.2% was obtained for antimony in QC sample MYP210. Since both the post and pre-digestion spikes for antimony did not meet the QC criteria, matrix effects may be present in the sample digestate which may depress or enhance the analyte signal during analysis.

C. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Silver in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYP210 Lab. Dup. RPD
Silver	41.7

The results reported for silver in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

D. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Lead and zinc in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP210 did not meet the 10% criterion for the analytes shown below.

Analyte	MYP210 % Difference
Lead	11.1
Zinc	26.3

The results reported for lead and zinc in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

E. The following results are estimated because of sample quantitation problems. The results are flagged "J" in Table 1A.

- Thallium in samples MYP191 through MYP193, MYP197 through MYP202, and MYP210

High negative results were obtained for thallium in samples MYP191 through MYP193, MYP197 through MYP202, and MYP210. The absolute values for thallium in the samples listed above exceed the CRDL of 10.0 μg/L (2.0 mg/Kg). The laboratory reported the results for thallium in the above samples as non-detected. In the reviewer's opinion, the results reported for thallium in MYP191 through MYP193, MYP197 through MYP202, and MYP210 are quantitatively unreliable due to high negative results obtained.

F. A relative percent difference (RPD) of 56.2 was obtained for mercury in the analysis of field duplicate pair samples MYP200 and MYP201. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±35 RPD or ±2xCRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

G. A high recovery result of 130.0% for mercury was obtained in the analysis of the CRDL standard (CRA). While there are no criteria established for the CRA recovery, the high recovery result obtained for mercury may indicate high bias for mercury result in sample MYP207 (0.20 μg/L = 0.07 mg/Kg), which is at the CRDL of 0.20 μg/L.

In addition, a high final recovery result of 152.0% for zinc was obtained in the analysis of the CRDL standard (CRI). However, all of the sample results for zinc were at least 25x greater than the CRDL of 4.0 mg/Kg.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: August 30, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-019-SL-101-A			MS-019-SL-102-A			MS-019-SL-103-A			MS-019-SL-104-A			MS-019-SL-105-A			MS-019-SL-106-A			MS-019-SL-107-A		
Sample I.D.	MYP191			MYP192			MYP193			MYP194			MYP195			MYP196			MYP197		
Date of Collection	8/2/94			8/2/94			8/2/94			8/2/94			8/2/94			8/2/94			8/2/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10200			11500			11700			14700			11600			16100			9240		
Antimony	5.6 U	J	B	8.2 L	J	AB	6.4 L	J	AB	5.6 U	J	B	8.2 L	J	AB	6.6 L	J	AB	8.9 L	J	AB
Arsenic	58.3			53.9			49.1			36.2			19.2			12.6			25.2		
Barium	85.2			96.3			83.5			94.7			103			109			101		
Beryllium	1.0			1.1			0.92 L	J	A	1.3			1.0			1.0			0.76 L	J	A
Cadmium	0.89 L	J	A	0.70 L	J	A	2.8			0.60 U			0.62 L	J	A	0.60 U			10.8		
Calcium	24600			40600			36200			11100			12300			20900			5880		
Chromium	12.5			14.6			16.6			9.0			10.3			11.4			7.9		
Cobalt	8.8 L	J	A	9.0 L	J	A	10.0			10.6			11.0			11.3			7.8 L	J	A
Copper	54.9			147			167			40.6			38.1			27.6			677		
Iron	20300			24000			21600			23500			20200			19800			16900		
Lead	88.7	J	D	181	J	D	210	J	D	57.7	J	D	72.8	J	D	88.6	J	D	887	J	D
Magnesium	5760			5820			6590			7110			6990			7290			4750		
Manganese	1510			1260			1330			809			835			708			998		
Mercury	0.81			8.9			28.5			10.1			4.3			1.4			373		
Nickel	9.1			13.5			11.9			7.9 L	J	A	7.5 L	J	A	10.0			6.2 L	J	A
Potassium	1540			2320			1880			2070			1830			2670			1140		
Selenium	0.69 L	J	A	0.32 U			0.95 L	J	A	0.34 U			0.58 L	J	A	0.86 L	J	A	6.5		
Silver	17.4	J	BC	14.6	J	BC	15.9	J	BC	13.6	J	BC	8.5	J	BC	12.5	J	BC	77.3	J	BC
Sodium	79.1 L	J	A	189 L	J	A	408 L	J	A	101 L	J	A	171 L	J	A	192 L	J	A	80.0 L	J	A
Thallium	0.71 U	J	E	0.68 U	J	E	0.69 U	J	E	0.72 U			0.70 U			0.72 U			0.68 U	J	E
Vanadium	36.2			36.7			41.1			47.0			39.9			48.1			26.4		
Zinc	297	J	D	444	J	D	811	J	D	201	J	D	117	J	D	121	J	D	930	J	D
Percent Solids	99.3 %			99.5 %			98.9 %			98.6 %			99.2 %			98.9 %			99.3 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

E 1A

Case N 22540 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: August 30, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-019-SL-108-A			MS-019-SL-109-A			MS-019-SL-110-A			MS-019-SL-111-A			MS-020-SL-101-A			MS-020-SL-102-A			MS-020-SL-103-A		
Sample I.D.	MYP198			MYP199			MYP200 D1			MYP201 D1			MYP202			MYP203			MYP204		
Date of Collection	8/2/94			8/2/94			8/2/94			8/2/94			8/2/94			8/2/94			8/2/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10800			16400			13200			11300			18700			19200			12700		
Antimony	5.6 U	J	B	8.5 L	J	AB	8.5 L	J	AB	9.2 L	J	AB	5.3 U	J	B	5.4 U	J	B	6.4 U	J	B
Arsenic	54.6			52.4			72.3			63.6			21.8			11.8			16.0		
Barium	191			104			110			102			78.9			101			83.0		
Beryllium	0.95 L	J	A	1.4			1.2			1.2			1.8			1.6			1.0 L	J	A
Cadmium	8.0			0.74 L	J	A	0.87 L	J	A	0.75 L	J	A	0.56 U			0.57 U			0.67 U		
Calcium	17000			26300			39800			39700			18000			17000			4440		
Chromium	10.7			16.8			14.0			13.2			18.4			18.9			13.3		
Cobalt	12.2			11.3			12.1			11.6			17.3			16.3			11.2 L	J	A
Copper	320			82.0			76.2			70.7			41.8			37.4			39.8		
Iron	20800			26600			23700			22700			31600			26800			22400		
Lead	415	J	D	83.8	J	D	92.1	J	D	81.5	J	D	52.8	J	D	48.9	J	D	50.2	J	D
Magnesium	5800			8570			7380			6890			9140			8410			7760		
Manganese	3290			1790			1890			1770			869			815			826		
Mercury	275			13.9			10.1		F	18.0		F	1.4			1.3			3.7		
Nickel	10.5			11.5			10.5			11.4			14.9			12.6			8.5 L	J	A
Potassium	2470			2730			2020			1870			2830			3190			1350		
Selenium	5.4			0.33 U			0.99			0.32 U			0.32 U			0.33 U			0.38 U		
Silver	78.8	J	BC	28.1	J	BC	41.9	J	BC	42.9	J	BC	3.7	J	BC	3.4	J	BC	13.6	J	BC
Sodium	286 L	J	A	78.4 L	J	A	61.8 L	J	A	51.2 L	J	A	90.7 L	J	A	114 L	J	A	137 L	J	A
Thallium	0.70 U	J	E	0.71 U	J	E	0.68 U	J	E	0.67 U	J	E	0.67 U	J	E	1.5 L	J	A	1.4 L	J	A
Vanadium	32.8			57.5			48.7			45.6			63.8			57.4			39.1		
Zinc	648	J	D	291	J	D	238	J	D	213	J	D	165	J	D	77.0	J	D	112	J	D
Percent Solids	99.2 %			98.8 %			99.5 %			99.6 %			98.9 %			99.4 %			84.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: August 30, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-021-SL-101-A			MS-021-SL-102-A			MS-021-SL-103-A			MS-022-SL-101-A			MS-022-SL-102-A			MS-022-SL-103-A			Lab Blank		
Sample I.D.	MYP205			MYP206			MYP207			MYP208			MYP209			MYP210					
Date of Collection	8/2/94			8/2/94			8/2/94			8/2/94			8/2/94			8/2/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	14400			15600			20000			8780			14000			16000			6.6 U		
Antimony	7.1 L	J	AB	7.1 L	J	AB	8.2 L	J	AB	5.3 U	J	B	16.1	J	B	5.4 U	J	B	5.7 U		
Arsenic	16.5			39.3			10.8			13.7			31.0			22.5			0.56 U		
Barium	171			103			75.9			48.5			83.2			105			2.1 U		
Beryllium	1.0			1.5			1.1			0.80 L	J	A	1.3			1.3			0.32 U		
Cadmium	0.63 L	J	A	2.2			0.55 U			0.56 U			0.57 U			0.57 U			0.60 U		
Calcium	12600			10800			47500			5580			12100			18900			15.8 U		
Chromium	12.2			29.6			16.7			7.6			15.9			12.6			0.80 U		
Cobalt	10.9			15.5			10.8			7.4 L	J	A	16.2			12.7			2.5 U		
Copper	65.9			102			21.5			40.1			48.1			43.2			0.38 U		
Iron	23100			39800			21400			17600			27200			25600			1.6 U		
Lead	66.5	J	D	279	J	D	22.0	J	D	87.2	J	D	155	J	D	85.8	J	D	0.22 U		
Magnesium	10200			9210			10600			5360			7820			8380			10.4 U		
Manganese	868			787			454			653			985			775			0.26 U		
Mercury	14.3			61.1			0.07		G	2.4			3.2			12.0			0.10 U		
Nickel	10.5			21.2			9.7			7.6			12.0			10.1			3.5 U		
Potassium	2540			2890			2100			1050			2570			2260			57.8 U		
Selenium	1.9			0.32 U			1.1			1.4			1.2			0.33 U			0.52 L	J	A
Silver	28.0	J	BC	69.7	J	BC	2.9	J	BC	15.4	J	BC	8.6	J	BC	16.7	J	BC	0.36 U		
Sodium	230 L	J	A	145 L	J	A	187 L	J	A	67.9 L	J	A	86.0 L	J	A	198 L	J	A	17.0 U		
Thallium	0.82 L	J	A	0.71 L	J	A	1.6 L	J	A	1.3 L	J	A	1.6 L	J	A	0.69 U	J	E	0.72 U		
Vanadium	55.0			72.4			58.0			30.9			60.8			51.0			1.1 U		
Zinc	170	J	D	350	J	D	52.2	J	D	119	J	D	108	J	D	110	J	D	1.0 U		
Percent Solids	99.4 %			99.7 %			99.2 %			100 %			100 %			99.6 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
N/A-Not Applicable

ANALYTICAL RESULTS

T 1A

Case No: 2540 Memo #01

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: August 30, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com						Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6.6			40.0																	
Antimony	5.7			12.0																	
Arsenic	0.56			2.0																	
Barium	2.1			40.0																	
Beryllium	0.32			1.0																	
Cadmium	0.60			1.0																	
Calcium	15.8			1000																	
Chromium	0.80			2.0																	
Cobalt	2.5			10.0																	
Copper	0.38			5.0																	
Iron	1.6			20.0																	
Lead	0.22			0.60																	
Magnesium	10.4			1000																	
Manganese	0.26			3.0																	
Mercury	0.10			0.10																	
Nickel	3.5			8.0																	
Potassium	57.8			1000																	
Selenium	0.34			1.0																	
Silver	0.36			2.0																	
Sodium	17.0			1000																	
Thallium	0.72			2.0																	
Vanadium	1.1			10.0																	
Zinc	1.0			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #01 LABORATORY ALI

SDG NO. MYP191 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE August 30, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	X		O	
7. MATRIX SPIKE ANALYSIS	M		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #01 LABORATORY ALI

SDG NO. MYP191 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE August 30, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: A high recovery result of 130.0% for mercury was obtained in the analysis of the CRDL standard (CRA). While there are no criteria established for the CRA recovery, the high recovery result obtained for mercury may indicate high bias for mercury result in sample MYP207 (0.20 μg/L = 0.07 mg/Kg), which is at the CRDL of 0.20 μg/L.

In addition, a high final recovery result of 152.0% for zinc was obtained in the analysis of the CRDL standard (CRI). However, all of the sample results for zinc were at least 25x greater than the CRDL of 4.0 mg/Kg.

In Reference to Case No(s).:

22540 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of FAX: August 22, 1994

Laboratory Name: Associated Laboratories, Inc. (ALI)

Lab Contact: Jim McCall

Region: 9

Regional Contact: Dina D. David, ESAT/ICF Kaiser

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP191

Summary of Questions/Issues Discussed:

1. Please provide the digestion logs for mercury. Digestion was performed on August 8 and 9, 1994, as indicated on Form 13 (Preparation Log).
2. Why did the laboratory use a dilution factor of 10 in the analysis of the ICP Interference Check Sample (ICS) solutions A and AB for arsenic, selenium, and thallium? Note that the ICP ICS solutions A and AB did not contain the above analytes.
3. Please note that high negative results were obtained for thallium in samples MYP191 through MYP202. The absolute values obtained for thallium in most of these samples were greater than the CRDL of 10 ug/L.
4. The result obtained for mercury in sample MYP0207 was incorrectly reported as 0.07 mg/Kg on Form I, instead of 0.10 U (non-detected).

Summary of Resolution:

1.-4. See attached sheet. The resolution for the above items was received by fax at ESAT/ICF on August 29, 1994.

Signature: Dina D. David

Date: August 30, 1994

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: MDW for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 21, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #05
SDG NO.:	MYP211
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (See Case Summary)
COLLECTION DATE:	August 2, 3, and 11, 1994
REVIEWER:	Karen Pettit, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #05
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 21, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP211 through MYP220 and MYP241 through MYP250

COLLECTION DATE: August 2, 3, and 11, 1994
SAMPLE RECEIPT DATE: August 6 and 13, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP214 and MYP215

LABORATORY QC: Matrix Spike: MYP211
Duplicates: MYP211
ICP Serial Dilution: MYP211

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 16, 1994	August 17 and 18, 1994
Mercury	August 18 and 22, 1994	August 18, 22, and 23, 1994
Percent Solids	Not Applicable	August 16, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in four samples, and for thallium in ten samples, which have negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. These sample results for selenium and thallium were estimated because they were quantitatively questionable.

The ICP ICS solution is analyzed to determine the effects of high concentrations of interfering elements on each analyte. In the final analysis of the ICP ICS solution AB for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICP61E Trace Analyzer, the results obtained for the interferents (aluminum, calcium, iron, and magnesium) did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform the appropriate corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICP61E Trace Analyzer. The effect on the quality of the data is not known.

TPO ATTENTION:

SAMPLING ISSUES: There was no QC sample specified on the chain of custody. The laboratory did not contact Sample Management Office (SMO) regarding the selection of a QC sample.

OTHER: None.

ADDITIONAL COMMENTS:

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the MDL and CRDL were 57.8 mg/Kg and 1000 mg/Kg, respectively. Consequently, the result obtained for potassium was reported as non-detected.

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at

ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 µg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 µg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	No	D
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	B
12. Sample Quantitation	No	A,C
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Zinc in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP211 did not meet the 10% criterion for zinc as shown below.

Analyte	MYP211 % Difference
Zinc	15.9

The results reported for zinc in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

C. The following results are estimated because of sample quantitation problems. The results are flagged "J" in Table 1A.

- Selenium in samples MYP219, MYP242, MYP243, and MYP246
- Thallium in samples MYP211, MYP213, MYP214, MYP215, MYP217, MYP218, MYP219, MYP220, MYP244, and MYP246

High negative results were obtained for selenium in samples MYP219, MYP242, MYP243, and MYP246 and for thallium in samples MYP211, MYP213, MYP214, MYP215, MYP217, MYP218, MYP219, MYP220, MYP244, and MYP246. The absolute values for selenium and thallium in the samples listed above exceed the CRDL of 5.0 µg/L (1.0 mg/Kg) for selenium and 10.0 µg/L (2.0 mg/Kg) for thallium. The laboratory reported the results for selenium and thallium in the above samples as non-detected. In the reviewer's opinion, the results reported

for selenium and thallium in the samples listed above are quantitavely unreliable due to high negative results obtained.

D. A relative percent difference (RPD) of 58.7 was obtained for lead in the analysis of field duplicate pair samples MYP214 and MYP215. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±35 RPD or ±2xCRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #05
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-025-SL-101A			MS-025-SL-102A			MS-025-SL-103A			MS-028-SL-101A			MS-028-SD-104A			MS-028-SL-102A			MS-028-SL-103A		
Sample I.D.	MYP211			MYP212			MYP213			MYP214 D1			MYP215 D1			MYP216			MYP217		
Date of Collection	8/3/94			8/3/94			8/3/94			8/2/94			8/2/94			8/2/94			8/2/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10000			11500			12100			10300			10600			22000			15400		
Antimony	5.3 U			5.5 U			6.0 L	J	A	5.5 U			5.5 U			5.6 U			5.6 U		
Arsenic	33.6			14.6			19.0			15.7			17.0			13.9			18.1		
Barium	84.7			83.2			75.1			65.4			67.7			189			97.7		
Beryllium	0.78 L	J	A	0.92 L	J	A	0.84 L	J	A	0.85 L	J	A	0.83 L	J	A	1.0			1.1		
Cadmium	0.56 U			0.58 U			0.68 L	J	A	0.58 U			0.58 U			0.59 U			0.94 L	J	A
Calcium	*16300*			8520			27900			9560			11500			19900			11200		
Chromium	9.3			10.1			9.0			9.3			10.1			16.5			11.4		
Cobalt	7.5 L	J	A	8.9 L	J	A	9.1 L	J	A	7.5 L	J	A	8.3 L	J	A	12.1			10.0		
Copper	52.8			38.3			50.2			42.0			38.8			37.6			59.0		
Iron	19900			24000			22100			18600			19400			28700			24900		
Lead	62.1			73.6			57.1			177		D	96.7		D	78.1			100		
Magnesium	6680			6210			7380			6160			6320			9640			6060		
Manganese	1300			501			1320			889			851			477			649		
Mercury	2.3			0.93			1.5			4.0			3.4			7.8			24.3		
Nickel	6.0 L	J	A	8.2			6.2 L	J	A	5.7 L	J	A	6.9 L	J	A	10.2			7.3 L	J	A
Potassium	1450			2220			1370			1300			1310			3500			2000		
Selenium	0.31 U			0.33 U			0.33 U			0.36 L	J	A	0.33 U			0.34 U			0.34 U		
Silver	18.3			3.5			20.5			21.4			24.6			4.7			27.8		
Sodium	195 L	J	A	242 L	J	A	175 L	J	A	52.8 L	J	A	66.6 L	J	A	187 L	J	A	105 L	J	A
Thallium	0.67 U	J	C	0.70 U			0.70 U	J	C	0.70 U	J	C	0.70 U	J	C	0.71 U			0.71 U	J	C
Vanadium	36.2			62.0			43.3			33.0			34.5			69.4			53.0		
Zinc	251	J	B	84.7	J	B	175	J	B	167	J	B	173	J	B	107	J	B	116	J	B
Percent Solids	99.1 %			98.7 %			99.6 %			99.5 %			99.5 %			98.9 %			99.4 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

Case N 22540 Memo #05

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 21, 1994

TABLE 1A

Concentration in mg/Kg

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Station Location	MS-031-SL-101A			MS-031-SL-102A			MS-031-SL-103A			MS-001-SL-101A			MS-001-SL-102A			MS-001-SL-103A			MS-001-SL-104A		
Sample I.D.	MYP218			MYP219			MYP220			MYP241			MYP242			MYP243			MYP244		
Date of Collection	8/2/94			8/2/94			8/2/94			8/11/94			8/11/94			8/11/94			8/11/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	16800			12900			13200			6230			12800			13300			7850		
Antimony	20.7			5.4 U			5.7 U			5.2 U			5.2 U			5.7 U			5.6 U		
Arsenic	518			16.4			24.5			3.6			6.5			8.4			12.7		
Barium	939			94.8			91.1			54.8			125			120			71.6		
Beryllium	1.3			1.3			1.2			0.52 L	J	A	0.88 L	J	A	0.98 L	J	A	0.72 L	J	A
Cadmium	6.7			0.58 L	J	A	0.60 U			0.55 U			0.55 U			1.7			1.3		
Calcium	14600			8510			10700			2670			5740			7740			3570		
Chromium	15.5			12.6			12.3			7.9			16.2			13.3			10.4		
Cobalt	12.2			11.7			11.9			6.0 L	J	A	11.9			11.2			8.1 L	J	A
Copper	378			33.1			34.6			11.6			14.2			81.6			76.2		
Iron	32200			24000			26300			13100			22200			23100			20800		
Lead	6100			42.6			44.6			7.9			9.2			106			103		
Magnesium	8250			7630			7990			2470			4760			5840			4150		
Manganese	813			937			941			213			436			541			460		
Mercury	76.5			2.2			2.6			0.19			2.0			54.9			66.0		
Nickel	11.5			9.8			8.3			5.3 L	J	A	9.2			10.1			5.3 L	J	A
Potassium	2510			1570			1550			1340			1090			3020			1500		
Selenium	0.32 U			0.32 U	J	C	0.34 U			0.31 U			0.31 U	J	C	0.34 U	J	C	0.34 U		
Silver	41.9			16.5			12.8			0.33 U			0.33 U			20.5			20.9		
Sodium	169 L	J	A	72.3 L	J	A	108 L	J	A	231 L	J	A	678 L	J	A	331 L	J	A	188 L	J	A
Thallium	0.67 U	J	C	0.69 U	J	C	0.72 U	J	C	0.66 U			0.66 U			0.72 U			0.71 U	J	C
Vanadium	62.7			46.1			52.1			35.3			67.5			62.6			52.7		
Zinc	3200	J	B	84.9	J	B	89.6	J	B	28.4	J	B	52.6	J	B	203	J	B	150	J	B
Percent Solids	99.8 %			99.9 %			99.5 %			99.6 %			99.2 %			99.4 %			99.1 %		

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS

TABLE 1A

Case No.: 22540 Memo #05
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-004-SL-101A			MS-004-SL-102A			MS-004-SL-103A			MS-004-SL-104A			MS-004-SL-105A			MS-012-SL-137A			Lab Blank*		
Sample I.D.	MYP245			MYP246			MYP247			MYP248			MYP249			MYP250					
Date of Collection	8/11/94			8/11/94			8/11/94			8/11/94			8/11/94			8/11/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	9860			16900			14500			15600			7910			5370			6.6 U		
Antimony	8.2 L	J	A	9.1 L	J	A	5.5 U			18.8			17.3			16.8			5.7 U		
Arsenic	39.8			28.8			12.6			60.8			90.0			16.8			0.56 U		
Barium	84.0			130			142			141			138			40.5			2.1 U		
Beryllium	1.1			1.2			1.1			1.1			0.97			0.63 L	J	A	0.32 U		
Cadmium	1.9			1.1			0.93 L	J	A	27.6			5.2			5.1			0.60 U		
Calcium	8440			11200			11000			9050			7050			3290			15.8 U		
Chromium	10.9			12.9			12.0			12.1			8.0			8.4			0.80 U		
Cobalt	9.5			12.7			11.6			10.1			13.5			3.2 L	J	A	2.5 U		
Copper	306			250			204			3290			3120			340			0.38 U		
Iron	22800			27800			24300			23200			24600			15600			1.6 U		
Lead	261			162			70.6			1500			480			943			0.22 U		
Magnesium	5170			8010			7310			5630			3810			3720			10.4 U		
Manganese	629			665			581			360			492			252			0.26 U		
Mercury	126			45.9			14.4			13.7			149			948			0.10 U		
Nickel	7.2 L	J	A	8.4			8.8			7.8			11.2			3.4 U			3.5 U		
Potassium	2500			2900			3090			2990			1560			1100			57.8 U		
Selenium	0.41 L	J	A	0.33 U	J	C	0.33 U			10.9			11.3			7.3			0.34 U		
Silver	18.7			13.5			5.4			25.9			49.1			40.3			0.36 U		
Sodium	228 L	J	A	280 L	J	A	365 L	J	A	458 L	J	A	354 L	J	A	579 L	J	A	17.0 U		
Thallium	0.66 U			0.71 U	J	C	0.70 U			2.0			0.68 U			0.70 U			0.72 U		
Vanadium	55.2			71.3			68.1			73.5			43.4			20.2			1.1 U		
Zinc	175	J	B	148	J	B	90.9	J	B	384	J	B	410	J	B	482	J	B	1.0 U		
Percent Solids	99.6 %			99.0 %			99.4 %			99.6 %			99.4 %			98.3 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
* Two Lab Blanks were analyzed and reported for mercury. The results for mercury were both non-detected.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit
N/A-Not Applicable

ANALYTICAL RESULTS

TABLE 1A

Case N: 22540 Memo #05

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6.6			40.0																	
Antimony	5.7			12.0																	
Arsenic	0.56			2.0																	
Barium	2.1			40.0																	
Beryllium	0.32			1.0																	
Cadmium	0.60			1.0																	
Calcium	15.8			1000																	
Chromium	0.80			2.0																	
Cobalt	2.5			10.0																	
Copper	0.38			5.0																	
Iron	1.6			20.0																	
Lead	0.22			0.60																	
Magnesium	10.4			1000																	
Manganese	0.26			3.0																	
Mercury	0.10			0.10																	
Nickel	3.5			8.0																	
Potassium	57.8			1000																	
Selenium	0.34			1.0																	
Silver	0.36			2.0																	
Sodium	17.0			1000																	
Thallium	0.72			2.0																	
Vanadium	1.1			10.0																	
Zinc	1.0			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #05 LABORATORY ALI

SDG NO. MYP211 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 21, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	O		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	X			
10. SAMPLE QUANTITATION	X		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #05 LABORATORY ALI

SDG NO. MYP211 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 21, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in four samples, and for thallium in ten samples, which have negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. These sample results for selenium and thallium were estimated because they were quantitatively questionable.

The ICP ICS solution is analyzed to determine the effects of high concentrations of interfering elements on each analyte. In the final analysis of the ICP ICS solution AB for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICP61E Trace Analyzer, the results obtained for the interferents (aluminum, calcium, iron, and magnesium) did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform the appropriate corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICP61E Trace Analyzer. The effect on the quality of the data is not known.

TPO ATTENTION: There was no QC sample specified on the chain of custody. The laboratory did not contact Sample Management Office (SMO) regarding the selection of a QC sample.

AREAS OF CONCERN: None.

In Reference to Case No(s).:

22540 Memo #05

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 7, 1994

Laboratory Name: ALI

Lab Contact: Jim McCall

Region: 9

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP211

Summary of Questions/Issues Discussed:

When the data package for this SDG was examined, the discrepancies below were discovered.

1. There was no QC sample designated on the chain of custody. Was Sample Management Office contacted regarding the selection of a QC sample?

2. The percent solids calculation for sample MYP220 are incorrect. It appears that the weight results were not copied correctly from the raw data sheet to the sheet were the calculations were performed. Please correct the calculations and the appropriate Forms.

3. The samples in this SDG were received on two days, August 6 and 13, 1994. One of the associated airbills, #1177375334, is missing from the data package. Please supply a copy or an explanation regarding its location.

Please correct and resubmit the affected forms and resolve the questions above. Should you have any questions, please contact me at (415) 882-3183. Thank you for your prompt cooperation.

In Reference to Case No(s).:

22540 Memo #08

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 7, 1994

Laboratory Name: ALI

Lab Contact: Jim McCall

Region: 9

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP211

Summary of Resolution:

A response, dated September 14, 1994, was received in this office on September 20, 1994 due to an oversight in distributing data. Please note the following resolutions.

1. The laboratory selected the QC Sample without contacting SMO.

2. The percent solids result for sample MYP220 was recalculated and a corrected Form 1 and raw data sheets were submitted.

3. A copy of airbill #1177375334 was submitted.

Please see the attached response, dated September 14, 1994 for further information.

Karen Pettit
Signature

September 20, 1994
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

RECEIVED
SEP 15 1994
R. 9 QAMS

ASSOCIATED LABORATORIES

INORGANICS
LABORATORY RESPONSE TO REGIONAL AUDIT

REGION CONTACT: Karen Pettit, ICF Kaiser
REGION: 9
CASE: 22540
SDG: MYP211

DATE: September 14, 1994

COMMENTS:

Response to Questions/ Issues:

1. Since there was no QC sample designated on the chain of custody, the laboratory chose the sample used for QC.

2. The percent solids for sample MYP220 was reported incorrectly. The correct percent solids should be 99.5 percent. A corrected Form 1, page 012, and Percent Solid's Worksheet, page 247, are attached.

3. A copy of the airbill from August 5, #1177375334, is attached. The original is included in the data package for Case 22540 (MYP191).

Please contact Jim McCall if there are any questions. Sorry for the inconvenience.

CC: SMO, EMSL-LV

Rec'd 9/20/94
KP

RECEIVED
SEP 1 5 1994
R. 9 CAMS

FULL INORGANICS
COMPLETE SDG FILE (CSF)
INVENTORY SHEET

Lab Name: ASSOCIATED LABORATORIES, INC. City/State: ORANGE / CA

Case No. 22540 SDG No. MYP211 SDG Nos. to Follow: _____ _____ _____

SAS No. _____ Contract No. 68D20051 SOW No. ILM02.1

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II D and Section III V)

Rev 9/14/94

		Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region	
1.	Inventory Sheet (DC-2) (Do not number)					
2.	Cover Page	01	03	✓	✓	
3.	Inorganic Analysis Data Sheet (Form I-IN)	03	22	✓	✓	corrected pg. 1
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	23	27	✓	✓	
5.	CRDL Standards For AA and ICP (Form IIB-IN)	28	30	✓	✓	
6.	Blanks (Form III-IN)	31	35	✓	✓	
7.	ICP Interference Check Sample (Form IV-IN)	36	37	✓	✓	
8.	Spike Sample Recovery (Form VA-IN)	38	38	✓	✓	
9.	Post Digest Spike Sample Recovery (Form VB-IN)	39	39	✓	✓	
10.	Duplicates (Form VI-IN)	40	40	✓	✓	
11.	Laboratory Control Sample (Form VII-IN)	41	42	✓	✓	
12.	Standard Addition Results (Form VIII-IN)	43	43	✓	✓	
13.	ICP Serial Dilutions (Form IX-IN)	44	44	✓	✓	
14.	Instrument Detection Limits (Form X-IN)	45	47	✓	✓	
15.	ICP Interelement Correction Factors (Form XIA-IN)	48	49	✓	✓	
16.	ICP Interelement Correction Factors (Form XIB-IN)	50	50	✓	✓	
17.	ICP Linear Ranges (Form XII-IN)	51	52	✓	✓	
18.	Preparation Log (Form XIII-IN)	53	56	✓	✓	
19.	Analysis Run Log (Form XIV-IN)	57	65	✓	✓	
20.	ICP Raw Data	66	180	✓	✓	
21.	Furnace AA Raw Data	NA ~~181~~	~~242~~	✓	✓	WTT/8-24-94
22.	Mercury Raw Data	181	242	✓	✓	

	Page Nos. From	To	(Please Check:) Lab	Region	
23. Cyanide Raw Data	NA		✓	✓	
24. Preparation Logs Raw Data	243	246	✓	✓	
25. Percent Solids Determination Log	247	249	✓	✓	connected 2
26. Traffic Report	250	251	✓	✓	
27. EPA Shipping/Receiving Documents					
Airbill (No. of Shipments 1)	252	252	✓	✓	ADD 252+
Chain-of-Custody Records	250	251	✓	✓	
Sample Tags	NA		✓	✓	
Sample Log-In Sheet (Lab & DC1)	253	254	✓	✓	
SDG Cover Sheet	255	255	✓	✓	
28. Misc. Shipping/Receiving Records (list all individual records)					
Telephone Logs	NA			✓	
				✓	
				✓	
29. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)	256	256	✓	✓	
	NA			✓	
30. Internal Original Sample Prep & Analysis Records (describe or list)					
Prep Records INSTRUMENT logbook	257	258	✓	✓	
Analysis Records STANDARD logbook	259	269	✓	✓	
Description					
31. Other Records (describe or list)					
Telephone Communication Log	NA			✓	
				✓	
				✓	

32. Comments:

Completed by (CLP Lab):

[signature] (Signature) MARY THI TRUONG / DATA ANALYST (Print Name & Title) 08/24/94 (Date)

Audited by (EPA):

[signature] (Signature) Data Reviewer, ESAT/ICF (Print Name & Title) 9/20/94 (Date)

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM SEP 02 1994

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 1, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #02
SDG NO.:	MYP221
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	Ras Total Metals
SAMPLE NO.:	20 Soil Samples (MYP221 through MYP240)
COLLECTION DATE:	August 4, 1994
REVIEWER:	Karen Pettit, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-10367/22540M02.RPT

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #02
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 1, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP221 through MYP240

COLLECTION DATE: August 4, 1994
SAMPLE RECEIPT DATE: August 6, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None.
Equipment Blanks (EB): None.
Background Samples (BG): None.
Duplicates (D1): MYP222 and MYP223
(D2): MYP233 and MYP234

LABORATORY QC: Matrix Spike: MYP230
Duplicates: MYP230
ICP Serial Dilution: MYP230

ANALYSIS: Ras Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 8, 1994	August 10 and 11, 1994
Mercury	August 11 and 12, 1994	August 11 and 12, 1994
Percent Solids	Not Applicable	August 8, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the MDL and CRDL were 57.8 mg/Kg and 1000 mg/Kg, respectively. Although the true value for potassium in the LCS was less that the MDL, the result obtained for potassium was reported at 95.3 mg/Kg.

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	D
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	C
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery result for antimony in QC sample MYP230 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony are presented below and are based on an ideal recovery of 100%.

Analyte	MYP230 % Recovery	MYP230 % Bias
Antimony	34.1	-65.9

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in all of the samples may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 79.1% was obtained for antimony in QC sample MYP230. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (34.1%) obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Calcium, iron, and manganese in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP230 did not meet the 10% criterion for the analytes shown below.

Analyte	MYP230 % Difference
Calcium	11.8
Iron	10.5
Manganese	11.0

The results reported for calcium, iron, and manganese in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

D. A high initital CRDL standard (CRI) recovery of 251.5% and a final CRI standard recovery of 262.2% for zinc were reported for the analyses in this SDG. A high CRDL standard (CRA) recovery of 150.0% for mercury was reported for the analyses performed on August 11 and 12, 1994. While there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 1, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-064-SL-101A			MS-064-SL-102A			MS-064-SD-106A			MS-064-SL-103A			MS-064-SL-104A			MS-064-SL-105A			MS-065-SL-101A		
Sample I.D.	MYP221			MYP222 D1			MYP223 D1			MYP224			MYP225			MYP226			MYP227		
Date of Collection	08/04/94			08/04/94			08/04/94			08/04/94			08/04/94			08/04/94			08/04/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	18600			15800			13600			27800			13100			13400			20600		
Antimony	5.7 U	J	B	5.5 U	J	B	5.5 U	J	B	5.6 U	J	B	5.6 U	J	B	5.7 U	J	B	5.2 U	J	B
Arsenic	18.6			13.7			14.5			15.4			15.2			52.0			17.1		
Barium	87.7			60.0			56.7			108			76.1			81.1			165		
Beryllium	1.2			1.1			1.1			1.9			1.0			1.6			1.2		
Cadmium	0.72 L	J	A	0.83 L	J	A	1.0			0.95 L	J	A	0.59 U			0.60 U			0.55 U		
Calcium	3330	J	C	2020	J	C	1720	J	C	1400	J	C	3730	J	C	1500	J	C	10900	J	C
Chromium	10.1			15.1			14.0			19.5			8.6			6.6			13.0		
Cobalt	13.2			15.6			15.6			28.2			9.6 L			6.3 L			13.5		
Copper	57.7			59.5			57.8			85.1			52.0			32.9			49.6		
Iron	31400	J	C	30200	J	C	29000	J	C	36800	J	C	27700	J	C	53300	J	C	28700	J	C
Lead	81.0			62.8			56.0			93.8			53.7			73.7			391		
Magnesium	9090			6230			5740			7360			7010			6020			10300		
Manganese	1020	J	C	820	J	C	812	J	C	1140	J	C	675	J	C	462	J	C	1120	J	C
Mercury	0.14		D	0.09 U			0.08 U			0.16		D	0.09 U			0.09 U			0.63		
Nickel	11.7			12.9			13.3			21.3			7.6 L	J	A	5.0 L	J	A	15.1		
Potassium	2140			1650			1380			2130			1590			3290			2290		
Selenium	0.78 L	J	A	0.33 U			0.60 L	J	A	0.33 U			0.34 U			1.4			0.31 U		
Silver	3.1			1.2 L	J	A	1.1 L	J	A	1.7 L	J	A	1.3 L	J	A	3.2			11.0		
Sodium	128 L	J	A	106 L	J	A	102 L	J	A	101 L	J	A	191 L	J	A	160 L	J	A	98.2 L	J	A
Thallium	1.7 L	J	A	0.69 U			1.4 L	J	A	0.70 U			0.71 U			0.90 L	J	A	0.66 U		
Vanadium	48.8			54.0			47.8			64.0			40.5			46.3			46.0		
Zinc	161			140			133			203			114			74.5			116		
Percent Solids	94.7 %			99.2 %			99.3 %			97.4 %			94.4 %			98.4 %			99.5 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS

1A

Case No 22540 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 1, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-065-SL-102A			MS-065-SL-103A			MS-065-SL-104A			MS-065-SL-105A			MS-066-SL-101A			MS-066-SL-102A			MS-066-SD-104A		
Sample I.D.	MYP228			MYP229			MYP230			MYP231			MYP232			MYP233 D2			MYP234 D2		
Date of Collection	08/04/94			08/04/94			08/04/94			08/04/94			08/04/94			08/04/94			08/04/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	16000			8340			20600			7960			5850			29800			22200		
Antimony	5.4 U	J	B	6.1 U	J	B	8.1 L	J	AB	6.5 U	J	B	5.3 U	J	B	8.1 L	J	AB	6.2 L	J	AB
Arsenic	32.3			30.8			535			8.0			14.9			22.1			22.3		
Barium	123			85.4			87.4			122			92.2			301			244		
Beryllium	0.83 L	J	A	0.39 L	J	A	1.8			0.53 L	J	A	0.63 L	J	A	1.5			1.4		
Cadmium	0.57 U			0.65 U			1.7			0.69 U			0.56 U			0.58 U			0.60 U		
Calcium	18400	J	C	25600	J	C	33200	J	C	4630	J	C	3600	J	C	15200	J	C	16100	J	C
Chromium	1.6 L	J	A	0.86 U			4.5			23.2			7.3			13.9			12.5		
Cobalt	4.4 L	J	A	2.7 U			4.9 L	J	A	7.7 L	J	A	5.4 L	J	A	16.0			16.4		
Copper	37.5			8.4			23.6			31.1			25.5			44.7			40.2		
Iron	23800	J	C	14300	J	C	46700	J	C	17100	J	C	12800	J	C	31400	J	C	29600	J	C
Lead	61.0			17.3			21.4			124			72.7			29.4			25.7		
Magnesium	5370			1070 L	J	A	13200			3830			3510			11300			10900		
Manganese	242	J	C	26.3	J	C	345	J	C	337	J	C	972	J	C	902	J	C	873	J	C
Mercury	0.25		D	0.10 U			0.19		D	0.82			2.4			5.4			5.2		
Nickel	3.3 U			3.7 U			4.9 L	J	A	7.4 L	J	A	7.7			11.7			12.6		
Potassium	1680			2180			2080			1220			1010			4130			2960		
Selenium	0.32 U			0.37 U			0.36 U			0.39 U			0.32 U			0.33 U			0.34 U		
Silver	0.34 U			0.39 U			0.38 U			3.4			21.8			6.8			6.7		
Sodium	116 L	J	A	82.4 L	J	A	92.9 L	J	A	433 L	J	A	45.2 L	J	A	217 L	J	A	165 L	J	A
Thallium	1.9			4.8			0.75 U			3.5			0.85 L	J	A	0.97 L	J	A	0.72 U		
Vanadium	23.0			9.5 L	J	A	38.4			40.8			20.2			70.5			62.9		
Zinc	45.2			12.5		D	51.7			92.5			95.2			100			97.5		
Percent Solids	96.4 %			90.8 %			90.3 %			86.5 %			99.6 %			96.6 %			97.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 1, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	SM-066-SL-103A			MS-067-SL-101A			MS-067- SL-102A			MS-067-SL-103A			MS-067-SL-104A			MS-067-SL-105A			Lab Blank		
Sample I.D.	MYP235			MYP236			MYP237			MYP238			MYP239			MYP240					
Date of Collection	08/04/94			08/04/94			08/04/94			08/04/94			08/04/94			08/04/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	15800			14800			15100			11900			12200			9720			6.6 U		
Antimony	5.3 U	J	B	6.4 L	J	AB	7.8 L	J	AB	6.3 U	J	B	5.5 U	J	B	6.1 L	J	AB	5.7 U		
Arsenic	35.7			12.3			23.3			23.7			14.9			22.2			0.56 U		
Barium	196			120			70.8			48.0			113			33.8 L	J	A	2.1 U		
Beryllium	1.1			0.93 L	J	A	1.1			0.91 L	J	A	1.0			0.73 L	J	A	0.32 U		
Cadmium	0.56 U			0.58 U			0.56 U			0.67 U			0.58 U			0.57 U			0.60 U		
Calcium	13800	J	C	5150	J	C	8150	J	C	7760	J	C	5050	J	C	5760	J	C	15.8 U		
Chromium	9.5			13.4			10.7			8.6			12.5			7.9			0.80 U		
Cobalt	14.3			12.7			11.0			11.4			12.8			9.4 L	J	A	2.5 U		
Copper	34.2			27.6			39.1			38.4			28.2			31.0			0.38 U		
Iron	26600	J	C	22800	J	C	23000	J	C	22600	J	C	23700	J	C	19100	J	C	1.6 U		
Lead	33.9			38.2			33.1			33.6			48.0			23.5			0.22 U		
Magnesium	7780			7550			9000			8200			7100			7400			10.4 U		
Manganese	767	J	C	648	J	C	929	J	C	826	J	C	707	J	C	708	J	C	0.26 U		
Mercury	3.3			1.2			0.26		D	0.37		D	1.7			0.16		D	0.10 U		
Nickel	11.2			11.6			10.5			9.6			11.7			9.3			3.5 U		
Potassium	2310			1940			1550			1300			1590			939 L	J	A	67.7 L	J	A
Selenium	0.32 U			0.33 U			0.32 U			0.38 U			0.33 U			0.32 U			0.34 U		
Silver	5.8			2.1			11.6			21.4			4.0			21.7			0.36 U		
Sodium	193 L	J	A	202 L	J	A	99.1 L	J	A	76.0 L	J	A	221 L	J	A	51.2 L	J	A	17.0 U		
Thallium	1.3 L	J	A	1.3 L	J	A	0.67 U			0.80 U			0.70 U			0.69 U			0.72 U		
Vanadium	48.0			55.6			44.2			37.0			51.9			29.6			1.1 U		
Zinc	77.5			82.9			117			116			83.5			94.1			1.0 U		
Percent Solids	99.9 %			99.9 %			99.3 %			86.6 %			98.5 %			98.8 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS

1 1A

Case No 22540 Memo #02
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 1, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6.6			40.0																	
Antimony	5.7			12.0																	
Arsenic	0.56			2.0																	
Barium	2.1			40.0																	
Beryllium	0.32			1.0																	
Cadmium	0.60			1.0																	
Calcium	15.8			1000																	
Chromium	0.80			2.0																	
Cobalt	2.5			10.0																	
Copper	0.38			5.0																	
Iron	1.6			20.0																	
Lead	0.22			0.60																	
Magnesium	10.4			1000																	
Manganese	0.26			3.0																	
Mercury	0.10			0.10																	
Nickel	3.5			8.0																	
Potassium	57.8			1000																	
Selenium	0.34			1.0																	
Silver	0.36			2.0																	
Sodium	17.0			1000																	
Thallium	0.72			2.0																	
Vanadium	1.1			10.0																	
Zinc	1.0			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters. MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989 (USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994).

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #02 LABORATORY ALI

SDG NO. MYP221 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 1, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	X		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: A high initital CRDL standard (CRI) recovery of 251.5% and a final CRI standard recovery of 262.2% for zinc were reported for the analyses in this SDG. A high CRDL standard (CRA) recovery of 150.0% for mercury was reported for the analyses performed on August 11 and 12, 1994. While there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

In Reference to Case No(s).:

22540 Memo #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 26, 1994

Laboratory Name: ALI

Lab Contact: Jim McCall

Region: 9

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP221

Summary of Questions/Issues Discussed:

When the data package for this SDG was examined, the discrepancies below were discovered.

1. In the raw data, the results for mercury in samples MYP222, MYP223, MYP225, MYP226, and MYP229 were calculated at less than the MDL of 0.1 mg/Kg. Why were they not reported at the detection limit value for each sample and flagged with a "U" on Form 1? If the sample results were reported in error, please correct the appropriate forms.

2. The results for sample MYP230 on page 174 of the raw analysis log for mercury is miscalculated by approximately a factor of ten. The value for μg of mercury is entered as 0.44. When the amount was recalculated, using the linear regression, the value was found to be 0.0362 μg of mercury. Please recalculate the results and correct Form 1, Form 5, and Form 6, as well as the appropriate raw data sheets.

Please correct and resubmit the affected forms and resolve the questions above. Should you have any questions, please contact me at (415) 882-3183. Thank you for your prompt cooperation.

In Reference to Case No(s).:

22540 Memo #03

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 26, 1994

Laboratory Name: ALI

Lab Contact: Jim McCall

Region: 9

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP221

Summary of Resolution:

1. According to the response received on August 31, 1994, the sample results reported at less than the MDL had detectable levels of mercury. But since the digestate analyzed had a sample weight greater than 0.2 grams, the concentration results when calculated to mg/Kg were less than the MDL.

2. Corrections were made to all the appropriate forms and resubmitted. The forms were received on September 1, 1994.

Please see the attached response, dated August 31, 1994 for further information.

Karen Pettit
Signature

September 1, 1994
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

ASSOCIATED LABORATORIES

INORGANICS
LABORATORY RESPONSE TO REGIONAL AUDIT

REGION CONTACT: Karen Pettit, ICF Kaiser
REGION: 9
CASE: 22540
SDG: MYP221

DATE: August 31, 1994

COMMENTS:

Response to Questions/ Issues:

1. Samples MYP222, MYP223, MYP225, MYP226 AND MYP229 had detectable levels of mercury (at the detection limit) and thus were reported as detected with no "U" flag (ILM02, pg.B-17. As an example for sample MYP222: .02 ug/(0.23 g * 0.992) = 0.09 mg/kg. The detection limits are below 0.1 due to sample weight greater than 0.2 grams.

2. The result for mercury for sample MYP230 is reported incorrectly. The value should be 0.19 mg/kg on Form 1, Form 5A and Form 6. All Forms 1 are also corrected to remove the "*" flag for mercury. Also corrected pages 171 and 174 are attached. A revised DC-2 form is attached with the revised pages.

Please contact Jim McCall if there are any questions. Sorry for the inconvenience.

CC: SMO, EMSL-LV

INORGANIC/ORGANIC COMPLETE SDG FILE (CSF) INVENTORY CHECKLIST

Case No. 22540 SDG No. MYP221 SDG Nos. To Follow — SAS No. _____ Date Recvd 8 / 17 / 94

(ALI)

EPA Lab ID: ASSOCIATED LAB.

Lab Location: Irvine, CA

Region: IX Audit No.: 1173

Re-Submitted CSF? Yes___ No X

Box No(s): 1173

COMMENTS:

Over for additional comments.

ITEMS	YES	NO	N/A
CUSTODY SEALS			
1. Present on package?	✓		
2. Intact upon receipt?	✓		
FORM DC-2			
3. Numbering scheme accurate?	✓		
4. Are enclosed documents listed?	✓		
5. Are listed documents enclosed?	✓		
FORM DC-1			
6. Present?	✓		
7. Complete?	✓		
8. Accurate?	✓		
CHAIN-OF-CUSTODY RECORD(s)			
9. Signed?	✓		
10. Dated?	✓		
TRAFFIC REPORT(s) PACKING LIST(s)			
11. Signed?	✓		
12. Dated?	✓		
AIRBILLS/AIRBILL STICKER			
13. Present?	✓		
14. Signed?	✓		
15. Dated?	✓		
SAMPLE TAGS			
16. Does DC-1 list tags as being included?		✓	
17. Present?			✓
ALL DOCUMENTS			
18. Activities identified?	✓		
19. Legible?	✓		
20. Original?	✓		
20a. If "NO," does the copy indicate where original documents are located?			✓

Received by: Susan Lee — SUSAN LEE — Date 8/17/94

Audited by: Karen Pettit — KAREN PETTIT, DATA REVIEWER, ESAT/ — Date 8/22/94

Signature — Printed Name/Title

TO BE COMPLETED BY CEAT

Date Recvd by CEAT: ___/___/___ Date Entered: ___/___/___ Date Reviewed: ___/___/___

Entered by: _____ _____

Reviewed by: _____ _____

Signature — Printed Name/Title

FULL INORGANICS
COMPLETE SDG FILE (CSF)
INVENTORY SHEET

Lab Name: ASSOCIATED LABS City/State: ORANGE/CA 1173

Case No. 22540 SDG No. MYP221 SDG Nos. to Follow: _____ _____ _____

SAS No. _____ Contract No. 68D20005 SOW No. ILM02.1

RECEIVED
AUG 17 1994
R. 9 QAM

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II D and Section III V)

		Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region
1.	Inventory Sheet (DC-2) (Do not number)				✓
2.	Cover Page	01	02	✓	✓
3.	Inorganic Analysis Data Sheet (Form I-IN)	03	22	✓	✓
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	23	25	✓	✓
5.	CRDL Standards For AA and ICP (Form IIB-IN)	26	27	✓	✓
6.	Blanks (Form III-IN)	28	30	✓	✓
7.	ICP Interference Check Sample (Form IV-IN)	31	32	✓	✓
8.	Spike Sample Recovery (Form VA-IN)	33	33	✓	✓
9.	Post Digest Spike Sample Recovery (Form VB-IN)	34	34	✓	✓
10.	Duplicates (Form VI-IN)	35	35	✓	✓
11.	Laboratory Control Sample (Form VII-IN)	36	37	✓	✓
12.	Standard Addition Results (Form VIII-IN)	38	38	✓	✓
13.	ICP Serial Dilutions (Form IX-IN)	39	39	✓	✓
14.	Instrument Detection Limits (Form X-IN)	40	42	✓	✓
15.	ICP Interelement Correction Factors (Form XIA-IN)	43	44	✓	✓
16.	ICP Interelement Correction Factors (Form XIB-IN)	45	45	✓	✓
17.	ICP Linear Ranges (Form XII-IN)	46	47	✓	✓
18.	Preparation Log (Form XIII-IN)	48	50	✓	✓
19.	Analysis Run Log (Form XIV-IN)	51	57	✓	✓
20.	ICP Raw Data	58	170	✓	✓
21.	Furnace AA Raw Data	NA		✓	✓
22.	Mercury Raw Data	171	206	✓	✓

	Page Nos. From	To	(Please Check:) Lab	Region
23. Cyanide Raw Data	NA		✓	✓
24. Preparation Logs Raw Data	207	210	✓	✓
25. Percent Solids Determination Log	211	213	✓	✓
26. Traffic Report	214	215	✓	✓
27. EPA Shipping/Receiving Documents				
Airbill (No. of Shipments 2)	216	217	✓	✓
Chain-of-Custody Records	214	215	✓	✓
Sample Tags	NA		✓	✓
Sample Log-In Sheet (Lab & DC1)	218	218	✓	✓
SDG Cover Sheet	219	219	✓	✓
28. Misc. Shipping/Receiving Records (list all individual records)				
Telephone Logs	NA			✓
_____				✓
_____				✓
29. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)	220	220	✓	✓
_____	NA			✓
_____				✓
30. Internal Original Sample Prep & Analysis Records (describe or list)				
Prep Records INSTRUMENT Logbook	221	222	✓	✓
Analysis Records STANDARD Logbook	223	231	✓	✓
Description _____				✓
31. Other Records (describe or list)				
Telephone Communication Log	NA			✓
_____				✓
_____				✓

32. Comments: Attached One Original airbill.

Completed by (CLP Lab):

Mary Thi Truong (Signature) — MARY THI TRUONG / DATA ANALYST (Print Name & Title) — 08/16/94 (Date)

Audited by (EPA):

Karen Petit (Signature) — KAREN L PETIT, DATA REVIEWER, ESAT/CF (Print Name & Title) — 8/22/94 (Date)

FULL INORGANICS
COMPLETE SDG FILE (CSF)
INVENTORY SHEET

Lab Name: ASSOCIATED LABS City/State: ORANGE/CA

Case No. 22540 SDG No. MYP221 SDG Nos. to Follow: _____ _____ _____

SAS No. _____ Contract No. 68D2005 SOW No. ILM02.1

All documents delivered in the Complete SDG File must be original documents where possible. (Reference Exhibit B, Section II D and Section III V)

		Page Nos. From	Page Nos. To	(Please Check:) Lab	(Please Check:) Region	
1.	Inventory Sheet (DC-2) (Do not number)					
2.	Cover Page	01	02	✓		
3.	Inorganic Analysis Data Sheet (Form I-IN)	03	22	✓	✓	Form 1 corrected 8/31/94 Pgs 3-22
4.	Initial & Continuing Calibration Verification (Form IIA-IN)	23	25	✓		
5.	CRDL Standards For AA and ICP (Form IIB-IN)	26	27	✓		
6.	Blanks (Form III-IN)	28	30	✓		
7.	ICP Interference Check Sample (Form IV-IN)	31	32	✓		
8.	Spike Sample Recovery (Form VA-IN)	33	33	✓	✓	corrected Pg. 33
9.	Post Digest Spike Sample Recovery (Form VB-IN)	34	34	✓		
10.	Duplicates (Form VI-IN)	35	35	✓	✓	corrected pg. 35
11.	Laboratory Control Sample (Form VII-IN)	36	37	✓		
12.	Standard Addition Results (Form VIII-IN)	38	38	✓		
13.	ICP Serial Dilutions (Form IX-IN)	39	39	✓		
14.	Instrument Detection Limits (Form X-IN)	40	42	✓		
15.	ICP Interelement Correction Factors (Form XIA-IN)	43	44	✓		
16.	ICP Interelement Correction Factors (Form XIB-IN)	45	45	✓		
17.	ICP Linear Ranges (Form XII-IN)	46	47	✓		
18.	Preparation Log (Form XIII-IN)	48	50	✓		
19.	Analysis Run Log (Form XIV-IN)	51	57	✓		
20.	ICP Raw Data	58	170	✓		
21.	Furnace AA Raw Data	NA		✓		
22.	Mercury Raw Data	171	206	✓	✓	corrected pgs. 171 & 174

Amended forms Rec'd 9/1/94 JP BSAT

8/31/94

	Page Nos. From	To	(Please Check:) Lab	Region
23. Cyanide Raw Data	NA		✓	
24. Preparation Logs Raw Data	207	210	✓	
25. Percent Solids Determination Log	211	213	✓	
26. Traffic Report	214	215	✓	
27. EPA Shipping/Receiving Documents				
Airbill (No. of Shipments 2)	216	217	✓	
Chain-of-Custody Records	214	215	✓	
Sample Tags	NA		✓	
Sample Log-In Sheet (Lab & DC1)	218	218	✓	
SDG Cover Sheet	219	219	✓	
28. Misc. Shipping/Receiving Records (list all individual records)				
Telephone Logs	NA			
29. Internal Lab Sample Transfer Records & Tracking Sheets (describe or list)	220	220	✓	
	NA			
30. Internal Original Sample Prep & Analysis Records (describe or list)				
Prep Records INSTRUMENT logbook	221	222	✓	
Analysis Records STANDARD logbook	223	231	✓	
Description				
31. Other Records (describe or list)				
Telephone Communication Log	NA			

32. Comments:
Attached One Original airbill.

Completed by (CLP Lab):
Chang Hui Chuong (Signature) MAY THI TRUONG / DATA ANALYST (Print Name & Title) 08/16/94 (Date)

Audited by (EPA):
(Signature) (Print Name & Title) (Date)

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

FILE COPY

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdm for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 6, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #03
SDG NO.:	MYP271
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP271 through MYP290)
COLLECTION DATE:	August 8, 1994
REVIEWER:	Karen Pettit, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-10393/22540M03.RPT

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #03
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 6, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP271 through MYP290

COLLECTION DATE: August 8, 1994
SAMPLE RECEIPT DATE: August 13, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP272 and MYP273
(D2): MYP278 and MYP279
(D3): MYP289 and MYP290

LABORATORY QC: Matrix Spike: MYP281
Duplicates: MYP281
ICP Serial Dilution: MYP281

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 15, 1994	August 16 and 17, 1994
Mercury	August 15 and 16, 1994	August 15 and 16, 1994
Percent Solids	Not Applicable	August 15, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified;

Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in seven samples, and for thallium in three samples, which have negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. These sample results for selenium and thallium were estimated because they were quantitatively questionable.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

In the analysis of the laboratory control sample (LCS), the true value of potassium in the LCS was 50.0 mg/Kg, while the MDL and CRDL were 57.8 mg/Kg and 1000 mg/Kg, respectively. Although the true value for potassium in the LCS was less than the MDL, the result obtained for potassium was reported at 204.2 mg/Kg.

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

ADDITIONAL COMMENTS: (continued)

The Inorganic SOW specifies a concentration level of 1000 µg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 µg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	D
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	B
12. Sample Quantitation	No	A,C
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Calcium and lead in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP281 did not meet the 10% criterion for the analytes shown below.

Analyte	MYP281 % Difference
Calcium	17.6
Lead	19.8

The results reported for calcium and lead in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

C. The following results are estimated because of sample quantitation problems. The results are flagged "J" in Table 1A.

- Selenium in samples MYP275, MYP276, MYP282, MYP286, MYP287, MYP288, and MYP289
- Thallium in samples MYP275, MYP276, and MYP284

High negative results were obtained for selenium in samples MYP275, MYP276, MYP282, MYP286, MYP287, MYP288, and MYP289 and for thallium in samples MYP275, MYP276, and MYP284. The absolute values for selenium and thallium in the samples listed above exceed the CRDL of 5.0 µg/L (1.0 mg/Kg) for selenium and 10.0 µg/L (2.0 mg/Kg) for thallium. The laboratory reported the results for selenium and thallium in the above samples as non-detected. In the reviewer's opinion, the results reported for selenium and thallium in the

samples listed above are quantitavely unreliable due to high negative results obtained.

D. A low initial CRDL standard (CRI) recovery of 46.8% and a final CRI standard recovery of 81.3% for selenium were reported for the analyses in this SDG. While there are no criteria established for CRDL standard recoveries, low recoveries may indicate low bias for sample results near the CRDL. A high initial CRI recovery of 269.2% and a final CRI recovery of 92.2% for zinc were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 6, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-068-SL-103A			MS-068-SL-104A			MS-068-SD-106A			MS-068-SL-105A			MS-069-SL-101A			MS-069-SL-102A			MS-069-SL-103A		
Sample I.D.	MYP271			MYP272 D1			MYP273 D1			MYP274			MYP275			MYP276			MYP277		
Date of Collection	8/8/94			8/8/94			8/8/94			8/8/94			8/8/94			8/8/94			8/8/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	30300			4240			4520			7160			14000			12500			17300		
Antimony	5.7 U			5.5 U			5.5 U			5.2 U			5.2 U			5.3 U			5.6 U		
Arsenic	22.9			19.1			15.6			34.5			22.2			18.4			13.7		
Barium	431			80.4			68.1			82.6			156			118			140		
Beryllium	1.2			0.84 L	J	A	0.57 L	J	A	0.78 L	J	A	1.4			1.1			1.1		
Cadmium	0.60 U			0.90 L	J	A	0.58 U			0.59 L	J	A	0.81 L	J	A	0.70 L	J	A	1.0		
Calcium	14800	J	B	4570	J	B	5100	J	B	1910	J	B	5840	J	B	7060	J	B	5400	J	B
Chromium	13.4			25.1			21.7			9.3			13.9			13.6			14.9		
Cobalt	16.4			6.5 L	J	A	6.6 L	J	A	6.3 L	J	A	17.7			15.2			15.0		
Copper	46.4			51.0			43.9			35.2			55.1			43.5			57.4		
Iron	27500			23200			20800			25300			32200			30200			25700		
Lead	16.8	J	B	122	J	B	115	J	B	141	J	B	132	J	B	120	J	B	128	J	B
Magnesium	8730			3060			3420			5620			6860			6740			7790		
Manganese	995			755			802			559			1090			1020			878		
Mercury	0.52			0.39			0.28			0.34			3.0			2.5			4.2		
Nickel	11.6			9.8			10.5			6.4 L	J	A	18.7			12.4			14.4		
Potassium	4010			539 L	J	A	611 L	J	A	991			1790			1860			2040		
Selenium	0.34 U			0.71 L	J	A	0.70 L	J	A	0.31 U			0.31 U	J	C	0.32 U	J	C	0.34 U		
Silver	0.52 L	J	A	54.1			45.2			42.6			7.9			6.9			10.8		
Sodium	152 L	J	A	49.5 L	J	A	47.3 L	J	A	78.3 L	J	A	154 L	J	A	143 L	J	A	198 L	J	A
Thallium	0.72 U			0.70 U			0.70 U			0.67 U			0.66 U	J	C	0.68 U	J	C	0.71 U		
Vanadium	51.5			23.7			23.7			29.3			49.5			47.7			44.5		
Zinc	60.2			121			120			85.7			140			109			172		
Percent Solids	96.6 %			99.2 %			99.0 %			99.3 %			99.4 %			99.5 %			99.2 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALITICAL RESULTS

Case No: 22540 Memo #03 : 1A

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 6, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-070-SL-101A			MS-070-SD-104A			MS-070-SL-102A			MS-070-SL-103A			MS-071-SL-101A			MS-071-SL-102A			MS-071-SL-103A		
Sample I.D.	MYP278 D2			MYP279 D2			MYP280			MYP281			MYP282			MYP283			MYP284		
Date of Collection	8/8/94			8/8/94			8/8/94			8/8/94			8/8/94			8/8/94			8/8/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	13400			13600			15900			5060			15300			8670			7180		
Antimony	6.7 L	J	A	7.8 L	J	A	5.7 U			5.6 L	J	A	5.7 U			5.5 U			11.8		
Arsenic	16.2			15.4			6.9			7.2			13.6			8.4			17.0		
Barium	163			174			277			15.8 L	J	A	339			63.5			37.8		
Beryllium	1.3			0.90 L	J	A	0.88 L	J	A	0.33 L	J	A	1.5			0.59 L	J	A	0.76 L	J	A
Cadmium	1.3			0.94			0.60 U			0.58 U			0.60 U			0.58 U			2.0		
Calcium	6360	J	B	6680	J	B	3170	J	B	10900	J	B	1910	J	B	6430	J	B	47800	J	B
Chromium	14.7			15.3			6.6			4.7			8.8			8.2			8.2		
Cobalt	13.8			14.3			5.5 L	J	A	4.2 L	J	A	4.0 L	J	A	6.7 L	J	A	6.0 L	J	A
Copper	60.2			60.7			41.9			17.1			34.5			30.7			163		
Iron	25500			25000			18600			8170			45200			15600			18200		
Lead	179	J	B	191	J	B	220	J	B	20.3	J	B	80.5	J	B	40.4	J	B	157	J	B
Magnesium	6830			6900			4120			4250			2890			6160			5730		
Manganese	875			831			264			605			101			575			1250		
Mercury	6.8			6.5			2.2			0.39			7.9			0.19			737		
Nickel	12.9			12.4			4.9 L	J	A	3.4 U			3.5 U			5.5 L	J	A	8.4		
Potassium	2170			2210			2230			415 L	J	A	3380			927 L	J	A	692 L	J	A
Selenium	0.32 U			0.31 U			0.34 U			0.47 L	J	AD	0.34 U	J	C	0.33 U			7.0		
Silver	14.9			15.0			2.4			24.9			6.4			19.1			153		
Sodium	193 L	J	A	190 L	J	A	93.2 L	J	A	38.9 L	J	A	676 L	J	A	73.3 L	J	A	45.3 L	J	A
Thallium	0.67 U			0.66 U			0.73 U			0.70 U			0.73 U			0.69 U			0.67 U	J	C
Vanadium	41.8			43.4			26.5			14.1			41.7			28.2			26.8		
Zinc	153			152			67.5			47.4			29.0			81.1			150		
Percent Solids	99.4 %			99.8 %			98.3 %			99.9 %			97.3 %			99.7 %			99.5 %		

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #03
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 6, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-072-SL-101A			MS-072-SL-102A			MS-072-SL-103A			MS-073-SL-101A			MS-073-SL-102A			MS-073-SD-104A			Lab Blank		
Sample I.D.	MYP285			MYP286			MYP287			MYP288			MYP289 D3			MYP290 D3					
Date of Collection	8/8/94			8/8/94			8/8/94			8/8/94			8/8/94			8/8/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	9560			10300			11500			9680			12200			9920			6.6 U		
Antimony	6.1 L	J	A	5.7 U			5.2 U			5.6 U			5.7 U			5.8 L	J	A	5.7 U		
Arsenic	34.1			46.7			12.4			14.6			86.2			86.2			0.56 U		
Barium	80.3			37.2 L	J	A	141			95.2			63.4			59.5			2.1 U		
Beryllium	0.74 L	J	A	1.1			1.1			1.0			1.4			1.3			0.32 U		
Cadmium	0.60 U			0.60 U			0.55 U			0.59 U			0.60 U			0.58 U			0.60 U		
Calcium	1260	J	B	3780	J	B	4190	J	B	6630	J	B	989 L	J	AB	1140	J	B	18.5 L	J	A
Chromium	4.6			6.0			12.0			13.2			5.0			3.7			0.80 U		
Cobalt	6.6 L	J	A	7.0 L	J	A	12.7			9.2 L	J	A	2.5 U			2.4 U			2.5 U		
Copper	24.9			16.2			42.8			33.2			14.3			13.5			0.38 U		
Iron	21400			30000			23900			20500			41400			39000			1.6 U		
Lead	31.0	J	B	19.7	J	B	96.6	J	B	83.8	J	B	25.0	J	B	27.4	J	B	0.22 U		
Magnesium	5410			8640			5660			5640			10100			7410			10.4 U		
Manganese	357			399			627			563			399			306			0.26 U		
Mercury	1.1			0.08 U			2.2			1.6			0.08			0.07			0.10 U		
Nickel	3.7 L	J	A	6.4 L	J	A	12.2			10.2			3.5 U			3.3 U			3.5 U		
Potassium	2300			2720			1290			1310			4080			3860			58.5 L	J	A
Selenium	0.34 U			0.34 U	J	C	0.31 U	J	C	0.34 U	J	C	0.34 U	J	C	0.33 U			0.34 U		
Silver	5.7			26.9			9.7			8.5			1.1 L	J	A	0.88 L	J	A	0.36 U		
Sodium	62.1 L	J	A	96.6 L	J	A	118 L	J	A	265 L	J	A	206 L	J	A	251 L	J	A	17.0 U		
Thallium	0.71 U			0.72 U			0.67 U			0.71 U			0.73 U			0.69 U			0.72 U		
Vanadium	29.7			25.7			43.9			35.4			34.4			26.7			1.1 U		
Zinc	57.4			50.4			107			98.1			53.0			40.3			1.8 L	J	A
Percent Solids	98.8 %			96.9 %			99.3 %			99.9 %			96.4 %			96.2 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
N/A-Not Applicable

ANALYT[illegible]L RESULTS

[illegible] 1A

Case N[illegible] 22540 Memo #03

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 6, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6.6			40.0																	
Antimony	5.7			12.0																	
Arsenic	0.56			2.0																	
Barium	2.1			40.0																	
Beryllium	0.32			1.0																	
Cadmium	0.60			1.0																	
Calcium	15.8			1000																	
Chromium	0.80			2.0																	
Cobalt	2.5			10.0																	
Copper	0.38			5.0																	
Iron	1.6			20.0																	
Lead	0.22			0.60																	
Magnesium	10.4			1000																	
Manganese	0.26			3.0																	
Mercury	0.10			0.10																	
Nickel	3.5			8.0																	
Potassium	57.8			1000																	
Selenium	0.34			1.0																	
Silver	0.36			2.0																	
Sodium	17.0			1000																	
Thallium	0.72			2.0																	
Vanadium	1.1			10.0																	
Zinc	1.0			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #03 LABORATORY ALI

SDG NO. MYP271 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 6, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	O		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	X		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #03 LABORATORY ALI

SDG NO. MYP271 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 6, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in seven samples, and for thallium in three samples, which have negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. These sample results for selenium and thallium were estimated because they were quantitatively questionable.

TPO ATTENTION: None.

AREAS OF CONCERN: A low initial CRDL standard (CRI) recovery of 46.8% and a final CRI standard recovery of 81.3% for selenium were reported for the analyses in this SDG. While there are no criteria established for CRDL standard recoveries, low recoveries may indicate low bias for sample results near the CRDL. A high initial CRI recovery of 269.2% and a final CRI recovery of 92.2% for zinc were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

ICF KAISER
ENVIRONMENT & ENERGY GROUP

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MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: MDW for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 12, 1994 (Amended September 16, 1994)

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #06
SDG NO.:	MYP291
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP291 through MYP310)
COLLECTION DATE:	August 8, 9 and 11, 1994
REVIEWER:	Dina D. David, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #06
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: September 12, 1994 (Amended September 16, 1994)

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP291 through MYP310

COLLECTION DATE: August 8, 9 and 11, 1994
SAMPLE RECEIPT DATE: August 13, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP300 and MYP301

LABORATORY QC: Matrix Spike: MYP303
Duplicates: MYP303
ICP Serial Dilution: MYP303

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 16, 1994	August 18, 1994
Mercury	August 23 and 24, 1994	August 23 and 24, 1994
Percent Solids	Not Applicable	August 16, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: Exhibit E Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interference Check Sample (ICS) at the beginning and end of each analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium = 500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in three samples and for thallium in seventeen samples, which had negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. The results for selenium and thallium in many samples were estimated because they were quantitatively unreliable.

The ICP ICS solution AB is analyzed to determine the effects of high concentrations of interfering elements on each analyte. In the final analysis of the ICP ICS solution AB for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the results obtained for the interferents (aluminum, calcium, iron and magnesium) did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICAP61E Trace Analyzer. The effect on the quality of the data is unknown.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

ADDITIONAL COMMENTS: (continued)

The Inorganic SOW specifies a concentration level of 1000 µg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 µg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	No	C
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	D
12. Sample Quantitation	No	A,E
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony and copper in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and copper in QC sample MYP303 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte are presented below and are based on an ideal recovery of 100%.

Analyte	MYP303 % Recovery	MYP303 % Bias
Antimony	66.9	-33.1
Copper	141.2	+41.2

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in all of the samples may be biased low, and where non-detected, false negatives may exist. The results reported for copper in all of the samples may be biased high.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. Post-digestion spike recovery results of 104.7% and 93.4% were obtained for antimony and copper, respectively, in QC sample MYP303. Since the post-digestion spike recovery results were acceptable, the low pre-digestion spike recovery result obtained for antimony (66.9%) and the high pre-digestion spike recovery result obtained for copper (141.2%) may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing or enhancing the analytical result.

C. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Lead in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYP303 Lab. Dup. RPD
Lead	52.1

The results reported for lead in all of the samples are considered quantitatively uncertain. The imprecision between duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

D. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Zinc in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP303 did not meet the 10% criterion for zinc as shown below.

Analyte	MYP303 % Difference
Zinc	20.4

The results reported for zinc in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

E. The following results are estimated because of sample quantitation problems. The results are flagged "J" in Table 1A.

- Selenium in samples MYP298, MYP306, and MYP307
- Thallium in samples MYP291 through MYP297, MYP299 through MYP306, MYP308, and MYP309

High negative results were obtained for selenium in samples MYP298, MYP306, and MYP307, and for thallium in samples MYP291 through MYP297, MYP299 through MYP306, MYP308, and MYP309. The absolute values for selenium and thallium in the samples listed above exceed the CRDL of 5.0 μg/L (1.0 mg/Kg) for selenium and 10.0 μg/L (2.0 mg/Kg) for thallium. The laboratory reported the results for selenium and thallium in the above samples as non-detected. In the reviewer's opinion, the results reported for selenium and thallium in the samples listed above are quantitatively unreliable due to high negative results obtained.

ANALYTICAL RESULTS

: 1A

Case N: 22540 Memo #06

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: September 12, 1994 (Amended September 16, 1994)

Concentration in mg/Kg

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Station Location	MS-073-SL-103A			MS-074-SL-101A			MS-074-SL-102A			MS-074-SL-103A			MS-074-SL-104A			MS-074-SL-105A			MS-074-SL-106A		
Sample I.D.	MYP291			MYP292			MYP293			MYP294			MYP295			MYP296			MYP297		
Date of Collection	8/8/94			8/9/94			8/9/94			8/9/94			8/9/94			8/9/94			8/9/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10500			20100			14100			11700			5560			21800			6490		
Antimony	5.6 U	J	B	5.1 L	J	AB	6.6 L	J	AB	5.5 U	J	B	5.4 U	J	B	5.5 U	J	B	5.6 U	J	B
Arsenic	12.3			8.9			15.9			12.2			9.2			5.6			12.5		
Barium	122			131			127			133			40.7			189			57.5		
Beryllium	0.87 L	J	A	1.8			1.3			1.1			0.53 L	J	A	1.3			0.54 L	J	A
Cadmium	0.69 L	J	A	0.83 L	J	A	1.2			1.5			0.57 U			0.58 U			0.98 L	J	A
Calcium	6650			32300			9320			6050			4580			5750			7540		
Chromium	13.0			10.9			12.8			10.4			8.9			14.6			7.7		
Cobalt	9.4 L	J	A	18.4			14.6			14.1			5.2 L	J	A	17.0			6.6 L	J	A
Copper	39.1	J	B	60.6	J	B	71.7	J	B	83.4	J	B	37.7	J	B	69.5	J	B	43.4	J	B
Iron	19800			43200			26100			25500			13000			28800			16600		
Lead	50.4	J	C	55.6	J	C	131	J	C	312	J	C	162	J	C	93.0	J	C	156	J	C
Magnesium	5840			11500			6740			5800			4070			8230			3700		
Manganese	726			1030			1050			892			1050			1210			1130		
Mercury	4.0			2.8			24.0			40.1			12.4			25.2			10.5		
Nickel	8.7			15.4			11.1			10.1			6.9 L	J	A	12.2			6.8 L	J	A
Potassium	1320			1620			2150			2240			407 L	J	A	2840			718 L	J	A
Selenium	0.33 U			0.30 U			0.48 L	J	A	1.9			1.1			0.33 U			1.8		
Silver	6.0			11.0			52.5			64.3			56.4			28.5			70.0		
Sodium	330 L	J	A	307 L	J	A	104 L	J	A	127 L	J	A	35.0 L	J	A	133 L	J	A	37.8 L	J	A
Thallium	0.71 U	J	E	0.64 U	J	E	0.70 U	J	E	0.69 U	J	E	0.68 U	J	E	0.69 U	J	E	0.72 U	J	E
Vanadium	36.6			46.6			46.3			43.0			19.6			63.6			24.1		
Zinc	98.9	J	D	96.9	J	D	132	J	D	273	J	D	141	J	D	140	J	D	172	J	D
Percent Solids	98.0 %			97.3 %			99.4 %			99.7 %			99.8 %			99.2 %			99.7 %		

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #06
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: September 12, 1994 (Amended September 16, 1994)

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-075-SL-101A			MS-075-SL-102A			MS-075-SL-103A			MS-075-SD-107A			MS-075-SL-104A			MS-075-SL-105A			MS-075-SL-106A		
Sample I.D.	MYP298			MYP299			MYP300 D1			MYP301 D1			MYP302			MYP303			MYP304		
Date of Collection	8/9/94			8/9/94			8/9/94			8/9/94			8/9/94			8/9/94			8/9/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	7630			10600			13000			11600			11900			12700			15000		
Antimony	5.3 U	J	B	4.9 U	J	B	5.3 U	J	B	5.3 U	J	B	5.9 U	J	B	5.7 U	J	B	49.4	J	B
Arsenic	6.3			11.6			10.2			10.2			15.0			11.2			16.3		
Barium	64.6			105			92.0			96.9			104			167			195		
Beryllium	0.84 L	J	A	0.90			0.94			0.92 L	J	A	1.1			1.2			1.0		
Cadmium	0.56 U			0.52 U			0.56 U			0.59 L	J	A	0.73 L	J	A	1.0			0.57 U		
Calcium	3110			5130			3570			3540			6020			8510			4550		
Chromium	12.9			10.8			13.9			13.4			14.0			16.2			13.6		
Cobalt	8.1 L	J	A	7.5 L	J	A	10.8			9.7			12.6			13.0			14.7		
Copper	32.9	J	B	67.7	J	B	55.1	J	B	56.0	J	B	62.4	J	B	82.4	J	B	71.8	J	B
Iron	23000			24600			26900			25200			29600			29600			28100		
Lead	59.3	J	C	239	J	C	140	J	C	155	J	C	371	J	C	1190	J	C	1270	J	C
Magnesium	3550			5350			6390			6440			6300			5880			5880		
Manganese	340			520			590			607			697			743			874		
Mercury	0.08			3.7			1.0			1.2			1.3			54.7			14.3		
Nickel	7.3 L	J	A	6.4 L	J	A	10.0			11.7			13.0			9.0			11.2		
Potassium	712 L	J	A	1280			1460			1310			1820			2150			3260		
Selenium	0.32 U	J	E	0.71 L	J	A	0.32 U			0.32 U			0.35 U			0.41 L	J	A	0.32 U		
Silver	3.9			32.1			11.8			12.8			11.1			51.6			18.4		
Sodium	468 L	J	A	212 L	J	A	152 L	J	A	137 L	J	A	199 L	J	A	202 L	J	A	93.8 L	J	A
Thallium	0.68 U			0.62 U	J	E	0.67 U	J	E	0.67 U	J	E	0.75 U	J	E	0.72 U	J	E	0.69 U	J	E
Vanadium	47.1			36.2			48.9			42.2			50.1			47.6			50.2		
Zinc	120	J	D	107	J	D	98.6	J	D	99.5	J	D	126	J	D	249	J	D	156	J	D
Percent Solids	99.6 %			99.5 %			99.3 %			99.1 %			92.0 %			99.8 %			99.8 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

Case N(22540 Memo #06 1A

Site: Carson River

Lab.: Associated Laboratories, Inc. (ALI)

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: September 12, 1994 (Amended September 16, 1994)

Concentration in mg/Kg

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Station Location	MS-076-SL-101A			MS-076-SL-102A			MS-076-SL-103A			TP-007-SL-101A			TP-007-SL-102A			TP-007-SL-103A			Lab Blank*		
Sample I.D.	MYP305			MYP306			MYP307			MYP308			MYP309			MYP310					
Date of Collection	8/9/94			8/9/94			8/9/94			8/11/94			8/11/94			8/11/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	13200			9590			5840			12300			3080			4510			6.6 U		
Antimony	5.3 U	J	B	4.9 U	J	B	5.6 U	J	B	50.1	J	B	5.4 L	J	AB	5.3 U	J	B	5.7 U		
Arsenic	7.1			58.1			71.7			65.6			8.2			17.0			0.56 U		
Barium	163			30.9 L	J	A	84.2			47.0			17.3 L	J	A	26.9 L	J	A	2.1 U		
Beryllium	0.93 L	J	A	1.2			1.4			0.94 L	J	A	0.38 L	J	A	0.45 L	J	A	0.32 U		
Cadmium	0.56 U			0.52 U			0.60 U			64.5			3.4			5.2			0.60 U		
Calcium	4040			5020			803 L	J	A	12100			328 L	J	A	2860			15.8 U		
Chromium	9.5			4.4			3.5			12.6			8.1			9.1			0.80 U		
Cobalt	12.5			11.3			5.2 L	J	A	19.9			3.8 L	J	A	3.2 L	J	A	2.5 U		
Copper	30.7	J	B	18.0	J	B	22.4	J	B	3590	J	B	144	J	B	305	J	B	0.38 U		
Iron	23400			31200			45500			28600			9740			12000			1.6 U		
Lead	92.5	J	C	33.5	J	C	63.8	J	C	3320	J	C	491	J	C	858	J	C	0.25 L	J	A
Magnesium	4990			7160			2890			13100			1730			2730			10.4 U		
Manganese	716			352			184			1850			617			334			0.26 U		
Mercury	1.8			0.10 U			0.14			1490			295			459			0.10 U		
Nickel	10.8			10.0			3.4 U			26.9			3.1 U			3.3 U			3.5 U		
Potassium	3120			1940			4600			1270			271 L	J	A	442 L	J	A	57.8 U		
Selenium	0.32 U			0.29 U	J	E	0.34 U	J	E	37.2			2.5			5.8			0.39 L	J	A
Silver	7.7			6.4			11.6			241			66.7			87.7			0.36 U		
Sodium	101 L	J	A	56.0 L	J	A	191 L	J	A	112 L	J	A	18.0 L	J	A	53.1 L	J	A	17.0 U		
Thallium	0.68 U	J	E	0.62 U	J	E	0.71 U			0.74 U	J	E	0.65 U	J	E	0.68 U			0.72 U		
Vanadium	44.4			23.9			24.5			39.4			10.1			14.0			1.1 U		
Zinc	105	J	D	54.4	J	D	58.8	J	D	4660	J	D	251	J	D	485	J	D	1.0 U		
Percent Solids	99.3 %			100 %			98.8 %			95.6 %			100 %			97.6 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

N/A-Not Applicable

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

* Two preparation blanks (PB) were analyzed and reported for mercury only. The PB results for mercury were both non-detected.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #06
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: September 12, 1994 (Amended September 16, 1994)

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6.6			40.0																	
Antimony	5.7			12.0																	
Arsenic	0.56			2.0																	
Barium	2.1			40.0																	
Beryllium	0.32			1.0																	
Cadmium	0.60			1.0																	
Calcium	15.8			1000																	
Chromium	0.80			2.0																	
Cobalt	2.5			10.0																	
Copper	0.38			5.0																	
Iron	1.6			20.0																	
Lead	0.22			0.60																	
Magnesium	10.4			1000																	
Manganese	0.26			3.0																	
Mercury	0.10			0.10																	
Nickel	3.5			8.0																	
Potassium	57.8			1000																	
Selenium	0.34			1.0																	
Silver	0.36			2.0																	
Sodium	17.0			1000																	
Thallium	0.72			2.0																	
Vanadium	1.1			10.0																	
Zinc	1.0			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #06 LABORATORY ALI

SDG NO. MYP291 SITE NAME Carson River

REVIEW COMPLETION DATE September 12, 1994 (Amended September 16, 1994)

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	X		O	
7. MATRIX SPIKE ANALYSIS	M		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	X			
10. SAMPLE QUANTITATION	X		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #06 LABORATORY ALI

SDG NO. MYP291 SITE NAME Carson River

REVIEW COMPLETION DATE September 12, 1994 (Amended September 16, 1994)

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

TPO ACTION: Exhibit E Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interference Check Sample (ICS) at the beginning and end of each analysis run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium = 500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly. The results reported for selenium in three samples and for thallium in seventeen samples, which had negative results greater than the CRDL, may be due to interelement and background effects that occurred as the result of the high mineral content of the samples. The results for selenium and thallium in many samples were estimated because they were quantitatively unreliable.

The ICP ICS solution AB is analyzed to determine the effects of high concentrations of interfering elements on each analyte. In the final analysis of the ICP ICS solution AB for arsenic, lead, selenium, and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the results obtained for the interferents (aluminum, calcium, iron and magnesium) did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICAP61E Trace Analyzer. The effect on the quality of the data is unknown

TPO ATTENTION: None.

AREAS OF CONCERN: None.

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

FILE COPY

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdm for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 15, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #09
SDG NO.:	MYP351
LABORATORY:	Wadsworth/Alert Laboratories, Inc. (WADSPA)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP351 through MYP370)
COLLECTION DATE:	August 15 and 17, 1994
REVIEWER:	Mike McIntosh, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region 3

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #09
Site: Carson River
Laboratory: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Mike McIntosh, ESAT/ICF Kaiser
Date: September 15, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP351 through MYP370

COLLECTION DATE: August 15 and 17, 1994
SAMPLE RECEIPT DATE: August 20, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP348* and MYP353 (*See Additional Comments)
(D2): MYP360 and MYP365
(D3): MYP370 and MYP376* (*See Additional Comments)

LABORATORY QC: Matrix Spike: MYP366
Duplicates: MYP366
ICP Serial Dilution: MYP366

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 25, 1994	August 29 and 30, 1994
Mercury	August 26 and 30, 1994	August 26 and 31, 1994
Percent Solids	Not Applicable	August 25, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

*Field duplicate samples MYP348(D1) and MYP376(D2) are included in Case No. 22540 Memo #08 and Case No. 22540 Memo #10, respectively.

The laboratory analyzed all of the samples for antimony, arsenic, beryllium, cadmium, chromium, lead, selenium, and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for antimony, arsenic, beryllium, cadmium, chromium, lead, selenium, and thallium were at or below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work ILM02.1, and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

ICF KAISER

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	No	D
10. GFAA QC Analysis	Yes	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	C
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery result for antimony in QC sample MYP366 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony are presented below and are based on an ideal recovery of 100%.

Analyte	MYP366 % Recovery	MYP366 % Bias
Antimony	51.7	-48.3

The results reported for antimony in all of the samples may be biased low, and where non-detected, false negatives may exist.

According to the SOW ILM02.1, when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 111.3% was obtained for antimony in QC sample MYP366. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result of 51.7% obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Calcium, magnesium, and manganese in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP366 did not meet the 10% criterion for the analytes shown below.

Analyte	MYP366 % Difference
Calcium	11.3
Magnesium	10.4
Manganese	10.6

The results reported for calcium, magnesium, and manganese in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

D. In the analysis of the field duplicate pairs, the following relative percent differences (RPDs) were obtained for the analytes listed below.

Analyte	MYP348 D1 MYP353 D1 RPD	MYP370 D3 MYP376 D3 RPD
Chromium	69.9	---
Iron	53.6	---
Mercury	200	47.0
Vanadium	73.1	---
Zinc	58.1	---

The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±35 RPD or ±2X CRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pairs may be due to the sample matrix, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

Mercury was present in sample MYP353 at a concentration of 1.6 mg/Kg, while in the field duplicate sample MYP348, mercury was not detected.

Field duplicate samples MYP348(D1) and MYP376(D2) are included in Case No. 22540 Memo #08 and Case No. 22540 Memo #10, respectively.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #09
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Mike McIntosh, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FP-002-SL-108A			FP-002-SL-109A			FP-002-SD-111A			MS-077-SL-101A			MS-077-SL-102A			MS-077-SL-103A			MS-077-SL-104A		
Sample I.D.	MYP351			MYP352			MYP353 D1*			MYP354			MYP355			MYP356			MYP357		
Date of Collection	08/15/94			08/15/94			08/15/94			08/17/94			08/17/94			08/17/94			08/17/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3720			2830			3590			21900			16600			16900			7500		
Antimony	0.73 L	J	AB	0.43 L	J	AB	0.44 L	J	AB	0.66 U	J	B	0.75 L	J	AB	1.1 L	J	AB	2.5 L	J	AB
Arsenic	5.3			5.3			4.4			11.0			8.3			10.5			17.6		
Barium	40.7			24.9 L	J	A	35.7 L	J	A	204			161			138			74.3		
Beryllium	0.20 U			0.20 U			0.20 U			0.75 L	J	A	0.73 L	J	A	0.58 L	J	A	0.30 L	J	A
Cadmium	0.20 U			0.20 U			0.20 U			0.33 U			0.21 U			0.20 U			1.1		
Calcium	2100	J	C	1790	J	C	2250	J	C	32000	J	C	8920	J	C	25000	J	C	4460	J	C
Chromium	4.8			3.7			4.0		D	16.3			16.4			14.6			8.2		
Cobalt	5.0 L	J	A	4.3 L	J	A	5.0 L	J	A	15.4 L	J	A	11.7			12.3			9.0 L	J	A
Copper	21.2			7.0			7.4			24.1			32.9			42.0			83.5		
Iron	8420			7590			7620		D	23400			23500			22000			16500		
Lead	5.4			5.7			6.7			7.4			20.7			31.6			111		
Magnesium	2050	J	C	1690	J	C	2360	J	C	20200	J	C	7550	J	C	11600	J	C	4350	J	C
Manganese	244	J	C	215	J	C	220	J	C	631	J	C	399	J	C	768	J	C	472	J	C
Mercury	0.77			0.62			1.6		D	0.36			27.0			83.8			219		
Nickel	5.0 L	J	A	3.9 L	J	A	4.1 L	J	A	12.3 L	J	A	10.1			11.7			8.8		
Potassium	482 L	J	A	356 L	J	A	449 L	J	A	3410			3010			2850			1060		
Selenium	0.80 U			0.80 U			0.80 U			1.3 U			0.82 U			0.81 U			1.6		
Silver	1.2 L	J	A	0.60 U			0.95 L	J	A	0.99 U			4.3			9.8			33.3		
Sodium	159 L	J	A	149 L	J	A	133 L	J	A	5200			856 L	J	A	2270			664 L	J	A
Thallium	1.4 U			1.6 L	J	A	1.4 U			2.3 U			1.7 L	J	A	2.4			1.5 U		
Vanadium	23.9			20.1			19.7		D	66.9			61.9			59.5			31.3		
Zinc	27.1			25.8			30.3		D	65.5			85.1			88.9			152		
Percent Solids	99.6 %			99.8 %			99.8 %			60.4 %			97.4 %			98.6 %			95.4 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
*Field duplicate sample MYP348(D1) is included in Case No. 22540 Memo #08.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
N/A-Not Applicable

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #09
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Mike McIntosh, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-077-SL-105A			MS-077-SL-106A			MS-077-SL-107A			MS-077-SL-108A			MS-077-SL-109A			MS-077-SL-110A			MS-077-SL-110B		
Sample I.D.	MYP358			MYP359			MYP360 D2			MYP361			MYP362			MYP363			MYP364		
Date of Collection	08/17/94			08/17/94			08/17/94			08/17/94			08/17/94			08/17/94			08/17/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	8590			9590			7180			17100			8290			13600			16400		
Antimony	1.1 L	J	AB	1.5 L	J	AB	1.0 L	J	AB	1.5 L	J	AB	0.99 L	J	AB	2.3 L	J	AB	1.3 L	J	AB
Arsenic	8.1			11.0			5.0			12.3			5.6			17.3			14.7		
Barium	88.8			99.2			70.8			165			78.7			128			153		
Beryllium	0.30 L	J	A	0.28 L	J	A	0.30 L	J	A	0.58 L	J	A	0.21 U			0.55 L	J	A	0.48 L	J	A
Cadmium	0.23 L	J	A	2.1			0.21 L	J	A	0.32 L	J	A	0.21 U			1.6			0.54 L	J	A
Calcium	5100	J	C	32600	J	C	5160	J	C	24800	J	C	6870	J	C	31000	J	C	49700	J	C
Chromium	8.5			8.7			6.9			12.7			4.9			11.0			12.4		
Cobalt	9.0 L	J	A	7.8 L	J	A	8.2 L	J	A	12.5			7.4 L	J	A	9.4 L	J	A	11.3 L	J	A
Copper	26.1			40.3			38.7			47.5			23.0			90.4			37.7		
Iron	15500			12900			11900			21900			13700			18000			18600		
Lead	29.7			73.5			62.4			79.5			15.4			131			32.4		
Magnesium	3950	J	C	6640	J	C	3470	J	C	11800	J	C	5420	J	C	9980	J	C	13400	J	C
Manganese	424	J	C	579	J	C	198	J	C	633	J	C	445	J	C	853	J	C	684	J	C
Mercury	117			116			22.0			16.8			14.8			187			54.0		
Nickel	6.7 L	J	A	5.3 L	J	A	5.6 L	J	A	11.2			4.8 L	J	A	7.9 L	J	A	10.2		
Potassium	1390			2170			1480			4830			3270			2800			2940		
Selenium	0.84 U			0.97 L	J	A	1.4			0.82 U			0.82 U			2.3			0.97 U		
Silver	10.1			15.0			7.4			8.9			3.5			56.8			12.0		
Sodium	343 L	J	A	1260			284 L	J	A	2850			885 L	J	A	3540			4470		
Thallium	1.9 L	J	A	2.5			1.9 L	J	A	3.0			2.0 L	J	A	1.7 L	J	A	2.8		
Vanadium	39.7			35.2			33.9			57.2			38.0			47.6			56.4		
Zinc	75.0			179			78.7			117			69.2			174			85.0		
Percent Solids	94.8 %			92.0 %			96.0 %			97.6 %			97.2 %			98.4 %			82.6 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrume[illegible]ection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Appl[illegible]e

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #09
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Mike McIntosh, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	MS-077-SD-111A			FA-002-SL-101A			FA-002-SL-102A			FA-002-SL-103A			FA-002-SL-104A			FA-002-SL-105A					
Sample I.D.	MYP365 D2			MYP366			MYP367			MYP368			MYP369			MYP370 D3**			Lab Blank*		
Date of Collection	08/17/94			08/17/94			08/17/94			08/17/94			08/17/94			08/17/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	7530			4430			5350			4500			12200			4870			3.4 U		
Antimony	1.1 L	J	AB	0.40 U	J	B	0.56 L	J	AB	0.41 U	J	B	0.44 L	J	AB	0.42 L	J	AB	0.42 L	J	A
Arsenic	5.2			4.7			4.5			2.7			10.3			2.6			1.1 L	J	A
Barium	73.9			47.1			59.6			58.9			149			60.7			0.20 U		
Beryllium	0.33 L	J	A	0.26 L	J	A	0.28 L	J	A	0.20 U			0.58 L	J	A	0.21 U			0.20 U		
Cadmium	0.43 L	J	A	0.20 U			0.20 U			0.20 U			0.21 U			0.21 U			0.20 U		
Calcium	5510	J	C	2990	J	C	3640	J	C	3480	J	C	6370	J	C	4010	J	C	24.0 L	J	A
Chromium	7.4			4.9			6.5			5.0			12.4			5.5			0.32 L	J	A
Cobalt	7.5 L	J	A	4.3 L	J	A	5.0 L	J	A	5.1 L	J	A	11.0			5.3 L	J	A	2.2 U		
Copper	45.8			6.9			8.7			9.1			20.0			8.7			0.60 U		
Iron	12400			7670			8970			7480			18500			7940			2.0 L	J	A
Lead	82.2			5.0			10.4			7.2			7.3			7.3			0.60 U		
Magnesium	3920	J	C	2480	J	C	3210	J	C	2550	J	C	6270	J	C	2970	J	C	4.4 U		
Manganese	198	J	C	204	J	C	252	J	C	254	J	C	455	J	C	263	J	C	0.20 U		
Mercury	23.4			0.77			0.70			0.94			0.12			2.1		G	0.05 U		
Nickel	6.8 L	J	A	3.2 L	J	A	5.7 L	J	A	3.7 L	J	A	8.7			5.3 L	J	A	1.4 U		
Potassium	1550			2010			2530			2300			2480			2340			15.2 U		
Selenium	0.84 U			0.80 U			0.81 U			0.86 L	J	A	2.0			0.84 U			0.80 U		
Silver	8.2			0.60 U			0.60 U			0.61 U			0.62 U			1.1 L	J	A	0.60 U		
Sodium	288 L	J	A	482 L	J	A	522 L	J	A	793 L	J	A	15200			2370			3.6 U		
Thallium	1.9 L	J	A	1.4 U			2.1			1.4 U			1.9 L	J	A	1.5 U			1.4 U		
Vanadium	35.5			20.2			23.6			19.5			51.0			20.9			0.40 U		
Zinc	91.8			29.4			37.8			37.6			53.4			36.4			2.6 L	J	A
Percent Solids	95.4 %			99.6 %			99.2 %			97.8 %			97.4 %			95.2 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
*Two preparation blanks (PB) were analyzed for mercury. Results were non-detected.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit N/A-Not Applicable
**Field duplicate sample MYP376(D3) is included in Case No. 22540 Memo #10.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #09
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Mike McIntosh, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3.4			40.0																	
Antimony	0.40			12.0																	
Arsenic	0.40			2.0																	
Barium	0.20			40.0																	
Beryllium	0.20			1.0																	
Cadmium	0.20			1.0																	
Calcium	5.2			1000																	
Chromium	0.20			2.0																	
Cobalt	2.2			10.0																	
Copper	0.60			5.0																	
Iron	1.2			20.0																	
Lead	0.60			0.60																	
Magnesium	4.4			1000																	
Manganese	0.20			3.0																	
Mercury	0.05			0.10																	
Nickel	1.4			8.0																	
Potassium	15.2			1000																	
Selenium	0.80			1.0																	
Silver	0.60			2.0																	
Sodium	3.6			1000																	
Thallium	1.4			2.0																	
Vanadium	0.40			10.0																	
Zinc	0.60			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrumer ection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Appl.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #09 LABORATORY WADSPA

SDG NO. MYP351 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 15, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Mike McIntosh

NO. OF SAMPLES ____ WATER 20 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	X		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: None.

In Reference to Case No(s).:

22540 Memo # 07 through 09

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 12, 1994

Laboratory Name: Wadsworth/Alert Laboratories, Inc.

Lab Contact: David Brennan

Region: 9

Regional Contact: Mike McIntosh

Call Initiated By: _____ Laboratory X Region

In reference to data for the following sample delivery group(s):
SDG No. MYN311, SDG No. MYN331, and SDG No. MYP351 (Carson River)

Summary of Questions/Issues Discussed:

1. For the sample delivery groups (SDG) listed above, the ICP serial dilution sample is listed as having a dilution factor of 1 on the Form 14s (analysis run logs). Please change the dilution factor to 5 on all associated Form 14s.

Summary of Resolution:

1. Since the improper reporting of dilution factors did not affect data quality, the corrections to Form 14 will be inserted into the data package when received from the laboratory.

Signature

9-15-94
Date

Distribution: (1) Lab Copy, (2) Region Copy

In Reference to Case No(s).:

22540 Memo # 07 through 09

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 12, 1994

Laboratory Name: Wadsworth/Alert Laboratories, Inc.

Lab Contact: David Brennan

Region: 9

Regional Contact: Mike McIntosh

Call Initiated By: _____ Laboratory __X__ Region

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9-15-94
Date

Distribution: (1) Lab Copy, (2) Region Copy

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdw for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 15, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #08
SDG NO.:	MYP331
LABORATORY:	Wadsworth/Alert Laboratories, Inc. (WADSPA)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP331 through MYP350)
COLLECTION DATE:	August 15 and 16, 1994
REVIEWER:	Karen Pettit, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region 3

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #08
Site: Carson River
Laboratory: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 15, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP331 through MYP350

COLLECTION DATE: August 15 and 16, 1994
SAMPLE RECEIPT DATE: August 20, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP326* and MYP332
(D2): MYP348 and MYP353* (*See Additional Comments)

LABORATORY QC: Matrix Spike: MYP347
Duplicates: MYP347
ICP Serial Dilution: MYP347

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 23, 1994	August 26 and 29, 1994
Mercury	August 24 and 26, 1994	August 25 and 26, 1994
Percent Solids	Not Applicable	August 23, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

* Field duplicate sample MYP326 is included in Case 22540 Memo #07. Field duplicate sample MYP353 is included in Case 22540 Memo #09.

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

According to the case narrative provided by the laboratory, the sample bottle containing sample MYP348 was received broken. The sample bottle was sealed in a plastic bag so that the sample constituents were not compromised. The Region was contacted and the laboratory was told to proceed with the analysis of the sample. The sample was transferred to a glass container and the analyses were performed.

The laboratory analyzed all of the samples for antimony, arsenic, beryllium, cadmium, chromium, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for antimony, arsenic, beryllium, cadmium, chromium, lead, selenium and thallium were at or below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

ICF KAISER

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	F
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	No	C
9. Field Duplicate Sample Analysis	No	E
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	D
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony in QC sample MYP347 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony are presented below and are based on an ideal recovery of 100%.

Analyte	MYP347 % Recovery	MYP347 % Bias
Antimony	70.3	-29.7

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in all of the samples may be biased low, and where non-detected, false negatives may exist.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 98.6% was obtained for antimony in QC sample MYP347. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (70.3%) obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Aluminum and iron in all of the samples

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results did not meet the ±35 relative percent difference (RPD) and ±2X CRDL criteria for precision as listed below.

Analyte	MYP347 Lab. Dup. RPD
Aluminum	46.9
Iron	65.6

The results reported for aluminum and iron in all of the samples are considered quantitatively uncertain. The imprecision between

duplicate results may be due to sample nonhomogeneity, poor laboratory technique, or method defects.

D. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Zinc in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP347 did not meet the 10% criterion for zinc as shown below.

Analyte	MYP347 % Difference
Zinc	10.6

The results reported for zinc in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

E. Relative percent differences (RPD) of 69.9, 53.6, 200, 73.1, and 58.1 were obtained for chromium, iron, mercury, vanadium, and zinc, respectively, in the analysis of field duplicate pair samples MYP348 and MYP353. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±35 RPD or ±2xCRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

It should be noted that mercury was present in sample number MYP353 at a concentration of 1.6 mg/Kg, while in the duplicate analysis of sample MYP348, mercury was not detected.

Field duplicate sample MYP353 (D2) is included in Case 22540 Memo #09.

F. Initial CRI recoveries of 113.3% and 132.4%, and a final CRI recovery of 138.4% for arsenic were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #08
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA-008-SL-110B			FA-008-SD-111A			FP-001-SL-101A			FP-001-SL-102A			FP-001-SL-103A			FP-001-SL-104A			FP-001-SL-105A		
Sample I.D.	MYP331			MYP332 D1*			MYP333			MYP334			MYP335			MYP336			MYP337		
Date of Collection	08/16/94			08/16/94			08/15/94			08/15/94			08/15/94			08/15/94			08/15/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	16400	J	C	12300	J	C	13600	J	C	10800	J	C	9880	J	C	9700	J	C	9980	J	C
Antimony	0.52 L	J	AB	0.85 L	J	AB	1.3 L	J	AB	1.2 L	J	AB	1.5 L	J	AB	0.58 L	J	AB	1.1 L	J	AB
Arsenic	26.3			6.2		F	13.8			12.8			14.5			14.2			12.1		
Barium	103			113			131			97.1			112			106			97.9		
Beryllium	0.76 L	J	A	0.42 L	J	A	0.57 L	J	A	0.39 L	J	A	0.37 L	J	A	0.42 L	J	A	0.37 L	J	A
Cadmium	0.23 U			0.20 U			0.41 L	J	A	0.51 L	J	A	0.43 L	J	A	0.61 L	J	A	0.40 L	J	A
Calcium	5290			12200			6310			5470			5090			5520			4770		
Chromium	12.9			10.0			15.9			12.7			11.1			10.4			10.7		
Cobalt	9.4 L	J	A	5.7 L	J	A	8.2 L	J	A	7.4 L	J	A	7.4 L	J	A	5.5 L	J	A	7.2 L	J	A
Copper	22.4			21.2			46.5			37.0			38.3			32.0			34.6		
Iron	21200	J	C	16900	J	C	21500	J	C	18500	J	C	18300	J	C	16900	J	C	17400	J	C
Lead	7.4			10.7			50.9			46.2			52.1			38.7			44.6		
Magnesium	8860			7820			5880			4840			4860			4510			4420		
Manganese	670			392			452			358			467			466			419		
Mercury	0.06 U			2.1			48.2			31.0			25.3			25.8			39.7		
Nickel	10.8			8.1 L	J	A	8.3 L	J	A	7.5 L	J	A	7.7 L	J	A	5.6 L	J	A	6.4 L	J	A
Potassium	6640			3600			1640			1330			1320			1540			1860		
Selenium	0.92 U			0.81 U			0.93 L	J	A	0.86 U			0.86 U			0.88 U			0.83 U		
Silver	0.69 U			1.2 L	J	A	10.7			10.6			11.4			8.3			10.8		
Sodium	6850			5440			524 L	J	A	408 L	J	A	364 L	J	A	388 L	J	A	394 L	J	A
Thallium	1.6 U			1.4 U			2.4			1.5 U			1.5 U			1.5 U			1.8 L	J	A
Vanadium	66.6			49.4			59.7			52.9			50.4			46.6			48.8		
Zinc	62.2	J	D	52.7	J	D	121	J	D	107	J	D	114	J	D	108	J	D	106	J	D
Percent Solids	86.6 %			98.2 %			91.2 %			93.4 %			93.0 %			91.0 %			96.4 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
* Field Duplicate sample MYP326 is included in Case 22540 Memo #07

ANALYTICAL RESULTS

Case No: 22540 Memo #08 — 1A

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FP-001-SL-106A			FP-001-SL-107A			FP-001-SL-108A			FP-001-SL-109A			FP-001-SL-110B			FP-001-SD-111A			FP02-SL-101A		
Sample I.D.	MYP338			MYP339			MYP340			MYP341			MYP342			MYP343			MYP344		
Date of Collection	08/15/94			08/15/94			08/15/94			08/15/94			08/15/94			08/15/94			08/15/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	6970	J	C	8340	J	C	9550	J	C	8970	J	C	8210	J	C	10700	J	C	4610	J	C
Antimony	1.3 L	J	AB	0.72 L	J	AB	2.1 L	J	AB	1.2 L	J	AB	0.41 U	J	B	1.2 L	J	AB	0.54 L	J	AB
Arsenic	10.7			8.7		F	11.8			10.3			7.9		F	12.8			3.6		F
Barium	89.3			97.6			109			104			77.5			98.7			48.1 L	J	A
Beryllium	0.25 L	J	A	0.32 L	J	A	0.37 L	J	A	0.33 L	J	A	0.21 U			0.35 L	J	A	0.25 U		
Cadmium	0.54 L	J	A	0.49 L	J	A	0.51 L	J	A	0.30 L	J	A	0.21 U			0.40 L	J	A	0.25 U		
Calcium	5630			6750			6780			9720			4530			4790			2420		
Chromium	8.0			9.8			10.4			11.1			13.9			10.9			8.5		
Cobalt	4.7 L	J	A	6.9 L	J	A	7.4 L	J	A	8.1 L	J	A	5.8 L	J	A	7.8 L	J	A	3.9 L	J	A
Copper	27.0			26.9			39.7			27.5			8.8			32.1			7.6		
Iron	13200	J	C	15300	J	C	17300	J	C	15900	J	C	17600	J	C	17900	J	C	13700	J	C
Lead	38.5			37.3			49.2			30.9			4.3			41.0			8.4		
Magnesium	3880			4600			4900			4760			3430			4430			2370		
Manganese	474			520			517			534			255			448			159		
Mercury	23.2			30.2			51.5			0.05 U			0.05 U			0.05 U			0.06 U		
Nickel	5.2 L	J	A	5.9 L	J	A	7.5 L	J	A	6.7 L	J	A	6.7 L	J	A	6.8 L	J	A	4.4 L	J	A
Potassium	1120			2030			1180			1060 L	J	A	675 L	J	A	1860			562 L	J	A
Selenium	0.85 U			1.6			0.86 L	J	A	0.87 U			0.83 U			0.83 U			1.0 U		
Silver	9.5			7.8			11.4			7.0			0.62 U			10.5			1.3 L	J	A
Sodium	355 L	J	A	1380			483 L	J	A	469 L	J	A	427 L	J	A	429 L	J	A	253 L	J	A
Thallium	1.5 U			1.6 U			1.5 U			1.7 L	J	A	1.4 U			1.5 U			1.8 U		
Vanadium	33.9			40.4			46.7			45.0			59.0			50.4			43.6		
Zinc	99.8	J	D	112	J	D	120	J	D	91.9	J	D	45.9	J	D	104	J	D	47.3	J	D
Percent Solids	93.6 %			90.2 %			93.2 %			92.4 %			96.6 %			96.4 %			80.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #08
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FP-002-SL-102A			FP-002-SL-103A			FP-002-SL-104A			FP-002-SL-105A			FP-002-SL-106A			FP-002-SL-107A			Lab Blank**		
Sample I.D.	MYP345			MYP346			MYP347			MYP348 D2*			MYP349			MYP350					
Date of Collection	08/15/94			08/15/94			08/15/94			08/15/94			08/15/94			08/15/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3150	J	C	2770	J	C	4350	J	C	4460	J	C	3910	J	C	2760	J	C	3.4 U		
Antimony	0.53 L	J	AB	0.40 U	J	B	0.58 L	J	AB	0.83 L	J	AB	1.2 L	J	AB	0.40 U	J	B	0.40 U		
Arsenic	6.7		F	5.8		F	6.2		F	4.8		F	5.4		F	8.3		F	0.40 U		
Barium	41.7 L	J	A	36.1 L	J	A	53.6			42.5			58.4			38.0 L	J	A	0.20 U		
Beryllium	0.21 U			0.20 U			0.20 U			0.20 U			0.23 L	J	A	0.20 U			0.20 U		
Cadmium	0.21 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U		
Calcium	2390			1860			2510			2480			2450			2030			5.2 U		
Chromium	6.2			4.0			5.3			8.3		E	5.8			4.6			0.29 L	J	A
Cobalt	3.3 L	J	A	3.8 L	J	A	3.1 L	J	A	4.4 L	J	A	3.8 L	J	A	3.1 L	J	A	2.2 U		
Copper	7.2			7.1			11.1			9.0			10.2			7.7			0.60 U		
Iron	12100	J	C	7270	J	C	11800	J	C	13200	J	CE	10600	J	C	7620	J	C	1.2 U		
Lead	6.0			5.7			6.8			8.5			7.7			4.9			0.60 U		
Magnesium	1750			1610			2200			2440			1910			1490			4.4 U		
Manganese	256			264			318			278			266			239			0.20 U		
Mercury	0.05 U			0.05 U			0.05 U			0.05 U		E	0.05 U			0.05 U			0.05 U		
Nickel	3.6 L	J	A	4.4 L	J	A	5.1 L	J	A	4.7 L	J	A	7.6 L	J	A	3.4 L	J	A	1.4 U		
Potassium	343 L	J	A	364 L	J	A	467 L	J	A	552 L	J	A	484 L	J	A	544 L	J	A	15.2 U		
Selenium	0.85 U			0.80 U			0.80 U			0.80 U			0.80 U			0.80 U			0.80 U		
Silver	0.64 U			0.60 U			0.87 L	J	A	2.0 L	J	A	4.1			0.60 U			0.60 U		
Sodium	222 L	J	A	127 L	J	A	165 L	J	A	187 L	J	A	149 L	J	A	144 L	J	A	3.6 U		
Thallium	1.5 U			1.4 U			1.4 U			1.4 U			1.4 U			1.4 U			1.4 U		
Vanadium	35.9			20.8			32.1			42.4		E	32.1			18.9			0.40 U		
Zinc	35.4	J	D	31.2	J	D	31.5	J	D	55.1	J	DE	40.7	J	D	32.3	J	D	0.60 U		
Percent Solids	94.0 %			99.6 %			99.6 %			99.8 %			99.6 %			99.6 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
** Two Lab Blanks were analyzed for mercury. Results for both were non-detected.

D1,D2, etc.-Field Duplicate Pairs N/A-Not Applicable
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
* Field Duplicate sample MYP353 is included in Case 22540 Memo #09

ANALYTICAL RESULTS

Case No: 22540 Memo #08

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Reviewer: Karen Pettit, ESAT/ICF Kaiser

Date: September 15, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3.4			40.0																	
Antimony	0.40			12.0																	
Arsenic	0.40			2.0																	
Barium	0.20			40.0																	
Beryllium	0.20			1.0																	
Cadmium	0.20			1.0																	
Calcium	5.2			1000																	
Chromium	0.20			2.0																	
Cobalt	2.2			10.0																	
Copper	0.60			5.0																	
Iron	1.2			20.0																	
Lead	0.60			0.60																	
Magnesium	4.4			1000																	
Manganese	0.20			3.0																	
Mercury	0.05			0.10																	
Nickel	1.4			8.0																	
Potassium	15.2			1000																	
Selenium	0.80			1.0																	
Silver	0.60			2.0																	
Sodium	3.6			1000																	
Thallium	1.4			2.0																	
Vanadium	0.40			10.0																	
Zinc	0.60			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #08 LABORATORY WADSPA

SDG NO. MYP331 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 15, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES ____ WATER 20 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	M		O	
7. MATRIX SPIKE ANALYSIS	X		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	X			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: Initial CRI recoveries of 113.3% and 132.4%, and a final CRI recovery of 138.4% for arsenic were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

In Reference to Case No(s).:

22540 Memos #07, #08, and #09

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 12, 1994

Laboratory Name: Region 9, Richmond

Lab Contact: David Brennan

Region: 9

Regional Contact: Karen Pettit

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYN311, SDG No. MYN331, and SDG No. MYP351 (Carson River)

Summary of Questions/Issues Discussed:

1. For the sample delivery groups (SDG) listed above, the ICP serial dilution sample is listed as having a dilution factor of 1 on the Form 14s (analysis run logs). Please change the dilution factor to 5 on all associated Form 14s.

Summary of Resolution: To be determined.

1. Since the incorrect reporting of dilution factors did not affect the data quality, the corrections to Form 14 will be inserted into the data package when received from the laboratory.

Karen Pettit
Signature

September 15, 1994
Date

Distribution: (1) Lab Copy, (2) Region Copy

ICF KAISER

MEMORANDUM

SEP 1 9 1994

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

FILE COPY

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdm for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 16, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #07
SDG NO.:	MYP311
LABORATORY:	Wadsworth/Alert Laboratories, Inc. (WADSPA)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Soil Samples (MYP311 through MYP330)
COLLECTION DATE:	August 16, 1994
REVIEWER:	Dina D. David, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region 3

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-10431/22540M07.RPT

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #07
Site: Carson River
Laboratory: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: September 16, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP311 through MYP330

COLLECTION DATE: August 16, 1994
SAMPLE RECEIPT DATE: August 20, 1994

CONCENTRATION & MATRIX: 20 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP315 and MYP321
(D2): MYP326 and MYP332* (*See Additional Comments)

LABORATORY QC: Matrix Spike: MYP327
Duplicates: MYP327
ICP Serial Dilution: MYP327

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 23, 1994	August 26 and 29, 1994
Mercury	August 23 and 26, 1994	August 23 and 26, 1994
Percent Solids	Not Applicable	August 23, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

SAMPLING ISSUES: None.

OTHER:

ADDITIONAL COMMENTS:

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

*Data for field duplicate sample MYP332 have been validated and are included in Case No. 22540 Memo #08.

According to the case narrative submitted by the laboratory, the sample bottle for MYP320 was received broken. However, the sample bottle was contained in a plastic bag so the sample was not compromised. The Region was contacted by the laboratory regarding the above issue, and informed the laboratory to proceed with the analysis.

The laboratory analyzed all of the samples for arsenic, antimony, beryllium, cadmium, chromium, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, antimony, beryllium, cadmium, chromium, lead, selenium, and thallium were at or below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in all of the samples
- Mercury in samples MYP311 through MYP323 and MYP325 through MYP328

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony and mercury in QC sample MYP327 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte are presented below and are based on an ideal recovery of 100%.

Analyte	MYP327 % Recovery	MYP327 % Bias
Antimony	32.4	-67.6
Mercury	136.5	+36.5

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in all of the samples may be biased low, and where non-detected, false negatives may exist. The results reported for mercury in samples MYP311 through MYP323 and MYP325 through MYP328 may be biased high.

A 74.2% recovery was obtained for manganese in the matrix spike analysis of QC sample MYP327. This percent recovery, though marginally below the 75-125% criteria for accuracy, is not expected to significantly affect the results reported for manganese in all of the samples.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. Post-digestion spike recovery results of 95.6% for antimony and 100% for manganese were obtained in QC sample MYP327. Since the post-digestion spike recovery results were acceptable, the low pre-digestion spike recovery results obtained for antimony (32.4%) and for manganese (74.2%) may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

ANALYTICAL RESULTS

Case No 22540 Memo #07

TABLE 1A

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: September 16, 1994

Concentration in mg/Kg

Station Location	FA-001-SL-101A			FA-001-SL-102A			FA-001-SL-103A			FA-001-SL-104A			FA-001-SL-105A			FA-001-SL-106A			FA-001-SL-107A		
Sample I.D.	MYP311			MYP312			MYP313			MYP314			MYP315 D1			MYP316			MYP317		
Date of Collection	8/16/94			8/16/94			8/16/94			8/16/94			8/16/94			8/16/94			8/16/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3780			5190			4080			7490			5060			5210			5080		
Antimony	0.43 U	J	B	0.40 U	J	B	0.57 L	J	AB	0.60 L	J	AB	0.50 U	J	B	0.40 U	J	B	0.42 U	J	B
Arsenic	3.9			5.9			6.0			6.0			6.2			4.4			8.0		
Barium	37.7 L	J	A	84.1			52.3			101			61.1			42.2			92.2		
Beryllium	0.25 L	J	A	0.35 L	J	A	0.34 L	J	A	0.45 L	J	A	0.26 L	J	A	0.34 L	J	A	0.29 L	J	A
Cadmium	0.21 U			0.20 U			0.20 U			0.20 U			0.25 U			0.20 U			0.44 L	J	A
Calcium	3870			6050			4180			8800			9650			3890			7920		
Chromium	4.7			5.5			7.7			8.2			6.5			6.8			6.4		
Cobalt	2.4 U			4.4 L	J	A	4.4 L	J	A	5.1 L	J	A	2.8 U			2.2 U			5.3 L	J	A
Copper	5.9			9.1			13.9			11.2			7.6			5.6			17.2		
Iron	6190			7890			7900			11000			7520			8050			8680		
Lead	4.5			9.7			17.7			4.9			5.5			3.8			15.2		
Magnesium	2450			2960			2360			4760			4400			2800			2980		
Manganese	172			274			305			323			283			183			862		
Mercury	0.23	J	B	0.42	J	B	8.9	J	B	0.13	J	B	0.47	J	B	0.05 L	J	AB	13.0	J	B
Nickel	3.8 L	J	A	4.5 L	J	A	3.8 L	J	A	5.9 L	J	A	4.6 L	J	A	3.8 L	J	A	4.6 L	J	A
Potassium	1850			1540			1720			2380			2500			2950			2560		
Selenium	0.85 U			1.0			0.81 U			0.81 U			1.0 U			0.80 U			0.84 U		
Silver	0.64 U			0.60 U			1.9 L	J	A	0.61 U			0.75 U			0.60 U			1.8 L	J	A
Sodium	947 L	J	A	386 L	J	A	1400			5710			603 L	J	A	1010			2440		
Thallium	1.5 U			1.5 L	J	A	1.4 U			1.4 U			1.8 U			1.4 U			1.6 L	J	A
Vanadium	18.4			21.3			22.8			31.1			19.9			21.1			24.1		
Zinc	23.9			33.2			44.8			36.9			36.5			26.5			57.6		
Percent Solids	93.6 %			99.2 %			98.8 %			98.6 %			79.6 %			99.8 %			95.4 %		

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS

TABLE 1A

Case No.: 22540 Memo #07
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Dina D. David, ESAT/ICF Kaiser
Date: September 16, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA-001-SL-108A			FA-001-SL-109A			FA-001-SL-110B			FA-001-SD-111A			FA-008-SL-101A			FA-008-SL-102A			FA-008-SL-103A		
Sample I.D.	MYP318			MYP319			MYP320			MYP321 D1			MYP322			MYP323			MYP324		
Date of Collection	8/16/94			8/16/94			8/16/94			8/16/94			8/16/94			8/16/94			8/16/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3910			4540			2180			4570			15100			17000			2890		
Antimony	0.40 U	J	B	0.44 U	J	B	0.46 U	J	B	0.51 U	J	B	0.65 L	J	AB	0.51 L	J	AB	0.41 U	J	B
Arsenic	5.3			5.6			4.5			7.9			14.9			15.6			4.6		
Barium	57.2			69.3			41.8 L	J	A	62.3			220			274			26.1 L	J	A
Beryllium	0.20 L	J	A	0.24 L	J	A	0.23 U			0.25 U			0.51 L	J	A	0.74 L	J	A	0.21 U		
Cadmium	0.28 L	J	A	0.22 U			0.23 U			0.25 U			0.47 L	J	A	0.21 U			0.21 U		
Calcium	4010			5130			1650			8450			41100			57800			5300		
Chromium	5.6			5.6			3.5			5.0			10.8			13.1			4.8		
Cobalt	2.2 U			4.1 L	J	A	2.5 U			2.8 U			9.6 L	J	A	11.2			2.3 U		
Copper	18.6			7.3			5.4 L	J	A	6.9			23.6			29.9			4.2 L	J	A
Iron	7120			7770			5360			7130			19100			21500			6090		
Lead	19.1			4.6			12.8			5.7			6.8			7.1			3.0		
Magnesium	2160			3060			1180			4420			17500			24400			1660		
Manganese	343			262			66.1			304			636			813			169		
Mercury	9.5	J	B	2.6	J	B	4.2	J	B	0.58	J	B	0.72	J	B	0.10 L	J	AB	0.05 U		
Nickel	4.3 L	J	A	5.0 L	J	A	3.6 L	J	A	3.0 L	J	A	9.9			11.8			2.6 L	J	A
Potassium	1720			1790			371 L	J	A	2540			4490			4990			939 L	J	A
Selenium	1.1			0.87 U			0.93 U			1.0 U			0.81 U			0.84 U			0.82 U		
Silver	2.1			0.65 U			0.69 U			0.76 U			0.61 U			0.63 U			0.62 U		
Sodium	2080			3310			179 L	J	A	689 L	J	A	16700			13000			2650		
Thallium	1.4 U			1.5 U			1.6 U			1.8 U			1.6 L	J	A	1.5 L	J	A	1.4 U		
Vanadium	20.2			21.4			18.4			19.4			50.7			56.9			19.9		
Zinc	49.9			31.8			23.7			36.7			57.5			70.6			16.8		
Percent Solids	99.0 %			91.8 %			86.4 %			78.8 %			98.4 %			95.4 %			97.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS

Case No: 22540 Memo #07

TABLE 1A

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: September 16, 1994

Concentration in mg/Kg

Station Location	FA-008-SL-104A			FA-008-SL-105A			FA-008-SL-106A			FA-008-SL-107A			FA-008-SL-108A			FA-008-SL-109A			Lab Blank**		
Sample I.D.	MYP325			MYP326 D2*			MYP327			MYP328			MYP329			MYP330					
Date of Collection	8/16/94			8/16/94			8/16/94			8/16/94			8/16/94			8/16/94					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	10100			9660			9560			7330			7090			6640			3.4 U		
Antimony	0.56 L	J	AB	0.41 U	J	B	0.68 L	J	AB	0.40 U	J	B	0.41 U	J	B	0.40 U	J	B	1.1 L	J	A
Arsenic	7.5			7.8			6.3			4.8			8.2			4.9			1.1 L	J	A
Barium	122			105			102			61.8			23.0 L	J	A	39.7 L	J	A	0.20 U		
Beryllium	0.41 L	J	A	0.51 L	J	A	0.41 L	J	A	0.30 L	J	A	0.35 L	J	A	0.31 L	J	A	0.20 U		
Cadmium	0.21 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U		
Calcium	17700			13000			15800			3490			4540			2940			5.2 U		
Chromium	8.1			8.6			8.1			6.6			8.4			6.9			1.7 L	J	A
Cobalt	6.5 L	J	A	6.4 L	J	A	5.7 L	J	A	5.1 L	J	A	2.5 L	J	A	3.8 L	J	A	2.2 U		
Copper	21.0			19.2			14.6			10.7			8.1			9.4			0.60 U		
Iron	14600			14100			13300			9740			11100			8300			1.2 U		
Lead	9.3			11.0			5.6			4.9			3.2			3.9			0.60 U		
Magnesium	11100			7540			5830			3140			3130			2870			4.4 U		
Manganese	462			459			356			146			125			127			0.20 U		
Mercury	1.7	J	B	2.5	J	B	1.3	J	B	0.38	J	B	0.05 U			0.05 U			0.05 U		
Nickel	8.8			7.2 L	J	A	6.8 L	J	A	4.8 L	J	A	5.3 L	J	A	3.4 L	J	A	1.4 U		
Potassium	3550			3310			3010			2120			1900			1960			15.2 U		
Selenium	0.82 U			0.81 U			0.81 U			0.81 U			0.81 U			0.81 U			0.80 U		
Silver	0.62 U			0.77 L	J	A	0.60 U			0.61 U			0.61 U			0.61 U			0.60 U		
Sodium	9370			4850			1520			828 L	J	A	5340			7590			3.6 U		
Thallium	1.4 U			1.4 U			1.4 U			1.4 U			1.9 L	J	A	1.4 U			1.4 U		
Vanadium	39.4			39.0			35.8			28.6			39.8			29.2			0.40 U		
Zinc	47.0			46.9			38.7			26.6			24.8			30.5			0.60 U		
Percent Solids	97.0 %			98.4 %			99.2 %			98.8 %			98.6 %			98.8 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

*Field duplicate sample MYP332 (D2) is included in Case No. 22540 Memo #08.

D1, D2, etc.-Field Duplicate Pairs

N/A-Not Applicable

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

**Two preparation blanks were analyzed for mercury. Results were non-detected.

ANALYTICAL RESULTS

TABLE 1A

Case No.: 22540 Memo #07

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Reviewer: Dina D. David, ESAT/ICF Kaiser

Date: September 16, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Sample I.D.	MDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	3.4			40.0																	
Antimony	0.40			12.0																	
Arsenic	0.40			2.0																	
Barium	0.20			40.0																	
Beryllium	0.20			1.0																	
Cadmium	0.20			1.0																	
Calcium	5.2			1000																	
Chromium	0.20			2.0																	
Cobalt	2.2			10.0																	
Copper	0.60			5.0																	
Iron	1.2			20.0																	
Lead	0.60			0.60																	
Magnesium	4.4			1000																	
Manganese	0.20			3.0																	
Mercury	0.05			0.10																	
Nickel	1.4			8.0																	
Potassium	15.2			1000																	
Selenium	0.80			1.0																	
Silver	0.60			2.0																	
Sodium	3.6			1000																	
Thallium	1.4			2.0																	
Vanadium	0.40			10.0																	
Zinc	0.60			4.0																	

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #07 LABORATORY WADSPA

SDG NO. MYP311 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 16, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 20 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	X		M	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	X		M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: None.

In Reference to Case No(s).:

22540 Memo #07

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 12, 1994

Laboratory Name: Wadsworth/Alert Laboratories, Inc.

Lab Contact: David Brennan

Region: 9

Regional Contact: Dina D. David

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP311 (MYN311 through MYN330)
Site: Carson River

Summary of Questions/Issues Discussed:

1. For this SDG, the ICP serial dilution sample is listed as having a dilution factor of 1 on Form 14 (analysis run log). Please change the dilution factor to 5 on the affected Form 14.

Summary of Resolution:

1. Since the improper reporting of dilution factor did not affect data quality, the correction to Form 14 will be inserted into the data package when received from the laboratory.

Dina D. David
Signature

September 16, 1994
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

Mercury Specialization: Soil

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: August 20, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7762Y-01 Memo #01
SDG NO.:	SY5814
LABORATORY:	Oak Ridge Research Institute (ORRI)
ANALYSIS:	SAS Mercury Speciation
SAMPLE NO.:	22 Soil Samples (See Case Summary)
COLLECTION DATE:	April 27, 28, and 30, and May 4, 6, 7, 17, and 27, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Tom B. Bennett, Jr. , TPO USEPA Region IV
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

Data Validation Report

Case No.: SAS 7762Y-01 Memo #01
Site: Carson River
Laboratory: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF
Date: August 20, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY5814 through SY5825 and SY5834 through SY5843

COLLECTION DATE: April 27, 28, and 30, and May 4, 6, 7, 17, and 27, 1993

SAMPLE RECEIPT DATE: May 18 and 28, 1993

CONCENTRATION & MATRIX: 22 Low Concentration Soil Samples

FIELD QC:
Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): SY5824 and SY5825

LABORATORY QC:
Matrix Spike: SY5823 and SY5836
Duplicates: SY5823 and SY5836
Matrix Spike Duplicates: SY5823 and SY5836

ANALYSIS: SAS Mercury Speciation

Analyte	Sample Preparation and Digestion Date		Analysis Date
Total Mercury	June 16, 1993		June 17, 1993
Elemental Mercury	June 27, 1993*		June 28, 1993
Mercuric Sulfide	June 26 - 29, 1993		June 29, 1993
Methyl Mercury	June 27, 1993	Column A:	June 27 and 28, 1993
		Column B:	July 4, 1993
Percent Solids	Not Applicable		Unknown

* Dates of oven drying of samples is unknown.

TPO ACTION:

METHOD NON-COMPLIANCE: The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes and all of the samples.

SAMPLING ISSUES: The first 10 samples of this SDG were received by the laboratory after the expiration of the technical holding times.

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: For this SAS contract the laboratory submitted an SOP which outlined methods and QC procedures. The paperwork requirements were not specific in many aspects, and the data package differed in many respects from the requirements of the SAS CRF. The laboratory worked with the validator to provide data which could be reproduced by the validator, and to provide raw data documentation normally provided with SAS data packages. During this process the laboratory resubmitted all of the sample and all of the QC results on several occasions due to errors and inconsistencies between the results calculated by the laboratory and those calculated by the validator. In addition, the laboratory submitted the following paperwork after being requested by the validator:

- Worksheets for sample sizes used before correction for percent solids, and worksheets for percent solids. These were requested in the SAS CRF, but not dealt with in the laboratory SOP, and were not provided in the original data package.

The following raw data paperwork was not in the original data package, and was not received for this data package after being requested by the validator:

- Bench sheets showing instrument output in the actual order in which samples were analyzed, with times and dates. The laboratory indicated that the handwritten data sheets were in the actual order of analysis, but the ICV and CCV analyses were not shown.
- Traceability forms or raw data worksheets for matrix spike, LCS, ICV and CCV, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- Calibration standards were analyzed in order of increasing concentration, but were requested to be analyzed in decreasing order. In the future the laboratory will analyze in decreasing order.
- The laboratory did not include QC samples in its count of the number of samples between CCV and continuing calibration blank (CCB) analysis. Thus 13 to 14 samples (ten environmental samples) were analyzed between CCVs and CCBs. A CCV and CCB were not analyzed at the end of the analytical runs. The laboratory will correct this in the future.
- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 2X the QC sample concentration to provide the most relevant data. Thus, the matrix spike concentrations for QC sample SY5836 tended to be near the lower end of the calibration range, whereas the matrix spikes for QC sample SY5823 tended to be near the midpoint. The laboratory will spike at the mid-point concentration in the future.

- Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which were for total mercury.
- Form X (instrument detection limits [IDL]) and Form XIV (analysis run log), or their equivalents, were not provided. Note that no IDL studies have been performed.

The large number of mathematical errors in the calculations for the results in the various submisions of this data package indicate a lack of internal peer review of the results submitted by the laboratory.

Note that the laboratory has procured the EPA Contract Laboratory Program Inorganic Statement of Work and will be able to follow CLP format with respect to analytical procedures, documentation, and presentation of results in the future.

SAMPLING ISSUES: None

OTHER: None

ADDITIONAL COMMENTS:

The CRDLs specified in the laboratory SOP (which was used for the SAS contract) are 7 ppb for total mercury, elemental mercury, and mercuric sulfide, and 30 ppb for methyl mercury. These detection limits were effective for the analysis of the final extracts. The detection limits in mg/kg for the original soil samples vary depending upon extraction procedure and the volume of extract used. The results which the laboratory reported as "<CRDL" are reported in Table 1A as the calculated value in mg/kg of the soil sample for the extraction procedure and the volume of extract used, with the "U" qualifier for non-detected results. (Thus, the CRDLs set forth in the SAS CRF were not effective for these soil samples.) In the calculations for inorganic mercury, which were made by subtracting the results for elemental mercury, mercuric sulfide, and methyl mercury from the results for total mercury, results below the CRDL are considered to be zero. In the calculations for elemental mercury, the laboratory quantitated and subtracted results for the reanalysis of the total mercury after heating even when these results were less than the CRDL.

The method for the analysis of elemental mercury involves the analysis for total mercury, from which is subtracted the results for total mercury reanalysis after 5 days of heating at 150°C to drive off the mercury vapors. As the elemental mercury in the matrix spikes should be effectively driven off in the heating process, the results for matrix spike recovery of elemental mercury are calculated by comparing the result for the remaining mercury in the sample to the result for the remaining mercury in the matrix spike sample.

Field duplicate samples SY5824 and SY5825 were taken from the same location on different dates (May 7 and 17, 1993).

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS Client Request Form (CRF) for mercury speciation, the SOP submitted by the laboratory

for this SAS contract, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	D
2. Sample Holding Times	No	A
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	No	C
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- All of the analytes in all of the samples

The samples in this SDG were collected from April 27 through May 27, 1993, and were received on May 18 and 28, 1993. They were analyzed for total mercury, elemental mercury, mercuric sulfide, and methyl mercury on June 17 through July 4, 1993. These soil analyses exceeded the 12-day (from sample collection) technical holding time stated in the SAS CRF by 9 to 56 days, and exceeded the 10-day (from laboratory receipt) contractual holding time stated in the SAS CRF by 10 to 37 days.

Note, in particular, that the analyses for methyl mercury, which were all non-detected results, were performed 26 to 56 days after the expiration of the technical holding time.

Sample results may be biased low and false negatives may exist.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Total mercury in all of the samples except sample SY5823

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike (MS) and matrix spike duplicate (MSD) recovery results for total mercury in QC sample number SY5836 did not meet the 75-125% criteria for accuracy. The percent recoveries and possible percent bias for total mercury is presented below and is based on an ideal recovery of 100%.

Analyte	SY5836-MS % Recovery	SY5836-MSD % Recovery	Average % Bias
Total mercury	148	232	+90

Note that the MS and MSD recovery results for total mercury in sample SY5823 (104% and 109%) were within the 75-125% criteria for accuracy, and the result for sample SY5823 has therefore not been qualified. Sample SY5823 was spiked with 500 mg/kg Hg and was diluted 10X in the analysis, whereas sample SY5836 was spiked with 40 mg/kg Hg and analyzed undiluted. All of the sample analyses were performed undiluted.

Results above the CRDL are considered quantitatively uncertain. The results reported for total mercury in all of the samples except sample SY5823 may be biased high.

C. A 23.3 relative percent difference (RPD) was obtained for total mercury, a 78.3 RPD was obtained for elemental mercury, a 145 RPD was obtained for mercuric sulfide, and a 43.4 RPD was obtained for inorganic mercury in the analysis of field duplicate pair samples SY5824 and SY5825. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±20 RPD or ±CRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to lack of sample homogeneity, the sample matrix, poor sampling or laboratory technique, or method defects. Note also that the samples were collected from the same location on different dates (May 7 and 17, 1993). The effect on the quality of the data is not known.

D. Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which appear to be for total mercury. These results were within the 75-125% criteria stated in the SAS CRF.

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #01
Site: Carson River
Lab.: Oakridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: August 20, 1993

Analysis Type: Low Concentration Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg

Station Location	MS001-SL-25-A			MS001-SL-41-A			MS001-SL-51-A			MS001-SL-59-A			MS002-SL-11-A			MS002-SL-25-A			MS003-SL-12-A		
Sample I.D.	SY5814			SY5815			SY5816			SY5817			SY5818			SY5819			SY5820		
Date of Collection	04/27/93			04/28/93			04/28/93			04/28/93			04/30/93			04/30/93			05/04/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	0.55	J	AB	97.5	J	AB	121	J	AB	43.7	J	AB	8.1	J	AB	0.69	J	AB	1.3	J	AB
Elemental Mercury	0.50	J	A	97.4	J	A	72.3	J	A	26.9	J	A	0.54	J	A	0.54	J	A	1.3	J	A
Mercuric Sulfide	1.5 U	J	A	56.5	J	A	72.0	J	A	5.3	J	A	1.4 U	J	A	1.4 U	J	A	1.5 U	J	A
Methyl Mercury	0.047 U	J	A	0.045 U	J	A	0.047 U	J	A	0.046 U	J	A	0.044 U	J	A	0.044 U	J	A	0.046 U	J	A
Inorganic Mercury	<0.05	J	A	0.0	J	A	0.0	J	A	<11.5	J	A	<7.6	J	A	<0.15	J	A	0.0	J	A

Station Location	MS003-SL-33-A			MS003-SL-55-A			MS004-SL-02-A			MS004-SL-14-A			MS004-SL-16-A			MS006-SL-09-A			MS010-SL-29-A		
Sample I.D.	SY5821			SY5822			SY5823			SY5824 D1			SY5825 D1			SY5834			SY5835		
Date of Collection	05/04/93			05/04/93			05/06/93			05/07/93			05/17/93			05/27/93			05/27/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	3.6	J	AB	1.3	J	AB	297	J	A	326	J	ABC	258	J	ABC	51.0	J	AB	787	J	AB
Elemental Mercury	3.5	J	A	0.76	J	A	131	J	A	155	J	AC	67.8	J	AC	25.7	J	A	633	J	A
Mercuric Sulfide	2.0	J	A	1.5 U	J	A	16.6	J	A	14.3	J	AC	89.1	J	AC	21.6	J	A	80.8	J	A
Methyl Mercury	0.047 U	J	A	0.045 U	J	A	0.045 U	J	A	0.045 U	J	A	0.044 U	J	A	0.045 U	J	A	0.047 U	J	A
Inorganic Mercury	0.0	J	A	<0.52	J	A	<149	J	A	<157	J	AC	<101	J	AC	<3.6	J	A	<73.1	J	A

N/A-Not Applicable
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #01
Site: Carson River
Lab.: Oakridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: August 20, 1993

Analysis Type: Low Concentration Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg

Station Location	DD001-SL-10-A			DD001-SL-07-A			MS005-SL-16-A			MS005-SL-12-A			MS010-SL-69-A			MS010-SL-38-A			MS007-SL-41-A		
Sample I.D.	SY5836			SY5837			SY5838			SY5839			SY5840			SY5841			SY5842		
Date of Collection	05/27/93			05/27/93			05/27/93			05/27/93			05/27/93			05/27/93			05/27/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	109	J	AB	74.5	J	AB	124	J	AB	176	J	AB	790	J	AB	23.9	J	AB	24.9	J	AB
Elemental Mercury	40.3	J	A	40.2	J	A	86.6	J	A	28.2	J	A	358	J	A	20.1	J	A	12.0	J	A
Mercuric Sulfide	18.3	J	A	41.2	J	A	45.2	J	A	59.8	J	A	35.4	J	A	6.6	J	A	9.1	J	A
Methyl Mercury	0.043 U	J	A	0.044 U	J	A	0.052 U	J	A	0.043 U	J	A	0.046 U	J	A	0.044 U	J	A	0.043 U	J	A
Inorganic Mercury	<50.4	J	A	0.0	J	A	0.0	J	A	<88.5	J	A	<397	J	A	0.0	J	A	<3.8	J	A

Station Location	MS008-SL-06-A																				
Sample I.D.	SY5843			Lab Blank			CRDL														
Date of Collection	05/27/93																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	5.6	J	AB	0.89 U			0.89 *														
Elemental Mercury	1.1	J	A	0.89 U			0.89 *														
Mercuric Sulfide	1.4 U	J	A	1.4 U			1.4														
Methyl Mercury	0.043 U	J	A	0.043 U			0.043														
Inorganic Mercury	<4.5	J	A	N/A			N/A														

* For 1 mL Extract Analyzed. Will Vary When Different if Volume of Extract is Analyzed.
N/A-Not Applicable
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #01 LABORATORY Oak Ridge Research Institute

SDG NO. SY5814 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 20, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 22 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			M	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			O	
7. MATRIX SPIKE ANALYSIS			M	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #01 LABORATORY Oak Ridge Research Institute

SDG NO. SY5814 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 20, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 22 SOIL _____ OTHER

TPO ACTION: The first 10 samples of this SDG were received by the laboratory after the expiration of the technical holding times. The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes and all of the samples.

TPO ATTENTION: For this SAS contract the laboratory submitted an SOP which outlined methods and QC procedures. The paperwork requirements were not specific in many aspects, and the data package differed in many respects from the requirements of the SAS CRF. The laboratory worked with the validator to provide data which could be reproduced by the validator, and to provide raw data documentation normally provided with SAS data packages. During this process the laboratory resubmitted all of the sample and all of the QC results on several occasions due to errors and inconsistencies between the results calculated by the laboratory and those calculated by the validator. In addition, the laboratory submitted the following paperwork after being requested by the validator:

- Worksheets for sample sizes used before correction for percent solids, and worksheets for percent solids. These were requested in the SAS CRF, but not dealt with in the laboratory SOP, and were not provided in the original data package.

The following raw data paperwork was not in the original data package, and was not received for this data package after being requested by the validator:

- Bench sheets showing instrument output in the actual order in which samples were analyzed, with times and dates. The laboratory indicated that the handwritten data sheets were in the actual order of analysis, but the ICV and CCV analyses were not shown.
- Traceability forms or raw data worksheets for matrix spike, LCS, ICV and CCV, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- Calibration standards were analyzed in order of increasing concentration, but were requested to be analyzed in decreasing order. In the future the laboratory will analyze in decreasing order.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #01 LABORATORY Oak Ridge Research Institute

SDG NO. SY5814 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 20, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 22 SOIL _____ OTHER

TPO ATTENTION: (Continued)

- The laboratory did not include QC samples in its count of the number of samples between CCV and continuing calibration blank (CCB) analysis. Thus 13 to 14 samples (ten environmental samples) were analyzed between CCVs and CCBs. A CCV and CCB were not analyzed at the end of the analytical runs. The laboratory will correct this in the future.
- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 2X the QC sample concentration to provide the most relevant data. Thus, the matrix spike concentrations for QC sample SY5836 tended to be near the lower end of the calibration range, whereas the matrix spikes for QC sample SY5823 tended to be near the midpoint. The laboratory will spike at the mid-point concentration in the future.
- Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which were for total mercury.
- Form X (instrument detection limits [IDL]) and Form XIV (analysis run log), or their equivalents, were not provided. Note that no IDL studies have been performed.

The large number of mathematical errors in the calculations for the results in the various submisions of this data package indicate a lack of internal peer review of the results submitted by the laboratory.

Note that the laboratory has procured the EPA Contract Laboratory Program Inorganic Statement of Work and will be able to follow CLP format with respect to analytical procedures, documentation, and presentation of results in the future.

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #1

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: July 21, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. We still need ICV/CCV results in concentration units with %R and LCS results for all analytes.
2. Sample and duplicate results are incorrectly entered on Form VI (equivalent) and some RPDs are incorrect.
3. Matrix spike and matrix spike duplicate results for %R are incorrect, and some are not entered.
4. Are results reported as dry weight basis, i.e., has % moisture correction already been applied?
5. In your SOP, are methyl mercury iodide standards dissolved in benzene directly, or are they put through extractions? If direct, shouldn't a 5X dilution (extraction) factor be applied?
6. In the elemental mercury method, wouldn't methyl mercury also be driven off by the heat? Shouldn't the methyl mercury concentration also be subtracted from the total mercury?
7. In the mercuric sulfide method, are the standards run through the extraction process? If not, is there a loss of extract for which a compensation factor needs to be applied? Are all 14 mLs of extract recovered?
8. Please give working formula for calculation of results.

Summary of Resolution:

1. The laboratory will calculate and send these results. (Received 8/9/93 and 8/12/93)

2,3. The laboratory will correct and resubmit. (Received 7/30/93, 8/2/93 and 8/11/93)

4,6,7. Yes, yes, and yes.

5. Directly. Yes, however, all of the results in this SDG are non-detects, so you will not see this in any calculations.
7. No. No, all 14 mLs of extract are recovered.
8. Concentration from the absorbance (from the linear regression) × Total Volume (generally 250 mLs) × 1000 ÷ Volume of Extract (in mLs)

Signature _____ Date August 12, 1993

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: July 23, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I still need the following:
   A) Instrument bench sheets for CVAA if applicable.
   B) Sample preparation worksheets with wet weights.
   C) Percent solids worksheets.
   D) Traceability forms for standards, and preparation forms for standards (weights, volumes, analyst, date).
   E) Forms (either first submission or resubmission) for LCS, blanks, ICV and CCVs, matrix spikes (MS) and matrix spike duplicates (MSD), and duplicates.
2. Please note the following problems for future reference:
   a) No CCV or CCB at end of analytical runs.
   B) More than 10 analyses between CCVs/CCBs.
   C) Matrix spikes not at mid-point of calibration curve.
   D) Calibration standards not run in decreasing order (as specified in the SAS CRF).
   E) I cannot tell if the low level standard is incorporated into the calibration curve as it is not on the daily worksheet.
   F) Rounding off of decimal places before final result makes reproducing results for validation difficult. The following CLP protocols might be useful for data calculation and presentation:
      1) Carry decimal places down the line, and round off at the end. Repeated rounding of intermediary figures makes reproducing the results difficult.
      2) CLP software shows matrix spike and duplicate results to 4 decimal places for calculation of percent recovery (%R) and relative percent difference (RPD). This might be a useful idea for your data reporting.
      3) Show results to several decimal places on worksheets, especially when you use them in your calculations.

4) Generally CLP results are reported to 3 significant figures, except for results less than 10, which are reported to 2 significant figures. Percents are reported to 1 decimal place.
G) There is a difference between an IDL or MDL and a CRDL (the validator explained the difference as per the CLP).
H) I see how you calculated your matrix spike recoveries for elemental mercury, and it now makes sense. Perhaps the total mercury spike would be appropriate as the elemental mercury spike in the future as elemental mercury is total mercury minus the total mercury after 5 days of heating.
I) The laboratory may find the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1 or ILM03.0) to be extremely useful for QC and reporting protocols.

3. I have problems with many of your results, most of which appear to be rounding discrepancies. Let's go through some examples to verify calculations.
4. The following results appear to be problems which are more than rounding discrepancies:
A) Elemental Mercury (Hg^o) is Total Mercury (HG_T) minus a non-detect (<CRDL), not <CRDL. This applies to samples SY5814, SY5815, and SY5819 through SY5822.
B) Hg^o in sample SY5818 is 7.8-7.6 = 0.2 (or 7.0 U), not 7.6.
C) Hg^o in duplicate sample SY5823-D appears to be 104 not 125.
Hg^o in duplicate sample SY5836-D appears to be 31.8 not 46.
Hg^o in SY5823-MS appears to be 646 not 126; in SY5823-MSD appears to be 669 not 120.
Hg^o in SY5836-MS appears to be 99.7 not 43; in SY5836-MSD appears to be 132 not 39.

Summary of Resolution:

1. A-E) The laboratory will provide these forms. (See TRLs #4,5, and 9)
2. A,B) The laboratory will perform correctly in the future.
C) The laboratory tries to make the spike approximately 2X the result for the most appropriate value. The laboratory will spike at the mid-point in the future, especially as that is easier.
D) The laboratory will perform calibrations in decreasing order as per the SAS CRF in the future, and will run a blank between each standard to prevent carry-over.
E) The low level standard is incorporated into the calibration curve.
F) The laboratory sees the usefulness of these recommendations, and will employ them in the future.
G) The laboratory will look into this.
H) This makes sense to the laboratory, and may be used in the future.
I) The laboratory will procure this document from the EPA.
3. The laboratory and the validator can reproduce the same results by carrying decimal places through the calculations.
4. A-C) The laboratory will check these results and send any changes to the validator for confirmation. (See TRL #9)
The laboratory thanks the validator for the many suggestions to make the data packages in the future less problematical. The laboratory is interested in producing documents and packages in the CLP format in the future.

Signature

August 16, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #3

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: July 29, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I still am having difficulty reproducing some of your results. What values are you using in your linear regressions? Let's go through the input of the regression and some calculations.

Summary of Resolution:

1. The values used in the linear regression are the averages of the individual absorbances on the raw data worksheets. These are not necessarily the same as those on the Daily Data Worksheets print-outs. The validator and the laboratory are able to produce the same results from the raw data by using the true average of the calibration absorbances in the linear regression and by not rounding off numbers in the calculations until the final result. The laboratory resubmitted all of the results, and all of the forms affected by these recalculations. ICF/ESAT received copies of these changes on July 30, 1993.

Signature

July 30, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #4

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: July 30, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. Results for elemental mercury (Hg^o) are not <CRDL when analysis for total mercury after 5 days of heating is <CRDL, because Hg^o = Total Mercury (Hg_T) - Total Mercury After Heating (Hg_{T-H}). When Hg_{T-H} is <CRDL (i.e. non-detected), subtract zero from Hg_T to get Hg^o. Please correct results for Hg^o in samples SY5814, SY5815, and SY5819 through SY5822. In addition, correct results for inorganic mercury for these samples, as they are affected by the results for Hg^o.
2. Otherwise, so far I have been able to reproduce results received this morning.
3. In the future, a worksheet showing all values for Hg^o calculations would be useful.
4. I still need the percent solids worksheet and the sample preparation worksheets with non-corrected weights.
5. In our first conversation, we discussed a 5X correction factor for methyl mercury. Was it incorporated in the calculations for those results greater than the CRDL such as the matrix spike sample?
6. We also discussed a correction factor for mercuric sulfide (HgS) due to the fraction of the extract passing the filter vs. the fraction not passing (out of 14 mL). Was such a factor incorporated in the calculations for HgS?
7. I now understand your calculations for Hg^o matrix spike (MS) and matrix spiKe duplicate (MSD) percent recoveries.

Summary of Resolution:

1. The laboratory agrees, and will send corrected results. (Received 8/11/93)
2. Good.
3. The laboratory thinks this is a good idea.
4. The laboratory will send copies of these worksheets. (Sample prearation worksheet received 8/2/93. Percent solids worksheet: see TRL #9.)
5. It is incorporated in the results.
6. All 14 mLs are recovered. No correction factor is needed.
7. O.K. The laboratory will continue to calculate as done originally.

Chris Davis _____ August 16, 1993

Signature Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #5

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 2, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. In the 7/30/93 draft of corrected results and forms, the relative percent differences for total mercury, elemental mercury, and mercuric sulfide in duplicate samples SY5823-D and SY5836-D are still incorrect (they appear to be percent differences). Please recalculate and resubmit.
2. I still need the following:
   A) Worksheets for percent solids.
   B) Bench sheets showing actual order of analyses, date, time, etc.
   C) Dates for 5-day heating for elemental analyses.
   D) Traceability forms for standards.
   E) Copies of sample receiving notebook pages with sample receiving temperatures.

Summary of Resolution:

1. The laboratory will recalculate and send corrections. (See TRL #9.)
2. The laboratory will send these pages. (See TRL #9.)

Signature

August 16, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #6

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 3, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I do not believe that I ever received corrections for elemental mercury (Hg^o) when analysis is <CRDL. This also affects inorganic mercury results for these samples (SY5814, SY5815, and SY5819 through SY5822).
2. I definitely do not have the ICV and CCV results in concentration units for this package. I did receive these results for the next package, however, percent difference (%D) is still given instead of percent recovered (%R).
3. I need to figure out detection limits for the methyl mercury analyses. Please confirm if I am doing calculation correctly:
   Run linear regression. Enter absorbance for CRDL standard, read Y-intercept to get concentration (C) in pg/2 μL benzene. Then:

$$\text{CRDL} = \frac{\text{C pg} \times 400\text{ mL benzene} \times 0.5\text{ mL ethanol} \times 1\text{ mL toluene} \times 1\text{ mg}}{2\ \mu\text{L benzene} \times 0.2\text{ mL ethanol} \times 0.5\text{ mL toluene} \times \text{G g sample} \times 10^6\text{ pg}}$$

4. For methyl mercury, I get different results for the matrix spike samples. Can we go over the calculations.

Summary of Resolution:

1. The laboratory will recalculate and send corrections. (Received 8/9/93 and 8/11/93: see TRLs #7 and 8.)
2. The laboratory will send this page. (Received 8/9/93 and 8/12/93.)
3. This is correct.
4. Our calculations agree. The validator had interchanged results from column A with those of column B.

Signature

August 12, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #7

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 6 and 9, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I still do not have the corrections for elemental mercury (samples SY5814, SY5815, and SY5819 through SY5822) or the revised ICV and CCV results. Please send.

Summary of Resolution:

1. The laboratory will send these corrections. (They were received at ICF/ESAT by FAX on 8/9/93 and 8/11/93.)

Chris Davis
Signature

August 11, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #8

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 11, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I have found mistakes for elemental mercury (samples SY5815 and SY5822) and inorganic mercury (samples SY5815, and SY5819, SY5820, and SY5822) in the corrected results received on 8/9/93. Let us go over the calculations for these samples.

Summary of Resolution:

1. The laboratory agrees. ICF/ESAT received copies of the corrected results by FAX on 8/11/93.

Chris Davis
Signature

August 11, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 12, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. I cannot reproduce your results for elemental mercury in matrix spike and matrix spike duplicate samples SY5823-MS, SY5823-MSD, SY5836-MS, and SY5823-MSD, and in duplicate sample SY5836-D. The results for inorganic mercury will also be affected for these samples.
2. The relative percent differences (RPDs) for duplicate sample results that I mentioned in our 8/2/93 conversation have not been reported. Please calculate RPDs and send.
3. It appears that I have misplaced one of your FAXes to me which I believe includes the following documents: a worksheet for percent solids showing the percent solids data, i.e. wet sample weight, weight of crucible, dry sample weight, percent solids (or moisture), and date of determination; a copy of the relevant pages of the sample receipt notebook with sample receipt temperatures; the ICV/CCV form with percent recoveries and Laboratory Control Sample (LCS) results. Please send a copy of these pages.
4. What were the dates of sample heating for the elemental mercury analysis?
5. Do you have bench sheets showing the actual order of all analyses, including ICVs and CCVs, blanks, LCSs, samples, etc.?
6. In summary, due to the many corrections and resubmissions, it would be helpfull if you would send a final version of all corrected sample and QC results. In addition, please send the percent solids worksheets, traceability forms for standards and LCSs, and a copy of the laboratory receiving notebook showing sample temperatures. Thank you.

Summary of Resolution:

1. The validator was subtracting the results for these analyses from the duplicate, MS, and MSD sample results, instead of from the respective QC sample results. The results are correct.
2. The laboratory was under the impression that the percent differences reported would suffice, and that RPD would be reported in future packages. The laboratory will caculate and report the values for RPD.
3. The laboratory will send copies of these pages.
4. This information was never provided by the laboratory.
5. The hand written data sheets are in actual order of analysis.
6. Yes. The laboratory will provide a copy of the final version of all sample and QC results, as well as the other requested paperwork.

ICF/ESAT received copies of the corrected sample and QC results, corrected worksheets, the sample preparation worksheet, and the sample receipt temperature worksheet by FAX on 8/12/93. ICF/ESAT received a copy of the percent solids worksheet on 8/16/93. Originals of these documents were received by Federal Express on 8/16/93.

Signature

August 16, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #10

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 13, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. The results for inorganic mercury in samples SY5814 and SY5824 are incorrect. The results for inorganic mercury in sample SY5814 should be 0.0456 ppm, not 0.3193 ppm, and sample SY5824 should be 157.6247 not 156.6247.

Summary of Resolution:

1. The laboratory agrees. ICF/ESAT received copies of the corrected results by FAX on 8/13/93 and 8/16/93.

Signature

August 16, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #01

TRL #11

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 16, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5814 through SY5825 and SY5834 through SY5843

Summary of Questions/Issues Discussed:

1. The corrections for the results for inorganic mercury in samples SY5814 and SY5824 were not included in the corrections received by FAX on 8/13/93.
2. In addition, in checking the percent solids results received by FAX on 8/13/93, I noted incorrect calculations for percent solids results in samples SY5724 (92.9% not 94.9%) and SY5825 (94.4% not 96.0%). Please correct all results for these samples.

Summary of Resolution:

1,2. The laboratory will make these corrections. ICF/ESAT received copies of the corrected results by FAX on 8/16/93. However, the result for inorganic mercury in sample SY5814 was still not correct: the result should be 0.0456, not 0.4560. The validator has corrected, initialed, and dated the most recent copy of this result in the data package.

Signature

August 16, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: August 27, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7762Y-01 Memo #02
SDG NO.:	SY6378
LABORATORY:	Oak Ridge Research Institute (ORRI)
ANALYSIS:	SAS Mercury Speciation
SAMPLE NO.:	10 Soil Samples (See Case Summary)
COLLECTION DATE:	June 3 and 10, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Tom B. Bennett, Jr. , TPO USEPA Region IV
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: SAS 7762Y-01 Memo #02
Site: Carson River
Laboratory: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF
Date: August 27, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY6378 through SY6382 and SY6403 through SY6407

COLLECTION DATE: June 3 and 10, 1993
SAMPLE RECEIPT DATE: June 4 and 11, 1993

CONCENTRATION & MATRIX: 10 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: SY6378 and SY6404
Duplicates: SY6378 and SY6404
Matrix Spike Duplicates: SY6378 and SY6404

ANALYSIS: SAS Mercury Speciation

Analyte	Sample Preparation and Digestion Date	Analysis Date
Total Mercury	July 10 and 11, 1993	July 12, 1993
Elemental Mercury	July 6-11, 1993	July 12, 1993
Mercuric Sulfide	July 6 and 10, 1993	July 14, 1993
Methyl Mercury	July 7, 1993	Column A: July 6 and 15, 1993 Column B: July 15, 1993
Percent Solids	Not Applicable	July 6, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: For this SAS contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork was not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control standard (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.
- Although the result for the Column B confirmation analyses of matrix spike duplicate sample SY6378 on July 15, 1993 was reported on the QC summary forms, the raw data chromatograms for these analyses could not be located by the laboratory.

The following were requested in the SAS CRF, but were not specified in the SOP:

- Calibration standards were analyzed in order of increasing concentration, but were requested to be analyzed in decreasing order. In the future the laboratory will analyze in decreasing order.
- The laboratory did not include QC samples in its count of the number of samples between CCV and continuing calibration blank (CCB) analysis. Thus 13 to 14 samples (ten environmental samples) were analyzed between CCVs and CCBs. A CCV and CCB were not analyzed at the end of the analytical runs. The laboratory will correct this in the future.
- LCS results were not provided for the various analyses. Only one pair of LCS results were reported, which were for total mercury.
- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 1-2X the QC sample concentration to provide the most relevant data. Thus, the matrix spike concentrations for mercuric sulfide and methyl mercury were near the lower end of the calibration range. The matrix spike concentrations for total and elemental mercury were in the mid-range of the calibration curve. The laboratory will spike at the mid-point concentration in the future.
- Form X (instrument detection limits) and Form XIV (analysis run logs), or their equivalents, were not provided. Note that no IDL studies have been performed.

The laboratory reviewed its data package before validation took place, and submitted revised sample and QC results by FAX, along with various raw data worksheets that were not included in the original data package,

such as percent solids worksheets. The results for one sample were corrected due to a percent solids error, the matrix spike (MS) and matrix spike duplicate (MSD) percent recovery results for two analytes in one QC sample were misprinted, and one MS and one duplicate result were also misprinted, and required resubmission.

Note that the laboratory has procured the EPA Contract Laboratory Program Inorganic Statement of Work and will be able to follow CLP format with respect to analytical procedures, documentation, and presentation of results in the future.

SAMPLING ISSUES: None

OTHER: None

ADDITIONAL COMMENTS:

The contract required detection limits (CRDLs) specified in the laboratory SOP (which was used for the SAS contract) are 7 ppb for total mercury, elemental mercury, and mercuric sulfide, and 30 ppb for methyl mercury. These detection limits were effective for the analysis of the final extracts. The CRDLs in mg/kg for the original soil samples vary depending upon the percent solids result for the sample, the sample mass, and the volume of extract used. The CRDLs reported in Table 1A are for the largest volumes of extract used, and are thus the lowest CRDLs applicable to each analysis. Thus, the CRDLs set forth in the SAS CRF were not effective for these soil samples.

Results which are less than the CRDL have been reported by the laboratory for total mercury and mercuric sulfide. The validator has added the "L" qualifier to these results. The results for methyl mercury, which the laboratory reported as "<CRDL," are reported in Table 1A as the calculated value in mg/kg of the CRDL for the soil sample corrected for percent solids, the sample mass, and the volume of extract used, with the "U" qualifier.

The method for the analysis of elemental mercury involves the analysis for total mercury, from which is subtracted the results for total mercury analysis after 5 days of heating at 150°C to drive off the mercury vapors. In the calculations for elemental mercury, the laboratory quantitated and subtracted results for the reanalysis of the total mercury after heating even when these results were less than the CRDL.

The results for inorganic mercury are calculated by subtracting the results for elemental mercury, mercuric sulfide, and methyl mercury from the results for total mercury. For these calculations, methyl mercury results below the CRDL are considered to be zero.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for mercury speciation, the SOP submitted by the laboratory for this SAS contract, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	D
2. Sample Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	D
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	No	B
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A,C,E
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the laboratory detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the laboratory detection limit but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Note that no detection limit studies have been performed by the laboratory, and that the laboratory quantitated and reported results less than the CRDL for total mercury and mercuric sulfide, and used results less than the CRDL in the calculations for elemental mercury and inorganic mercury. Results less than the CRDL were not reported for methyl mercury.

B. The following results are estimated because of laboratory duplicate results outside method-QC limits. The results are flagged "J" in Table 1A.

- Total and elemental mercury in samples SY6378 through SY6382, SY6403, and SY6405 through SY6407

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results for QC sample SY6378 did not meet the ±20 relative percent difference (RPD) criteria required in the SAS CRF for precision as listed below.

Analyte	SY6378 Lab. Dup. RPD
Total mercury	23.4
Elemental mercury	23.2

The results reported for total and elemental mercury in the samples listed above are considered quantitatively uncertain. The imprecision between duplicate results may be due to lack of sample homogeneity, poor laboratory technique, or method defects.

Laboratory duplicate results for QC sample SY6404 did meet the ±20 RPD criteria required in the SAS CRF, therefore the results for total and elemental mercury in this sample have not been qualified.

C. A low CRDL Standard recovery of 51.9% was obtained for mercuric sulfide. While there are no criteria established for CRA recovery, this low recovery may indicate low bias in the results for mercuric sulfide in samples SY6378, SY6379, SY6382, and SY6404, which were near the CRDL. A CRDL standard was not required to be analyzed according to the SAS CRF.

D. Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which are for total mercury. These results were within the 75-125% criteria stated in the SAS CRF.

E. In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150 °C is subtracted from the result for total mercury (without heating). The results in samples SY6378, SY6380, SY6382, SY6404, and SY6407 for total mercury after heating were less than the CRDLs for these samples (see Comment A).

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #02
Site: Carson River
Lab.: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: August 27, 1993

Analysis Type: Low Concentration Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg (Dry Weight Basis)

Station Location	MS-011-SL-48-A			MS-012-SL-09-A			MS-012-SL-37-A			MS-012-SL-38-A			MS-013-SL-12-A			MS-015-SL-02-A			MS-016-SL-01-A		
Sample I.D.	SY6378			SY6379			SY6380			SY6381			SY6382			SY6403			SY6404		
Date of Collection	06/03/93			06/03/93			06/03/93			06/03/93			06/03/93			06/10/93			06/10/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	55.6	J	B	396	J	B	1230	J	B	780	J	B	39.5	J	B	798	J	B	112		
Elemental Mercury	54.6	J	BE	387	J	B	1230	J	BE	777	J	B	38.8	J	BE	794	J	B	111		E
Mercuric Sulfide	0.016 L	J	AC	3.3 L	J	AC	15.8			13.3			0.016 L	J	AC	13.8			0.76 L	J	AC
Methyl Mercury	0.064 U			0.065 U			0.063 U			0.062 U			0.063 U			0.066 U			0.063 U		
Inorganic Mercury	<1.0			<5.2			0.0			0.0			<0.64			0.0			<0.7		
Percent Solids	94.0 %			92.9 %			95.6 %			97.0 %			96.0 %			91.0 %			95.0 %		

Station Location	MS-017-SL-03-A			MS-018-SL-01-A			TP-003-SL-01-A			Lab Blank			CRDL*								
Sample I.D.	SY6405			SY6406			SY6407														
Date of Collection	06/10/93			06/10/93			06/10/93														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	1860	J	B	655	J	B	646	J	B	8.8 U			8.8								
Elemental Mercury	1840	J	B	646	J	B	643	J	BE	1.8 U			1.8 **								
Mercuric Sulfide	22.4			11.2			10.9			2.8 U			2.8								
Methyl Mercury	0.067 U			0.067 U			0.065 U			0.060 U			0.060								
Inorganic Mercury	0.0			0.0			0.0			N/A			N/A								
Percent Solids	90.0 %			89.0 %			93.0 %			---			---								

* CRDLs for Largest Volumes of Extracts Analyzed. (Total Mercury: 0.20 mL; Elemental Mercury: 1.0 mL; Mercuric Sulfide: 0.025 mL; Methyl Mercury: 0.002 mL). Will Vary for each Sample.

** This is the CRDL for the analyses for total mercury after heating to drive off elemental mercury, which is then subtracted from total mercury to give elemental mercury.

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable: Results are derived by subtraction of other results.

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #02 LABORATORY Oak Ridge Research Institute

SDG NO. SY6378 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 27, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 10 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			O	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			M	
7. MATRIX SPIKE ANALYSIS			O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			M	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #02 LABORATORY Oak Ridge Research Institute

SDG NO. SY6378 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 27, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 10 SOIL _____ OTHER

TPO ATTENTION: For this SAS contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork was not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control standard (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.
- Although the result for the Column B confirmation analyses of matrix spike duplicate sample SY6378 on July 15, 1993 was reported on the QC summary forms, the raw data chromatograms for these analyses could not be located by the laboratory.

The following were requested in the SAS CRF, but were not specified in the SOP:

- Calibration standards were analyzed in order of increasing concentration, but were requested to be analyzed in decreasing order. In the future the laboratory will analyze in decreasing order.
- The laboratory did not include QC samples in its count of the number of samples between CCV and continuing calibration blank (CCB) analysis. Thus 13 to 14 samples (ten environmental samples) were analyzed between CCVs and CCBs. A CCV and CCB were not analyzed at the end of the analytical runs. The laboratory will correct this in the future.
- LCS results were not provided for the various analyses. Only one pair of LCS results were reported, which were for total mercury.
- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 1-2X the QC sample concentration to provide the most relevant data. Thus, the matrix spike concentrations for mercuric sulfide and methyl mercury were near the lower end of the calibration range. The matrix spike concentrations for total and elemental mercury were in the mid-range of the calibration curve. The laboratory will spike at the mid-point concentration in the future.
- Form X (instrument detection limits) and Form XIV (analysis run logs), or their equivalents, were not provided. Note that no IDL studies have been performed.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #02 LABORATORY Oak Ridge Research Institute

SDG NO. SY6378 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE August 27, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 10 SOIL _____ OTHER

TPO ATTENTION: (Continued)

The laboratory reviewed its data package before validation took place, and submitted revised sample and QC results by FAX, along with various raw data worksheets that were not included in the original data package, such as percent solids worksheets. The results for one sample were corrected due to a percent solids error, the matrix spike (MS) and matrix spike duplicate (MSD) percent recovery results for two analytes in one QC sample were misprinted, and one MS and one duplicate result were also misprinted, and required resubmission.

Note that the laboratory has procured the EPA Contract Laboratory Program Inorganic Statement of Work and will be able to follow CLP format with respect to analytical procedures, documentation, and presentation of results in the future.

In Reference to Case No(s).:

SAS 7762Y-01 Memo #02

TRL #1

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: August 18, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY6378 through SY6382 and SY6403 through SY6407

Summary of Questions/Issues Discussed:

1. The laboratory has reviewed and revised the data package for this SDG, and is resubmitting corrected QC and sample results, as well as additional raw data.

Summary of Resolution:

1. ICF/ESAT received the resubmission by FAX on 8/18/93.

Signature

August 18, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: August 26, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY6378 through SY6382 and SY6403 through SY6407

Summary of Questions/Issues Discussed:

1. I calculate a percent solids result of 92.9% (not 94%) for sample SY6379. Please change the result on the sample weight worksheet and recalculate all of the results for this sample.
2. On the QC result form, the matrix spike (MS) and matrix spike duplicate (MSD) percent recoveries are incorrect for mercuric sulfide and methyl mercury in sample SY6404. The results should be 111.6% (not 116%) and 111.9% (not 119%), respectively. Please correct the QC result form.
3. I calculate a result of 206.99 mg/kg for the MS result for sample SY6404, not 208.04.
4. The MS and MSD results for methyl mercury are reported on the QC result form in ppb, whereas the form indicates results reported in ppm. Please change the decimal placement to reflect ppm.
5. The duplicate sample result for sample SY6378 appears correctly (43.2332 mg/kg) on the 8/18/93 FAX version of the QC result form, but incorrectly on the spreadsheet with all of the results. Please correct.
6. In the handwritten worksheet for the total and elemental mercury analyses (page 28 of the data package), the final group of samples for the QC of sample SY6378 should be labelled "elemental," not "total." Please correct and send me a copy.
7. The chromatograms for the analyses of the MS and MSD for sample SY6378 at the end of the methyl mercury analyses on 7/15/93, Column B (RTx35), are not included in the data package. Please send me a copy of this raw data.
8. No chain of custody forms are included in this data package. Please send me copies of the laboratory's copies of these forms.
9. What was the date of the percent solids analyses?

In Reference to Case No(s).:

SAS 7762Y-01 Memo #02

Summary of Resolution:

1. In the validator's copy of the raw data for percent solids, which is from a FAX transmission, the "pan weight with dry soil" appeared to be 7.113 g, whereas the actual value is 7.173 g. Therefore, the laboratory's original result of 94.0% is correct.

2-5. The laboratory is correcting and resubmitting these items.

6. This correction has already been made in the laboratory's copy of this page. The laboratory will send a copy of the corrected page.

7,8. The laboratory will send copies of these items, with the exception of the chromatograms for the analysis of SY6378-MSD, which the laboratory is unable to locate.

9. July 6, 1993.

ICF/ESAT received copies of these corrections and additions to the data package on 8/27/93.

Signature

August 27, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section (H-6-3)

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (P-3-2)

FROM: Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 14, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7762Y-01 Memo #03
SDG NO.:	SY5869
LABORATORY:	Oak Ridge Research Institute (ORRI)
ANALYSIS:	SAS Mercury Speciation
SAMPLE NO.:	15 Soil Samples (See Case Summary)
COLLECTION DATE:	June 17 and 23, and July 1, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061.

Attachment

cc: Tom B. Bennett, Jr. , TPO USEPA Region IV
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: SAS 7762Y-01 Memo #03
Site: Carson River
Laboratory: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF
Date: September 14, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY5869 through SY5873, SY6410, SY6413, SY6414, SY6419, SY6421 and SY6423 through SY6427

COLLECTION DATE: June 17 and 23, and July 1, 1993
SAMPLE RECEIPT DATE: June 18 and 25, and July 2, 1993

CONCENTRATION & MATRIX: 15 Low Concentration Soil Samples

FIELD QC:
Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): SY5869 and SY5873

LABORATORY QC:
Matrix Spike: SY5871, SY6413, and SY6426
Duplicates: SY5871, SY6413, and SY6426
Matrix Spike Duplicates: SY5871, SY6413, and SY6426

ANALYSIS: SAS Mercury Speciation

Analyte	Sample Preparation and Digestion Date	Analysis Date
Total Mercury	July 21, 1993	July 28 and August 3, 1993
Elemental Mercury	July 21-27, 1993	July 28 and August 3, 1993
Mercuric Sulfide	July 21-22, 1993	July 26 and 27, 1993
Methyl Mercury	July 23, 1993	Column A: July 26, 1993 Column B: August 4, 1993
Percent Solids	Not Applicable	July 19, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes in all of the samples.

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: For this SAS contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork was not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 0.5-2X the QC sample concentration to provide the most relevant data. The laboratory will spike at the mid-point concentration in the future.
- LCS results were only provided for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, or methyl mercury.
- Form X (instrument detection limits) was provided, but only gives information on the CRDL. Note that no IDL studies have been performed.

A variety of sample and QC sample results were incorrectly calculated. As a result, the sample and QC results forms required resubmission.

SAMPLING ISSUES: None

OTHER: None

ADDITIONAL COMMENTS:

The contract required detection limits (CRDLs) specified in the laboratory SOP (which was used for the SAS contract) are 7 ppb for total mercury, elemental mercury, and mercuric sulfide, and 30 ppb for methyl mercury. These detection limits were effective for the analysis of the final extracts. The CRDLs in mg/kg for the original soil samples vary depending upon the percent solids result for the sample, the sample mass, and the volume of extract used. The CRDLs reported in Table 1A are for the largest volumes of extract used, and are thus the lowest CRDLs applicable to each analysis. Thus, the CRDLs set forth in the SAS CRF were not effective for these soil samples.

Results which are less than the CRDL have been reported by the laboratory for total mercury and mercuric sulfide. The validator has added the "L" qualifier to these results. The results for methyl mercury, which the laboratory reported as "<CRDL," are reported in Table 1A as the calculated value in mg/kg of the CRDL for the soil sample corrected for percent solids, the sample mass, and the volume of extract used, with the "U" qualifier.

In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150 °C to drive off the elemental mercury is subtracted from the result for total mercury without heating. In the calculations for elemental mercury, the laboratory quantitated and subtracted results for the reanalysis of the total mercury after heating even when these results were less than the CRDL.

The results for inorganic mercury are calculated by subtracting the results for elemental mercury, mercuric sulfide, and methyl mercury from the results for total mercury. For these calculations, methyl mercury results below the CRDL are considered to be zero.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for mercury speciation, the SOP submitted by the laboratory for this SAS contract, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	F
2. Sample Holding Times	No	B
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	F
7. Spiked Sample Analysis	No	C
8. Laboratory Duplicate Sample Analysis	No	D
9. Field Duplicate Sample Analysis	No	E
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		

(Continued Next Page)

II. Validation Summary (Continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A,G
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the laboratory detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the laboratory detection limit but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Note that no detection limit studies have been performed by the laboratory, and that the laboratory quantitated and reported results less than the CRDL for total mercury and mercuric sulfide, and used results less than the CRDL in the calculations for elemental mercury and inorganic mercury. Results less than the CRDL were not reported for methyl mercury.

B. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- All of the analytes in all of the samples

These soil analyses exceeded the 12-day (from sample collection) technical holding time stated in the SAS CRF by 13 to 36 days, and exceeded the 10-day (from laboratory receipt) contractual holding time stated in the SAS CRF by 14 to 37 days.

Note, in particular, that the analyses for methyl mercury, which were all non-detected results, were performed 13 to 36 days after the expiration of the technical holding time.

Sample results may be biased low and false negatives may exist.

C. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Total mercury in all of the samples except samples SY5871 and SY6426

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike (MS) recovery result for total mercury in QC sample SY6413 did not meet the 75-125% criteria for accuracy. Note that the matrix spike duplicate (MSD) recovery of 121.2% for total mercury in this sample was within the 75-125% criteria for accuracy. The percent recoveries and possible percent bias for total mercury in sample SY6413 are presented below and are based on an ideal recovery of 100%.

Analyte	SY6413-MS % Recovery	SY6413-MSD % Recovery	Average % Bias
Total mercury	149.8	121.2	+35.5

Note that the MS and MSD recovery results for total mercury in QC samples SY5871 (117% and 116%) and SY6426 (110% and 113%) were within the 75-125% criteria for accuracy, and the total mercury results for samples SY5871 and SY6426 have therefore not been qualified.

Results above the CRDL are considered quantitatively uncertain. The results reported for total mercury in all of the samples except samples SY5871 and SY6426 may be biased high.

D. The following results are estimated because of laboratory duplicate results outside method QC limits. The results are flagged "J" in Table 1A.

- Total and elemental mercury in all of the samples except samples SY6413 and SY6426

Duplicate analyses demonstrate the analytical precision obtained for each sample matrix. Laboratory duplicate results for QC sample SY5871 did not meet the ±20 relative percent difference (RPD) criteria required in the SAS CRF for precision as listed below.

Analyte	SY5871 Lab. Dup. RPD
Total mercury	20.6
Elemental mercury	21.2

The results reported for total and elemental mercury in the samples listed above are considered quantitatively uncertain. In addition, the duplicate results for the matrix spike/matrix spike duplicate analysis of QC sample SY6413 (21.1 RPD) also did not meet the ±20 RPD SAS criteria for precision. The imprecision between duplicate results may be due to lack of sample homogeneity, poor laboratory technique, or method defects.

Results for the laboratory duplicate analyses of QC samples SY6413 and SY6426 did meet the ±20 RPD criteria required in the SAS CRF, therefore the results for total and elemental mercury in these samples have not been qualified.

E. A 74.2 relative percent difference (RPD) was obtained for total mercury, a 74.1 RPD was obtained for elemental mercury, and a 58.3 RPD was obtained for mercuric sulfide in the analysis of field duplicate pair samples SY5869 and SY5873. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±20 RPD or ±CRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to lack of sample homogeneity, the sample matrix, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

F. Laboratory Control Sample (LCS) results were not provided for the various analyses. Only one pair of LCS results were reported, which are for total mercury. These results were within the 75-125% criteria stated in the SAS CRF.

G. In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150 °C is subtracted from the result for total mercury (without heating). The results in samples SY5870 through SY5873 and SY6427 for total mercury after heating were less than the CRDLs for these samples (see Comment A).

ANALYTIC. ESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #03
Site: Carson River
Lab.: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 14, 1993

Analysis Type: Low Concentraton Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg (Dry Weight Basis)

Station Location	MS-019-SL-04-A			TP-014-SL-13-A			TP-015-SL-11-A			TP-016-SL-11-A			MS-019-SD-04-A			TP-004-SL-07-A			TP-005-SL-01-A		
Sample I.D.	SY5869 D1			SY5870			SY5871			SY5872			SY5873 D1			SY6410			SY6413		
Date of Collection	07/01/93			07/01/93			07/01/93			07/01/93			07/01/93			06/17/93			06/17/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	624	J	BCDE	4.9	J	BCDG	41.2	J	BDG	12.0	J	BCDG	1360	J	BCDEG	761	J	BCD	1480	J	BC
Elemental Mercury	620	J	BE	4.2	J	B	39.0	J	B	10.8	J	B	1350	J	BE	759	J	B	1470	J	B
Mercuric Sulfide	14.1	J	BE	2.9 U	J	B	12.5	J	B	3.6	J	B	25.7	J	BE	21.4	J	B	39.4	J	B
Methyl Mercury	0.064 U	J	B	0.062 U	J	B	0.061 U	J	B	0.061 U	J	B	0.063 U	J	B	0.063 U	J	B	0.074 U	J	B
Inorganic Mercury	0.0	J	B	<0.7	J	B	0.0	J	B	0.0	J	B	0.0	J	B	0.0	J	B	0.0	J	B
Percent Solids	93.9 %			96.6 %			98.4 %			98.5 %			94.6 %			94.9 %			80.8 %		

Station Location	TP-005-SL-10-A			TP-007-SL-01-A			TP-007-SL-04-A			TP-008-SL-08-A			TP-011-SL-02-A			TP-011-SL-05-A			TP-011-SL-09-A		
Sample I.D.	SY6414			SY6419			SY6421			SY6423			SY6424			SY6425			SY6426		
Date of Collection	06/17/93			06/17/93			06/17/93			06/23/93			06/23/93			06/23/93			06/23/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	1200	J	BCD	1650	J	BCD	1400	J	BCD	264	J	BCD	991	J	BCD	1060	J	BCD	1370	J	B
Elemental Mercury	1190	J	B	1630	J	B	1380	J	B	261	J	B	987	J	B	999	J	B	1360	J	B
Mercuric Sulfide	29.5	J	B	7.1	J	B	39.1	J	B	8.4	J	B	29.8	J	B	25.7	J	B	29.2	J	B
Methyl Mercury	0.072 U	J	B	0.064 U	J	B	0.065 U	J	B	0.063 U	J	B	0.066 U	J	B	0.065 U	J	B	0.065 U	J	B
Inorganic Mercury	0.0	J	B	<19.2	J	B	0.0	J	B	0.0	J	B	0.0	J	B	<35.9	J	B	0.0	J	B
Percent Solids	83.3 %			93.3 %			92.1 %			95.0 %			90.4 %			91.8 %			93.0 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable: Results are derived by subtraction of other results.
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #03
Site: Carson River
Lab.: Oak Ridge Research Institute (ORRI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 14, 1993

Analysis Type: Low Concentraton Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg (Dry Weight Basis)

Station Location	TP-012-SL-03-A			Lab Blank			CRDL*														
Sample I.D.	SY6427																				
Date of Collection	06/23/93																				
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	10.8	J	BCDO	3.5 U			3.5														
Elemental Mercury	9.7	J	B	0.58 U			0.58 **														
Mercuric Sulfide	2.1 L	J	AB	2.8 U			2.8														
Methyl Mercury	0.062 U	J	B	0.060 U			0.060														
Inorganic Mercury	0.0	J	B	N/A			N/A														
Percent Solids	96.5 %			—			—														

Station Location																					
Sample I.D.																					
Date of Collection																					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury																					
Elemental Mercury																					
Mercuric Sulfide																					
Methyl Mercury																					
Inorganic Mercury																					

* CRDLs for Largest Volumes of Extracts Analyzed. (Total Mercury: 0.50 mL; Elemental Mercury: 3.0 mL; Mercuric Sulfide: 0.025 mL; Methyl Mercury: 0.002 mL). Will Vary for each Sample.

** This is the CRDL for the analyses for total mercury after heating to drive off elemental mercury, which is then subtracted from total mercury to give elemental mercury.

Val-Validity Refer to Data Qualifiers in Table 1B

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

N/A-Not Applicable: Results are derived by subtraction of other results.

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #03 LABORATORY ORRI

SDG NO. SY5869 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE September 14, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 15 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			M	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			M	
7. MATRIX SPIKE ANALYSIS			M	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #03 LABORATORY ORRI

SDG NO. SY5869 SITE NAME Carson River

SOW NO. _____ REVIEW COMPLETION DATE September 14, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER 15 SOIL _____ OTHER

TPO ACTION: The technical and contractual holding times stated in the SAS CRF were exceeded for all of the analytes in all of the samples.

TPO ATTENTION: For this SAS contract the laboratory submitted an SOP which outlined methods and quality control (QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements of the SAS Client Request Form (CRF). The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork was not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

The following were requested in the SAS CRF, but were not specified in the SOP:

- According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF requested that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory calculated the matrix spike concentrations to be approximately 0.5-2X the QC sample concentration to provide the most relevant data. The laboratory will spike at the mid-point concentration in the future.
- LCS results were only provided for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, or methyl mercury.
- Form X (instrument detection limits) was provided, but only gives information on the CRDL. Note that no IDL studies have been performed.

A variety of sample and QC sample results were incorrectly calculated. As a result, the sample and QC results forms required resubmission.

In Reference to Case No(s).:

SAS 7762Y-01 Memo #03

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 1, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5869 through SY5873, SY6410, SY6413, SY6414, SY 6419, SY6421, and SY6423 through SY6427

Summary of Questions/Issues Discussed:

1. For elemental mercury (Hg^o) duplicate sample results, do you subtract the result for total mercury (Hg_T) after 5 days of heating from the sample result or from the duplicate sample result?
2. I calculate different results (all in mg/kg) from those reported for the following:
   A) SY5869; Mercuric sulfide (HgS) 14.0972 Not 14.972
   B) SY5871; Hg_T 42.1706 Not 41.1706
      Hg^o 39.0365 Not 40.6036
      HgS 12.4899 Not 24.4899
      SY5871 Duplicate (D); 48.3060 (if subtract from SY5871D)
      or 38.6042 (if subtract from SY5871)
      SY5871 Matrix Spike (MS); HgS 55.9460 Not 48.1572
      SY5871 Matrix Spike Duplicate (MSD); Hgs 48.1333 Not 56.0729
      (MS and MSD were switched: wrong sample weights used)
   C) SY6413D; Hg_T 1357.3818 Not 1367.4614 (Divided by weight of SY6413 not SY6413D)
      Hg^o 1347.4595 (if subtract from SY6413D)
      or 1468.4074 (if subtract from SY6413)
      SY6413MS; Methyl mercury (Hg_{me}) 73.1156 Not 73.0424 (Did not divide by sample weight)
      SY6413MSD; Hg_{me} 69.1690 Not 68.6156 (Did not divide by sample weight)
   D) SY6426D; Hg^o no change (if subtract from SY6413D)
      or 1358.9932 (if subtract from SY6413)
      HgS 30.3468 Not 30.4751 (Divided by weight of SY6426 not SY6426D)
      SY6426MS; Hg^o 1101.5651 Not 1364.9350
      HgS 122.3988 if 2X dilution; or 61.1994 if 1X dilution (hand written worksheet shows 2X dilution)
      Hg_{me} 77.7804 Not 77.4693 (Did not divide by sample weight)

SY6426MSD; Hg 1278.7484 Not 1365.8793
HgS 109.1668 if 2X dilution; or 54.5834 if 1X dilution
(hand written worksheet shows 2X dilution)
Hg 73.7058 Not 73.0424 (Did not divide by sample weight)

3. I calculate different percent solids results than those reported for the following (all in percents):
   A) SY5871MSD; 95.1 Not 100
   B) SY6410; 94.9 Not 94.6
   C) SY6413MS; 100 Not 99.5
      SY6413MSD; 100 Not 99.0
   D) SY6426MS; 100 Not 99.3
      SY6426MSD; 95.1 Not 99.0
4. Please check the calculations listed above, and correct all sample and QC sample results on all sample and QC sample reporting forms, as well as the worksheets, where appropriate. If you disagree with any of my calculations, or need to explain your results, please call. Please FAX me a copy of all changes.
5. No chain of custody forms (traffic reports) were included in the data package. Please send.

Summary of Resolution:

1. Subtract from the duplicate sample result.
2,4,5. ICF/ESAT received copies of the resubmission of the corrected sample and QC results by FAX on 9/6/93.
3. This correction was not received at this time. See TRL #2.

Signature

September 9, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 7762Y-01 Memo #03

TRL #2

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: September 7, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Dr. Nathaniel Revis

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY5869 through SY5873, SY6410, SY6413, SY6414, SY 6419, SY6421, and SY6423 through SY6427

Summary of Questions/Issues Discussed:

1. In the corrections received 9/6/93, the corrections for the percent solids for sample SY6410 were not made. The correct percent solids for this sample is 94.9 Not 94.6. Please correct the results for this sample and the corrected sample weight worksheet.
2. Due to corrections for QC sample results, the following relative percent differences (RPDs) on the duplicate sample result form and percent recoveries (%Rs) on the matrix spike/matrix spike duplicate (MS/MSD) result form, which were not corrected for the new values, need correction:
   A) Duplicates: SY5871-D; Hg_T 20.6 RPD Not 19.6 RPD
   Hg^+ 21.2 RPD Not 21.9 RPD
   B) MS/MSD: SY5871; Hg_T 117 and 116 %R, Not 117 and 106 %R
   SY6413; Hg_T 150 and 121 %R, Not 152 and 125 %R
   HgS 65 and 83 %R, Not 67 and 83 %R
   SY6426; Hg_T 110 and 113 %R, Not 117 and 104 %R

   Please correct the duplicate sample result form and the matrix spike/matrix spike duplicate result form, and FAX me a copy of all changes.

Summary of Resolution:

1,2. ICF/ESAT received copies of the resubmission of the corrected sample and QC results by FAX on 9/7/93.

_____ Signature

September 9, 1993 Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 4, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7762Y-01 Memo #05
SDG NO.:	SY7149
LABORATORY:	Oak Ridge Research Institute (ORRI)
ANALYSIS:	SAS Mercury Speciation
SAMPLE NO.:	5 Soil Samples (SY7149 through SY7153)
COLLECTION DATE:	August 19, 1993
REVIEWER:	Dina D. David, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Tom B. Bennett, Jr., TPO USEPA Region IV
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-9267/7762Y1M5.RPT

Data Validation Report

Case No.: SAS 7762Y-01 Memo #05
Site: Carson River
Laboratory: Oak Ridge Research Institute (ORRI)
Reviewer: Dina D. David, ESAT/ICF
Date: November 4, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY7149 through SY7153

COLLECTION DATE: August 19, 1993
SAMPLE RECEIPT DATE: August 20, 1993

CONCENTRATION & MATRIX: 5 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: SY7150
Duplicates: SY7150
ICP Serial Dilution: Not Applicable

ANALYSIS: SAS Mercury Speciation

Analyte	Sample Preparation and Digestion Date	Analysis Date
Total Mercury	September 6, 1993	September 8, 1993
Elemental Mercury	September 1-6, 1993	September 8, 1993
Mercuric Sulfide	September 6, 1993	September 10, 1993
Methyl Mercury	August 31, 1993	September 1, 1993
Percent Solids	Not Applicable	September 24, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: The Special Analytical Services (SAS) Client Request Form (CRF) specifies contractual and technical holding times of 10 and 12 days, respectively, for all mercury species. The SAS CRF also specifies that samples must be analyzed on the same day that sample digestions or extractions are performed. The laboratory exceeded the contractual and technical holding times specified in the SAS CRF for all of the analytes in all of the samples. In addition, none of the samples were analyzed on the same day that they were digested or extracted by the laboratory.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

METHOD NON-COMPLIANCE: For this SAS contract, the laboratory submitted a Standard Operating Procedure (SOP) which outlined methods and quality assurance/quality control (QA/QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements stated in the SAS CRF. The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork were not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF specifies that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory used matrix spike concentrations at the CRDL for methyl mercury and above the CRDL but below mid-point of the calibration curve for the rest of the analytes in an effort to provide relevant data.

The following were requested in the SAS CRF, but were not specified in the SOP:

- The SAS CRF specifies the analysis of an LCS for total mercury, elemental mercury, and mercuric sulfide. LCS results were only reported for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, and methyl mercury from commercial or government sources.

- Instrument Detection Limits (IDLs) for total mercury, elemental mercury, mercuric sulfide, and methyl mercury were provided, but these IDLs only give information on the contract required detection limit (CRDL) specified for each analyte. Note that no IDL studies have been performed. However, the laboratory used a standard at the CRDL in the calibration of the instrument.

Initially, only the results for the ICV standards and the first CCV standards for each analysis were reported by the laboratory on the modified CLP Form IIA. Upon request by the validator, the laboratory filled in the rest of the CCV results on the modified CLP Form IIA. Note that all of the CCV results were compliant.

It should be noted that the volume of sample (10 μL) used for mercuric sulfide in the analyses of the preparation blank and initial and continuing calibration blanks (ICB/CCB) was less than the volume (25 μL) used for all of the samples. Thus, it is possible that the absorbance readings for the blanks would have been greater if the same volume was used.

TPO ATTENTION: (Continued)

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

The CRDLs specified in the laboratory SOP (which was used for the SAS contract) are 7 ppb for total mercury, elemental mercury, and mercuric sulfide, and 30 ppb for methyl mercury. These detection limits were applicable for the analysis of the final extracts. The CRDLs in mg/Kg for the original soil samples vary depending upon the percent solids result for each sample, the sample mass, and the volume of extract used. The CRDLs reported in Table 1A are for the largest volumes of extract used, and are therefore the lowest CRDLs applicable to each analysis. Thus, the CRDLs set forth in the SAS CRF were not applicable for these soil samples.

The results for methyl mercury, which the laboratory reported as "<CRDL," are reported in Table 1A as the calculated value in mg/Kg of the CRDL for the soil sample corrected for percent solids, the sample mass, and the volume of extract used, with the "U" qualifier.

In the analysis for elemental mercury, the result for total mercury after heating of a soil sample for 5 days at 150°C to drive off the elemental mercury is subtracted from the result for total mercury without heating. In the calculations for elemental mercury, the laboratory quantitated and subtracted results for the reanalysis of the total mercury after heating even when these results were less than the CRDL.

The results for inorganic mercury are calculated by subtracting the results for elemental mercury, mercuric sulfide, and methyl mercury from the results for total mercury. Therefore, these calculated results are the largest values possible for inorganic mercury. For these calculations, results for mercuric sulfide and methyl mercury which were below the CRDL are considered to be zero.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for mercury speciation, the SOP submitted by the laboratory for this SAS contract, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	No	D
2. Sample Preservation and Holding Times	No	A
3. Calibration	No	C
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	D
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	B
13. Sample Result Verification	Yes	

N/A - Not Applicable

III. Validity and Comments

A. The following results are estimated because the technical holding times were exceeded. The results are flagged "J" in Table 1A.

- All of the analytes in all of the samples

The soil analyses for samples SY7149 through SY7153 exceeded the 12-day (from sample collection) technical holding time stated in the SAS CRF by 3 to 12 days, and exceeded the 10-day (from laboratory sample receipt) contractual holding time stated in the SAS CRF by 1 to 11 days.

Sample results may be biased low and false negatives may exist.

B. The following result is estimated and is flagged "J" in Table 1A.

- Elemental mercury in sample SY7150

In the analysis for elemental mercury, the result for total mercury after heating a sample for 5 days at 150°C is subtracted from the

result for total mercury (without heating). The result in sample SY7150 for total mercury after heating was less than the CRDL for this sample.

Results greater than zero but below the CRDL are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in analytical precision near the limit of detection.

Note that no detection limit studies have been performed by the laboratory.

C. The following results are estimated and are flagged "J" because of accuracy problems.

- Total mercury in sample SY7152
- Elemental mercury in sample SY7150

A recovery result of 46.6% was obtained for total mercury in the analysis of the CRDL standard. While there are no criteria established for the CRDL standard recovery, the low recovery result may indicate possible low bias for total mercury in sample SY7152, which was detected near the CRDL. In addition, the low recovery result may indicate possible low bias in the result for mercury after heating in sample SY7150. This would result in a slightly high bias for elemental mercury in sample SY7150.

Note that the result reported for total mercury in the laboratory control sample (LCS) may also be biased low.

D. The purpose of the LCS is to serve as a monitor of the overall performance of all steps in the analysis, including sample preparation. An LCS was analyzed and reported for total mercury only. The result was within the 75-125% criteria specified in the SAS CRF.

The laboratory noted that certified reference samples suitable for LCSs for elemental mercury, mercuric sulfide, and methyl mercury were not available from commercial or government sources.

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7762Y-01 Memo #05
Site: Carson River
Lab.: Oak Ridge Research Institute (ORRI)
Reviewer: Dina D. David, ESAT/ICF Technology, Inc.
Date: November 4, 1993

Analysis Type: Low Concentraton Soil Samples for SAS Mercury Speciation

Concentration in mg/Kg (Dry Weight Basis)

Station Location	MS-001-SL-89-A			MS-004-SL-20-A			MS-004-SL-33-A			MS-032-SL-04-A			MS-032-SL-04-A			Lab Blank			CRDL*		
Sample I.D.	SY7149			SY7150			SY7151			SY7152			SY7153								
Date of Collection	08/19/93			08/19/93			08/19/93			08/19/93			08/19/93								
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Total Mercury	22.1	J	A	1.3	J	A	58.3	J	A	1.7	J	AC	17.2	J	A	1.8 U			0.88		
Elemental Mercury	18.9	J	A	1.1	J	ABC	49.2	J	A	1.7	J	A	13.0	J	A	1.8 U			0.88 **		
Mercuric Sulfide	6.2	J	A	2.9 U	J	A	8.1	J	A	2.8 U	J	A	4.5	J	A	7.0 U			2.8		
Methyl Mercury	0.061 U	J	A	0.061 U	J	A	0.061 U	J	A	0.061 U	J	A	0.062 U	J	A	0.060 U			0.060		
Inorganic Mercury	0.0	J	A	<0.2	J	A	<1.0	J	A	0.0	J	A	0.0	J	A	N/A			N/A		
Percent Solids	98.9 %			97.7 %			97.9 %			98.4 %			97.5 %			N/A			N/A		

Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com

* CRDLs for Largest Volumes of Extracts Analyzed. (Total Mercury: 2.0 mL; Elemental Mercury: 2.0 mL; Mercuric Sulfide: 0.025 mL; Methyl Mercury: 0.002 mL). Will Vary for each Sample.

** This is the CRDL for the analyses for total mercury after heating to drive off elemental mercury, which is then subtracted from total mercury to give elemental mercury.

Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

CRDL-Contract Required Detection Limit

N/A-Not Applicable: For inorganic mercury: Results are derived by subtraction of other results.

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #05 LABORATORY ORRI

SDG NO. SY7149 SITE NAME Carson River

SOW NO. Not Applicable REVIEW COMPLETION DATE November 4, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 5 SOIL _____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES			M	
2. CALIBRATION			X*	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			O	
7. MATRIX SPIKE ANALYSIS			O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			M	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

Hg - Total Mercury, Elemental Mercury, Mercuric Sulfide, and Methyl Mercury.

* - Applicable for total mercury and elemental mercury only.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #05 LABORATORY ORRI

SDG NO. SY7149 SITE NAME Carson River

SOW NO. Not Applicable REVIEW COMPLETION DATE November 4, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 5 SOIL _____ OTHER

TPO ACTION: The Special Analytical Services (SAS) Client Request Form (CRF) specifies contractual and technical holding times of 10 and 12 days, respectively, for all mercury species. The SAS CRF also specifies that samples must be analyzed on the same day that sample digestions or extractions are performed. The laboratory exceeded the contractual and technical holding times specified in the SAS CRF for all of the analytes in all of the samples. In addition, none of the samples were analyzed on the same day that they were digested or extracted by the laboratory.

TPO ATTENTION: For this SAS contract, the laboratory submitted a Standard Operating Procedure (SOP) which outlined methods and quality assurance/quality control (QA/QC) procedures. The paperwork requirements were not specific in many aspects, and the data package differed in some respects from the requirements stated in the SAS CRF. The laboratory provided the validator much of the raw data documentation normally provided with SAS data packages.

The following raw data paperwork were not provided in this data package:

- Traceability forms or raw data worksheets for matrix spike, laboratory control sample (LCS), initial calibration verification (ICV) and continuing calibration verification (CCV) standards, and calibration standard preparation.

According to the SOP, the matrix spike sample concentrations are calculated to be approximately 2X the lower limit of detection of the analytical method in use. The SAS CRF specifies that the matrix spike sample concentrations be at the mid-point of the calibration curve. The laboratory used matrix spike concentrations at the CRDL for methyl mercury and above the CRDL but below mid-point of the calibration curve for the rest of the analytes in an effort to provide relevant data.

The following were requested in the SAS CRF, but were not specified in the SOP:

- The SAS CRF specifies the analysis of an LCS for total mercury, elemental mercury, and mercuric sulfide. LCS results were only reported for total mercury. According to the laboratory, certified QC reference standards are not available for elemental mercury, mercuric sulfide, and methyl mercury from commercial or government sources.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7762Y-01 Memo #05 LABORATORY ORRI

SDG NO. SY7149 SITE NAME Carson River

SOW NO. Not Applicable REVIEW COMPLETION DATE November 4, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Dina D. David

NO. OF SAMPLES _____ WATER 5 SOIL _____ OTHER

TPO ATTENTION: (Continued)

The following were requested in the SAS CRF, but were not specified in the SOP:

- Instrument Detection Limits (IDLs) for total mercury, elemental mercury, mercuric sulfide, and methyl mercury were provided, but these IDLs only give information on the contract required detection limit (CRDL) specified for each analyte. Note that no IDL studies have been performed. However, the laboratory used a standard at the CRDL in the calibration of the instrument.

Initially, only the results for the ICV standards and the first CCV standards for each analysis were reported by the laboratory on the modified CLP Form IIA. Upon request by the validator, the laboratory filled in the rest of the CCV results on the modified CLP Form IIA. Note that all of the CCV results were compliant.

It should be noted that the volume of sample (10 μL) used for mercuric sulfide in the analyses of the preparation blank and initial and continuing calibration blanks (ICB/CCB) was less than the volume (25 μL) used for all of the samples. Thus, it is possible that the absorbance readings for the blanks would have been greater if the same volume was used.

AREAS OF CONCERN: Recovery results of 46.6% for total mercury and 53.5% for mercuric sulfide were obtained in the analysis of the CRDL standard.

In Reference to Case No(s).:

7762Y-01 Memo #05

REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log #1

Date of Call: October 27, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne (615)481-5000

Region: IX

Regional Contact: Dina D. David, ESAT/ICF Technology

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
All samples in SDG No. SY7149

Summary of Questions/Issues Discussed:

1. Corrected weight for sample SY7150MSD should be 0.9843g.
2. The laboratory reported a "<CRDL" for elemental mercury in sample SY7152 on page 1. According to the raw data, the result for elemental mercury should be 1.728 mg/Kg. Consequently, the result for inorganic mercury should be 0.0 mg/Kg. Please provide a corrected page 1.
3. MSD for total mercury: Recovery result should be 80% instead of 83%.
4. MSD for mercuric sulfide: Result should be 52.977 mg/Kg instead of 52.982 mg/Kg.
5. MSD for methyl mercury using capillary column: Result should be 53.295 mg/Kg instead of 52.091 mg/Kg. Recovery result should be 89% instead of 87%. Please correct pages 1 and 6.
6. Please calculate % Relative Standard Deviation (%RSD) and %Difference (%D) for the calibration factors in the instrument calibration and in the continuing calibration verification standards for methyl mercury (using a capillary column only).
7. Please fill in the blanks on page 6 for the CCV results for each analysis. CCV2 result for mercuric sulfide should be 69.8379 mg/Kg based on a mean absorbance of 0.0915. Recovery result for CCV2 should be 93% not 97% as reported.
8. Please correct spike added concentration for methyl mercury on page 6.

In Reference to Case No(s).:

7762Y-01 Memo #05

REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log #1

Date of Call: October 27, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne (615)481-5000

Region: IX

Regional Contact: Dina D. David, ESAT/ICF Technology

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
All samples in SDG No. SY7149

Summary of Resolution:

1-5. Corrected and resubmitted appropriate pages for the above issues through fax.

6. The laboratory calculated and reported %RSD and %D as requested. Results were submitted through fax.

7-9. The laboratory made the appropriate corrections and resubmitted appropriate pages through fax.

Hendina D. David
Signature

October 29, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

7762Y-01 Memo #05

REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log #2

Date of Call: November 4, 1993

Laboratory Name: Oak Ridge Research Institute (ORRI)

Lab Contact: Tanya Osborne (615)481-5000

Region: IX

Regional Contact: Dina D. David, ESAT/ICF Technology

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
All samples in SDG No. SY7149

Summary of Questions/Issues Discussed:

1. Please provide a copy of the original chain of custody sent to the laboratory by the sampler.

Summary of Resolution:

1. The laboratory provided a copy of the chain of custody through fax.

Dina D. David — November 4, 1993

Signature — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

RAS Metals: Soil & Groundwater

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
San Francisco, CA 94105-1535
415/882-3000 Fax 415/882-3199

MEMORANDUM

SEP

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-4

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdm for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 21, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	22540 Memo #10
SDG NO.:	MYP371
LABORATORY:	Wadsworth/Alert Laboratories, Inc. (WADSPA)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	17 Soil Samples and 3 Water Samples (See Case Summary)
COLLECTION DATE:	August 17 and 18, 1994
REVIEWER:	Fernando S. Contreras, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region 3

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-10459/22540M10.RPT

ICF KAISER

Data Validation Report

Case No.: 22540 Memo #10
Site: Carson River
Laboratory: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Fernando S. Contreras, ESAT/ICF Kaiser
Date: September 21, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYP371 through MYP390

COLLECTION DATE: August 17 and 18, 1994
SAMPLE RECEIPT DATE: August 20, 1994

CONCENTRATION & MATRIX: 17 Low Concentration Soil Samples and 3 Low Concentration Groundwater Samples

FIELD QC: Field Blanks (FB): MYP390
Equipment Blanks (EB): None.
Background Samples (BG): None.
Duplicates (D1): MYP370* and MYP376 (*See Additional Comments)
(D2): MYP388 and MYP389

LABORATORY QC: Matrix Spike: MYP385 and MYP388
Duplicates: MYP385 and MYP388
ICP Serial Dilution: MYP385 and MYP388

ANALYSIS: RAS Total Metals

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	August 26, 1994	August 30, 31, and September 1, 1994
Mercury	August 27, 29, and 30, 1994	August 27, 29, and 31, 1994
Percent Solids	Not Applicable	August 26, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: The results for antimony in samples MYP371 and MYP372 were rejected due to a 18.9% matrix spike recovery.

TPO ATTENTION:

SAMPLING ISSUES: None.

TPO ATTENTION: (continued)

OTHER: None.

ADDITIONAL COMMENTS:

*Field duplicate sample MYP370 was collected on August 17, 1994, as were the samples in this sample delivery group (SDG). Data for field duplicate sample MYP370 has been validated and is included in Case No. 22540 Memo #09, SDG No. MYP351.

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within the contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 μg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 μg/L.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	

(continued on the next page)

II. Validation Summary (continued)

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
3. Calibration	Yes	F
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	No	E
10. GFAA QC Analysis	Yes	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	D
12. Sample Quantitation	Yes	C
13. Sample Result Verification	Yes	

N/A - Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Antimony in samples MYP371 and MYP372

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for antimony in QC sample MYP385 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony are presented below and are based on an ideal recovery of 100%.

Analyte	MYP385 % Recovery	MYP385 % Bias
Antimony	18.9	-81.1

The results reported for antimony in samples MYP371 and MYP372 were below the method detection limit (MDL) and are considered unacceptable as less than 30% of the matrix spike was recovered.

The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

According to the Inorganic SOW when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 87.1% was obtained for antimony in QC sample MYP385. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (18.9%) obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in samples MYP373 through MYP387

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony in QC sample MYP385 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for antimony are presented below and are based on an ideal recovery of 100%.

Analyte	MYP385 % Recovery	MYP385 % Bias
Antimony	18.9	-81.1

Results above the MDL are considered quantitatively uncertain. The results reported for antimony in samples MYP373 through MYP387 may be biased low.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 87.1% was obtained for antimony in QC sample MYP385. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (18.9%) obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the instrument detection limit or the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the instrument detection limit (IDL) for waters or the method detection limit (MDL) for soils but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Copper, vanadium and zinc in samples MYP371 through MYP387

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYP385 did not meet the 10% criterion for the analytes shown below.

Analyte	MYP385 % Difference
Copper	10.3
Vanadium	10.5
Zinc	12.3

The results reported for copper, vanadium and zinc in samples MYP371 through MYP387 are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

E. In the analysis of the field duplicate pairs, the following relative percent differences (RPDs) were obtained for the analytes listed below.

Analyte	MYP370* # D1 MYP376 # D1 RPD	MYP388 # D2 MYP389 # D2 RPD
Copper	----	100.0
Iron	----	144.2
Lead	----	151.4
Manganese	----	66.2
Mercury	47.0	-----
Zinc	----	142.4

The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±20 RPD or ±CRDL for waters or ±35 RPD or ±2X CRDL for soils criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, high levels of solids in the sample, sample

nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

Field duplicate sample MYP370 was collected on August 17, 1994, as were the soil samples in this SDG. Data for field duplicate sample MYP370 has been validated and is included in Case No. 22540 Memo #09, SDG No. MYP351.

F. A high initial CRDL standard (CRI) recovery of 136.3% and a low final CRI standard recovery of 67.2% for lead and a low initial CRI recovery of 57.6% for thallium were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high and low percent recoveries indicate analytical uncertainty near the CRDL.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 22540 Memo #10
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Fernando S. Contreras, ESAT/ICF Kaiser
Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA002SL106A			FA002SL107A			FA002SL108A			FA002SL109A			FA002SL110B			FA002SD111A			FA010SL101A		
Sample I.D.	MYP371			MYP372			MYP373			MYP374			MYP375			MYP376 D1			MYP377		
Date of Collection	8/17/94			8/17/94			8/17/94			8/17/94			8/17/94			8/17/94			8/17/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	4670			4610			4690			5180			11000			4400			12700		
Antimony	0.40 U	R	A	0.40 U	R	A	0.56 L	J	BC	0.93 L	J	BC	1.0 L	J	BC	0.53 L	J	BC	1.0 L	J	BC
Arsenic	3.0			5.0			3.7			3.6			8.4			5.2			10.7		
Barium	54.6			51.6			53.2			56.1			135			52.0			156		
Beryllium	0.25 L	J	C	0.35 L	J	C	0.20 U			0.20 U			0.56 L	J	C	0.32 L	J	C	0.82 L	J	C
Cadmium	0.20 U			0.20 U			0.20 U			0.20 U			0.25 U			0.21 U			0.46 L	J	C
Calcium	3390			4030			4720			6460			13100			4460			14400		
Chromium	5.2			5.4			5.1			5.3			11.2			5.3			10.5		
Cobalt	3.7 L	J	C	3.7 L	J	C	4.4 L	J	C	4.4 L	J	C	9.1 L	J	C	3.9 L	J	C	8.9 L	J	C
Copper	8.7	J	D	9.0	J	D	7.9	J	D	9.0	J	D	15.8	J	D	8.3	J	D	45.6	J	D
Iron	8280			7520			7750			8010			16500			7300			17300		
Lead	6.5			6.5			5.3			5.8			6.1			7.2			43.0		
Magnesium	2630			2740			2780			4340			6380			2930			8520		
Manganese	243			227			223			246			281			240			512		
Mercury	1.1			0.90			0.56			0.54			0.07 L	J	C	1.3		E	48.6		
Nickel	4.5 L	J	C	4.7 L	J	C	4.8 L	J	C	4.4 L	J	C	8.6 L	J	C	3.4 L	J	C	10.1		
Potassium	2110			2520			2980			2850			1780			2350			7590		
Selenium	0.81 U			0.81 U			0.81 U			0.82 U			0.99 U			0.87 L	J	C	0.83 U		
Silver	0.60 U			0.61 U			0.60 U			0.61 U			0.74 U			0.63 U			2.7		
Sodium	195 L	J	C	665 L	J	C	991 L	J	C	4470			5050			2380			4340		
Thallium	1.4 U			1.4 U			1.4 U			1.4 U			1.7 U			1.5 U			1.4 U		
Vanadium	20.7	J	D	19.2	J	D	19.9	J	D	21.3	J	D	42.4	J	D	18.9	J	D	41.7	J	D
Zinc	38.5	J	D	36.9	J	D	32.1	J	D	36.0	J	D	55.8	J	D	36.5	J	D	103	J	D
Percent Solids	99.2 %			98.8 %			99.2 %			97.8 %			81.2 %			95.2 %			96.8 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTI. ULTS

TABLE 1A

Case No.: 22540 Memo #10
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Fernando S. Contreras, ESAT/ICF Kaiser
Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA010SL102A			FA010SL103A			FA010SL104A			FA010SL105A			FA010SL106A			FA010SL107A			FA010SL108A		
Sample I.D.	*MYP378*			*MYP379*			*MYP380*			*MYP381*			*MYP382*			*MYP383*			*MYP384*		
Date of Collection	8/17/94			8/17/94			8/17/94			8/17/94			8/17/94			8/17/94			8/17/94		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	15400			15500			17000			19000			19700			17100			22100		
Antimony	0.86 L	J	BC	1.8 L	J	BC	1.5 L	J	BC	1.4 L	J	BC	0.60 L	J	BC	0.70 L	J	BC	1.0 L	J	BC
Arsenic	6.2			9.0			11.5			9.6			15.4			11.0			18.2		
Barium	153			155			163			196			174			159			183		
Beryllium	0.75 L	J	C	0.69 L	J	C	0.80 L	J	C	0.80 L	J	C	0.97 L	J	C	1.0 L	J	C	1.1		
Cadmium	0.20 U			0.20 U			0.54 L	J	C	0.21 U			0.21 U			0.21 U			0.21 U		
Calcium	12500			7250			11400			12800			10500			12000			11200		
Chromium	11.5			11.8			13.3			13.2			13.6			13.0			15.1		
Cobalt	8.8 L	J	C	11.3			10.8			12.2			12.7			11.4			12.9		
Copper	25.3	J	D	42.9	J	D	64.1	J	D	29.5	J	D	31.7	J	D	26.2	J	D	33.6	J	D
Iron	19600			20600			21800			23700			24700			21700			27400		
Lead	11.4			26.8			48.9			11.2			13.1			15.1			13.7		
Magnesium	8940			7480			7970			10500			10600			10300			11800		
Manganese	531			516			607			798			542			534			581		
Mercury	3.6			18.7			59.7			0.51			0.51			0.37			0.45		
Nickel	10.6			11.7			11.5			12.3			13.0			12.3			14.7		
Potassium	8020			5190			5410			9730			10200			9300			9290		
Selenium	0.82 U			0.81 U			1.4			1.5			0.83 U			1.0			0.84 U		
Silver	0.61 U			2.4			6.8			0.62 U			0.62 U			0.62 U			0.63 U		
Sodium	1160			956 L	J	C	2260			4840			3180			6350			4500		
Thallium	1.4 U			1.4 U			2.1			2.1 L	J	C	1.4 U			2.9			1.5 U		
Vanadium	44.1	J	D	51.0	J	D	54.8	J	D	63.9	J	D	67.9	J	D	54.1	J	D	76.4	J	D
Zinc	73.7	J	D	83.5	J	D	110	J	D	80.7	J	D	88.6	J	D	94.3	J	D	105	J	D
Percent Solids	97.6 %			98.2 %			96.8 %			96.4 %			96.8 %			97.2 %			95.4 %		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

ANALYTICAL . .SULTS

TABLE 1A

Case No.: 22540 Memo #10

Site: Carson River

Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)

Reviewer: Fernando S. Contreras, ESAT/ICF Kaiser

Date: September 21, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals

Concentration in mg/Kg

Station Location	FA010SL109A			FA010SL110B			FA010SD111A			Lab Blank			MDL			CRDL					
Sample I.D.	MYP385			MYP386			MYP387														
Date of Collection	8/17/94			8/17/94			8/17/94														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	13900			19300			17900			14.8 L	J	C	3.4			40.0					
Antimony	1.2 L	J	BC	1.3 L	J	BC	0.84 L	J	BC	0.53 L	J	C	0.40			12.0					
Arsenic	13.1			12.7			9.1			6.5			0.40			2.0					
Barium	147			222			189			0.20 U			0.20			40.0					
Beryllium	0.76 L	J	C	1.1 L	J	C	0.91 L	J	C	0.20 U			0.20			1.0					
Cadmium	0.48 L	J	C	0.26 U			0.21 U			0.20 U			0.20			1.0					
Calcium	12000			7880			12400			15.0 L	J	C	5.2			1000					
Chromium	11.5			13.6			12.3			2.5			0.20			2.0					
Cobalt	9.5 L	J	C	12.8 L	J	C	12.8			2.2 U			2.2			10.0					
Copper	46.7	J	D	36.3	J	D	28.2	J	D	0.71 L	J	C	0.60			5.0					
Iron	19000			24800			23000			1.7 L	J	C	1.2			20.0					
Lead	38.1			11.8			11.8			0.60 U			0.60			0.60					
Magnesium	9520			10100			11100			4.4 U			4.4			1000					
Manganese	474			545			709			0.20 U			0.20			3.0					
Mercury	41.8			0.07 U			0.28			0.05 U			0.05			0.10					
Nickel	10.2			14.3			12.8			1.4 U			1.4			8.0					
Potassium	4100			4780			9820			15.2 U			15.2			1000					
Selenium	1.0 L	J	C	1.0 U			0.83 U			0.85 L	J	C	0.80			1.0					
Silver	4.1			0.78 U			0.62 U			0.60 U			0.60			2.0					
Sodium	5210			3440			4400			3.6 U			3.6			1000					
Thallium	1.6 L	J	C	1.9 L	J	C	1.4 U			1.4 U			1.4			2.0					
Vanadium	46.7	J	D	56.6	J	D	56.1	J	D	0.40 U			0.40			10.0					
Zinc	97.4	J	D	98.5	J	D	84.3	J	D	1.7 L	J	C	0.60			4.0					
Percent Solids	97.4 %			76.8 %			96.6 %			N/A			N/A			N/A					

Val-Validity Refer to Data Qualifiers in Table 1B

Com-Comments Refer to the Corresponding Section in the Narrative for each letter.

IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs

FB-Field Blank, EB-Equipment Blank, TB-Travel Blank

CRDL-Contract Required Detection Limit

N/A-Not Applicable

ANALYTICAL RESULTS

TABLE 1A

Case No.: 22540 Memo #10
Site: Carson River
Lab.: Wadsworth/Alert Laboratories, Inc. (WADSPA)
Reviewer: Fernando S. Contreras, ESAT/ICF Kaiser
Date: September 21, 1994

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW002GW107A			DW002GW117A			DW002GW127A			Lab Blank			IDL			CRDL					
Sample I.D.	MYP388 D2			MYP389 D2			MYP390 FB														
Date of Collection	8/18/94			8/18/94			8/18/94														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	17.0 U			17.0 U			17.0 U			17.0 U			17.0			200					
Antimony	2.9 L	J	C	2.2 L	J	C	2.5 L	J	C	3.4 L	J	C	2.0			60.0					
Arsenic	7.8 L	J	C	4.3 L	J	C	7.1 L	J	C	2.0 U			2.0			10.0					
Barium	47.1 L	J	C	40.8 L	J	C	1.0 U			2.4 L	J	C	1.0			200					
Beryllium	1.0 U			1.0 U			1.0 U			1.0 U			1.0			5.0					
Cadmium	1.0 U			1.0 U			1.0 U			1.0 U			1.0			5.0					
Calcium	45400			46400			51.7 L	J	C	68.9 L	J	C	26.0			5000					
Chromium	1.7 L	J	C	1.9 L	J	C	2.3 L	J	C	2.7 L	J	C	1.0			10.0					
Cobalt	11.0 U			11.0 U			11.0 U			11.0 U			11.0			50.0					
Copper	83.2		E	27.7		E	4.5 L	J	C	3.6 L	J	C	3.0			25.0					
Iron	1780		E	288		E	6.0 U			16.9 L	J	C	6.0			100					
Lead	72.4		E	10.0		E	3.0 U			3.0 U			3.0			3.0					
Magnesium	9720			10100			22.0 U			28.9 L	J	C	22.0			5000					
Manganese	42.8		E	85.2		E	1.0 U			1.0 U			1.0			15.0					
Mercury	0.10 U			0.10 U			0.10 U			0.10 U			0.10			0.20					
Nickel	7.0 U			7.0 U			7.0 U			7.0 U			7.0			40.0					
Potassium	3440 L	J	C	3300 L	J	C	76.0 U			76.0 U			76.0			5000					
Selenium	4.0 U			4.0 U			4.5 L	J	C	4.1 L	J	C	4.0			5.0					
Silver	3.0 U			3.0 U			3.0 U			3.0 U			3.0			10.0					
Sodium	34200			34200			53.9 L	J	C	47.3 L	J	C	18.0			5000					
Thallium	7.0 U			7.0 U			7.0 U			7.0 U			7.0			10.0					
Vanadium	2.8 L	J	C	2.0 U			2.0 U			2.0 U			2.0			50.0					
Zinc	1510		E	254		E	3.0 L	J	C	3.0 U			3.0			20.0					

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #10 LABORATORY WADSPA

SDG NO. MYP371 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 21, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Fernando S. Contreras

NO. OF SAMPLES 3 WATER 17 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	
2. CALIBRATION	O		O	
3. BLANKS	O		O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	
6. DUPLICATE ANALYSIS	O		O	
7. MATRIX SPIKE ANALYSIS	X		O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	M			
10. SAMPLE QUANTITATION	O		O	
11. SAMPLE VERIFICATION	O		O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		O	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [ ]FYI [ ]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22540 Memo #10 LABORATORY WADSPA

SDG NO. MYP371 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 21, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Fernando S. Contreras

NO. OF SAMPLES 3 WATER 17 SOIL _____ OTHER

TPO ACTION: The results for antimony in samples MYP371 and MYP372 were rejected due to a 18.9% matrix spike recovery.

TPO ATTENTION: None.

AREAS OF CONCERN: A high initial CRDL standard (CRI) recovery of 136.3% and a low final CRI standard recovery of 67.2% for lead and a low initial CRI recovery of 57.6% for thallium were reported for the analyses in this SDG. Although there are no criteria established for CRDL standard recoveries, high and low percent recoveries indicate analytical uncertainty near the CRDL.

In Reference to Case No(s).:

22540 Memo #10

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM

Telephone Record Log

Date of Call: September 15, 1994

Laboratory Name: WADSPA

Lab Contact: David F. Brennan

Region: 9

Regional Contact: Fernando S. Contreras

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample delivery group(s):
SDG No. MYP371

Summary of Questions/Issues Discussed:

During the data review, the reviewer noted the following discrepancies:

1. The dilution factor for QC samples MYP385L and MYP388L reported by the laboratory on Form 14s (pages 68 through 73) for all of the ICP metal analytes analyzed on August 30, 31, and September 1, 1994 does not correspond with the ICP raw data (pages 79 through 253). Please submit corrected Form 14s for QC samples MYP385L and MYP388L with the correct dilution factor.

Summary of Resolution:

1. The laboratory submitted corrected Form 14s for QC samples MYP385L and MYP388L with the correct dilution factor.

Resolution for item 1 was received on September 20, 1994.

Fernando S. Contreras
Signature

September 21, 1994
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

Contract Laboratory Program
REGION 9/LABORATORY COMMUNICATION SYSTEM
CSF COMPLETENESS EVIDENCE AUDIT PROGRAM
Telephone Communication Summary Form

AUDIT NO: 1189
CASE NO: 22540
SDG NO: MYP371
FILENAME: 22540M10.TCS

LAB CONTACT: David F. Brennan
LAB CODE: WADSPA
LAB NAME: Wadsworth/Alert Laboratories, Inc.
LAB LOCATION: Pittsburgh, PA

Items Discussed:

During the case audit, the validator noted the following discrepancies.

(1) The complete SDG file (CSF) inventory sheet (Form DC-2) contained several discrepancies: (a) The laboratory did not check off item #27 (Chain of Custody Records); (b) Item #15 (ICP Interelement Correction Factors) was paginated 56, instead of 56 and 59; (c) Item #16 (ICP Interelement Correction Factors) was paginated 60, instead of 57, 58, and 60. Please submit a corrected Form DC-2.

Resolution:

(1) The laboratory submitted a corrected Form DC-2.

Resolution for item 1 was received on September 20, 1994

Fernando S. Contreras, ESAT/ICF Kaiser

September 15, 1994
Date of Contact

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

ICF KAISER
ENVIRONMENT & ENERGY GROUP

ICF Kaiser Engineers, Inc.
160 Spear Street, Suite 1380
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SEP 28 1994

FILE COPY

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Coast Groundwater Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: mdm for Margie D. Weiner
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 27, 1994

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region 9 review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD9808131646
CASE/SAS NO.:	22565 Memo #01
SDG NO.:	MYP440
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	Ras Total Metals and Cyanide
SAMPLE NO.:	4 Water and 3 Soil Samples (See Case Summary)
COLLECTION DATE:	August 22, 1994
REVIEWER:	Karen Pettit, ESAT/ICF Kaiser

The comments and qualifications presented in this report have been reviewed and approved by the EPA Task Monitor for the ESAT Contract, whose signature appears above.

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region 9

TPO: [ ]FYI [ ]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

ICF KAISER

Data Validation Report

Case No.: 22565 Memo #01
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 27, 1994

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: Water: MYP440, MYP442, MYP444, and MYP446
Soil: MYP441, MYP443, and MYP445

COLLECTION DATE: August 22, 1994
SAMPLE RECEIPT DATE: August 25, 1994

CONCENTRATION & MATRIX: 4 Low Concentration Water and 3 Low Concentration Soil Samples

FIELD QC: Field Blanks (FB): MYP446
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYP442 and MYP444
(D2): MYP443 and MYP445

LABORATORY QC: Matrix Spike: MYP440 and MYP443
Duplicates: MYP440 and MYP443
ICP Serial Dilution: MYP440 and MYP443

ANALYSIS: Ras Total Metals and Cyanide

Analyte	Sample Preparation and Digestion Date	Analysis Date
ICP Metals	September 7, 1994	September 8 and 13, 1994
Mercury	September 9, 1994	September 9, 1994
Cyanide	August 31, 1994	August 31, 1994
Percent Solids	Not Applicable	September 7, 1994

TPO ACTION:

SAMPLING ISSUES: None.

OTHER: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of

solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; aluminum = 500 mg/L, calcium = 500 mg/L, iron = 200 mg/L, magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed analyses of the ICP ICS solutions A and AB at a 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly.

In the initial and final analyses of the ICP ICS solution AB for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICP61E Trace Analyzer, the results obtained for the interferent mineral iron did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform the appropriate corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICP61E Trace Analyzer. The effect on the quality of the data is not known.

TPO ATTENTION:

SAMPLING ISSUES: The results for iron and zinc in samples MYP440, MYP442, and MYP444 are estimated because of field blank contamination.

OTHER: None.

ADDITIONAL COMMENTS:

The laboratory analyzed all of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer according to Method 200.7 in the CLP Inorganic Statement of Work (SOW). The instrument detection limits (IDL) for arsenic, lead, selenium, and thallium were below the RAS contract required detection limits (CRDL) specified for these analytes in the Inorganic SOW.

According to the SOW, the spike sample analysis is designed to provide information about the effect of the sample matrix on the digestion and measurement methodology. The SOW further specifies that samples be spiked at concentrations appropriate to the analytical method used. There have been no spike concentration levels established for the ICAP61E Trace Analyzer. Consequently, the laboratory spiked the QC sample to be analyzed for arsenic, lead, selenium, and thallium at ICP/AA levels. This practice is within contractual specifications. However, since the IDLs, CRDLs and the expected analyte concentrations for arsenic, lead, selenium, and thallium in the samples are low, it is more appropriate to use the lower concentration GFAA spike levels which are consistent with the expected analyte concentrations.

The Inorganic SOW specifies a concentration level of 1000 µg/L for lead in the ICP interference check sample (ICS) solution AB, however, the true value of lead in the ICP ICS solution AB provided by the EPA is 4712 µg/L.

No IDL study for cyanide was included by the laboratory in this SDG. However, a standard at the CRDL was used in the calibration of the instrument. Note that the Inorganic SOW does not clearly specify that an IDL study for cyanide must be performed. In addition, cyanide is not listed on Form X, and directions in Exhibit B Section III of the SOW, do not have provisions for the cyanide instrument.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA Contract Laboratory Program Inorganic Statement of Work (ILM02.1), and the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	E
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
d. CRDL Standard		
4. Blanks	No	B
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	C
8. Laboratory Duplicate Sample Analysis	No	D
9. Field Duplicate Sample Analysis	Yes	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	Yes	
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the instrument detection limit or the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the instrument detection limit (IDL) for waters or the method detection limit (MDL) for soils but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

B. The following results are estimated because of field blank contamination. The results are flagged "J" in Table 1A.

- Iron and zinc in samples MYP440, MYP442, and MYP444

A field blank is intended to detect contaminants that may have been introduced in the field. Contaminants that are found in the field blank which are absent in the laboratory preparation blank could be indicative of a field QC problem, a deficiency in the bottle preparation procedure, a difference in preparation of the laboratory and field blanks, or other indeterminate source of contamination.

The reported results of 6060 μg/L for iron and 258 μg/L for zinc in field blank sample MYP446 exceed the contract required detection limit (CRDL) of 100 μg/L for iron and 20 μg/L for zinc. Detected results are considered estimated unless the concentration in the sample exceeds ten times the amount in the associated field blank. The results reported for iron and zinc in the samples listed above are considered uncertain due to field blank contamination.

C. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Antimony in samples MYP441, MYP443, and MYP445
- Mercury in samples MYP440, MYP442, MYP444, and MYP446

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for antimony in QC sample MYP443 and mercury in QC sample MYP440 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte are presented below and are based on an ideal recovery of 100%.

Analyte	MYP440 % Recovery	MYP440 % Bias	MYP443 % Recovery	MYP443 % Bias
Antimony			59.7	-40.3
Mercury	60.0	-40.0		

Results above the IDL or MDL are considered quantitatively uncertain. The results reported for antimony and mercury in the samples listed above may be biased low.

According to the SOW (ILM02.1), when the pre-digestion spike recovery results for ICP analytes (except silver) fall outside the control limits of 75-125%, a post-digestion spike must be performed for those elements that do not meet the specified criteria. A post-digestion spike recovery result of 113.9% was obtained for antimony in QC sample MYP443. Since the post-digestion spike recovery was acceptable, the low pre-digestion spike recovery result (59.7%) obtained for antimony may indicate sample nonhomogeneity, poor laboratory technique or matrix effects which may interfere with accurate analysis, depressing the analytical result.

D. In the analysis of the field duplicate pairs, the following relative percent differences (RPDs) were obtained for the analytes listed below.

Analyte	MYP442 MYP444 RPD	MYP443 MYP445 RPD
Aluminum	102.2	70.2
Arsenic		59.6
Barium		55.4
Iron	98.1	44.8
Magnesium		41.4
Manganese	44.1	77.1
Potassium		74.2
Zinc		55.7

The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±20 RPD or ±CRDL for waters and ±35 RPD or ±2X CRDL for soils criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, high levels of solids in the sample, sample nonhomogeneity, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

E. A high CRDL standard (CRA) recovery of 150.0% for mercury was reported for the analysis in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate analytical uncertainty for sample results near the CRDL.

Case No.: 22565 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 27, 1994

Analysis Type: Low Concentration Water Samples for RAS Total Metals & Cyanide

Concentration in ug/L

Station Location	L9NSR-SW-RS			L10NSR-SW-RS			L10NSR-SW-DS			L9NSR-SW-TB			Lab Blank			IDL			CRDL		
Sample I.D.	MYP440			MYP442 D1			MYP444 D1			MYP446 FB											
Date of Collection	8/22/94			8/22/94			8/22/94			8/22/94											
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	9510			974		D	3010		D	32.9 U			32.9 U			32.9			200		
Antimony	28.4 U			28.4 U			28.4 U			28.4 U			28.4 U			28.4			60.0		
Arsenic	18.3			49.3			48.0			2.8 U			2.8 U			2.8			10.0		
Barium	88.2 L	J	A	89.7 L	J	A	106 L	J	A	10.6 U			10.6 U			10.6			200		
Beryllium	1.6 U			1.6 U			1.6 U			1.6 U			1.6 U			1.6			5.0		
Cadmium	3.0 U			3.0 U			3.0 U			3.0 U			3.0 U			3.0			5.0		
Calcium	30000			44800			46900			86.9 L	J	A	79.1 U			79.1			5000		
Chromium	4.0 U			4.0 U			4.0 U			4.0 U			4.0 U			4.0			10.0		
Cobalt	12.3 U			12.3 U			12.3 U			12.3 U			12.3 U			12.3			50.0		
Copper	9.1 L	J	A	3.7 L	J	A	5.5 L	J	A	1.9 U			1.9 U			1.9			25.0		
Iron	8150	J	B	950	J	BD	2780	J	BD	6060		B	7.9 U			7.9			100		
Lead	1.1 U			1.1 U			2.6 L	J	A	1.1 U			1.1 U			1.1			3.0		
Magnesium	7310			23300			23200			51.9 U			51.9 U			51.9			5000		
Manganese	122			67.7		D	106		D	10.4 L	J	A	1.3 U			1.3			15.0		
Mercury	0.20	J	CE	0.20 U	J	C	0.20	J	CE	0.20 U	J	C	0.20 U			0.20			0.20		
Nickel	17.3 U			17.3 U			17.3 U			17.3 U			17.3 U			17.3			40.0		
Potassium	11100			21300			21300			343 L	J	A	289 U			289			5000		
Selenium	2.0 L	J	A	2.3 L	J	A	3.7 L	J	A	1.7 U			1.7 U			1.7			5.0		
Silver	1.8 U			1.8 U			1.8 U			1.8 U			1.8 U			1.8			10.0		
Sodium	42100			199000			195000			94.1 L	J	A	84.8 U			84.8			5000		
Thallium	3.6 U			3.6 U			3.6 U			3.6 U			3.6 U			3.6			10.0		
Vanadium	25.3 L	J	A	13.3 L	J	A	16.6 L	J	A	5.5 U			5.5 U			5.5			50.0		
Zinc	26.6	J	B	5.9 L	J	AB	11.2 L	J	AB	258		B	5.1 U			5.1			20.0		
Cyanide	5.0 U			5.0 U			5.0 U			5.0 U			5.0 U			N/A			10.0		

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
N/A-Not Applicable

Case No: 22565 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Karen Pettit, ESAT/ICF Kaiser
Date: September 27, 1994

Analysis Type: Low Concentration Soil Samples for RAS Total Metals & Cyanide

Concentration in mg/Kg

Station Location	L9NSR-BS-RS			L10NSR-BS-RS			L10NSR-BS-DS			Lab Blank			MDL			CRDL					
Sample I.D.	MYP441			MYP443 D2			MYP445 D2														
Date of Collection	8/22/94			8/22/94			8/22/94														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	12900			13400		D	27900		D	6.6 U			6.6			40.0					
Antimony	7.1 U	J	C	6.3 U	J	C	7.2 U	J	C	5.7 U			5.7			12.0					
Arsenic	7.1			10.9		D	5.9		D	0.56 U			0.56			2.0					
Barium	137			163		D	288		D	2.1 U			2.1			40.0					
Beryllium	0.92 L	J	A	0.90 L	J	A	1.9			0.32 U			0.32			1.0					
Cadmium	0.75 U			0.67 U			0.76 U			0.60 U			0.60			1.0					
Calcium	18100			17200			15700			15.8 U			15.8			1000					
Chromium	10.1			11.4			13.4			0.80 U			0.80			2.0					
Cobalt	6.5 L	J	A	6.7 L	J	A	10.1 L	J	A	2.5 U			2.5			10.0					
Copper	14.0			13.2			21.4			0.38 U			0.38			5.0					
Iron	15400			15400		D	24300		D	1.6 U			1.6			20.0					
Lead	7.7			9.8			11.8			0.22 U			0.22			0.60					
Magnesium	5280			5170		D	7870		D	10.4 U			10.4			1000					
Manganese	227			222		D	467		D	0.26 U			0.26			3.0					
Mercury	0.11 U			0.10 U			0.11 U			0.10 U			0.10			0.10					
Nickel	10.8			8.6 L	J	A	17.3			3.5 U			3.5			8.0					
Potassium	2770			2680		D	5840		D	57.8 U			57.8			1000					
Selenium	0.43 U			0.38 U			0.43 U			0.34 U			0.34			1.0					
Silver	0.45 U			0.40 U			0.46 U			0.36 U			0.36			2.0					
Sodium	491 L	J	A	547 L	J	A	550 L	J	A	17.0 U			17.0			1000					
Thallium	1.0 L	J	A	0.81 L	J	A	1.3 L	J	A	0.72 U			0.72			2.0					
Vanadium	30.5			32.7			39.2			1.1 U			1.1			10.0					
Zinc	37.1			36.1		D	64.0		D	1.0 U			1.0			4.0					
Cyanide	1.5 U			1.3 U			1.5 U			1.2 U			N/A			5.0					
Percent Solids	77.3 %			78.3 %			70.9 %			N/A			N/A			N/A					

Val-Validity Refer to Data Qualifiers in Table 1B
Com-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1,D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank
CRDL-Contract Required Detection Limit
N/A-Not Applicable

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the document "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," February, 1994.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22565 Memo #01 LABORATORY ALI

SDG NO. MYP440 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 27, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES 4 WATER 3 SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES	O		O	O
2. CALIBRATION	O		O	O
3. BLANKS	M		O	O
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O		O	O
6. DUPLICATE ANALYSIS	O		O	O
7. MATRIX SPIKE ANALYSIS	M		M	O
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION	O			
10. SAMPLE QUANTITATION	O		O	O
11. SAMPLE VERIFICATION	O		O	O
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT	M		M	O

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region 9

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 22565 Memo #01 LABORATORY ALI

SDG NO. MYP440 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 27, 1994

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Karen Pettit

NO. OF SAMPLES 4 WATER 3 SOIL _____ OTHER

TPO ACTION: Exhibit E, Section V (pages E-18 and E-19) of the Statement of Work (SOW) states that to verify interelement and background correction factors, the laboratory shall analyze an ICP Interelement Check Sample (ICS) at the beginning and the end of each analytical run or a minimum of twice per 8 hour working shift, whichever is more frequent, but not before initial calibration verification (ICV). The ICP ICS consists of solution A and solution AB. Solution A consists of the interferents (aluminum, calcium, iron, and magnesium), and solution AB consists of the analytes mixed with the interferents. Furthermore, the SOW states that the interferents be prepared and analyzed at the levels specified; Aluminum = 500 mg/L, Calcium = 500 mg/L, Iron = 200 mg/L, Magnesium =500 mg/L.

However, during the analysis of the samples for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICAP61E Trace Analyzer, the laboratory performed an analysis of the ICP ICS solutions A and AB at 10-fold dilution, not at the levels specified in the SOW. Since some of the sample results for selenium and thallium had negative results greater than the contract required detection limit (CRDL), it is not clear whether the interelement and background correction factors were applied correctly.

In the initial and final analyses of the ICP ICS solution AB for arsenic, lead, selenium and thallium by Thermo Jarrell Ash ICP61E Trace Analyzer, the results obtained for the interferent mineral, iron, did not meet the 80-120% control limits to verify interelement corrections. The laboratory did not perform the appropriate corrective actions. The SOW does not specifically address the analysis of the ICP ICS by Thermo Jarrell Ash ICP61E Trace Analyzer. The effect on the quality of the data is not known.

TPO ATTENTION: The results for iron and zinc in samples MYP440, MYP442, and MYP444 are estimated because of field blank contamination.

AREAS OF CONCERN: A high CRDL standard (CRA) recovery of 150.0% for mercury was reported for the analysis in this SDG. Although there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: September 15, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	20292 Memo #01
SDG NO.:	MYL914
LABORATORY:	Associated Laboratories, Inc. (ALI)
ANALYSIS:	RAS Total Metals
SAMPLE NO.:	20 Water Samples (See Case Summary)
COLLECTION DATE:	July 14 and 15, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Steve Remaley, TPO USEPA Region IX

TPO: [ ]FYI [X]Attention [X]Action

SAMPLING ISSUES: [X]Yes [ ]No

Data Validation Report

Case No.: 20292 Memo #01
Site: Carson River
Laboratory: Associated Laboratories, Inc. (ALI)
Reviewer: Chris Davis, ESAT/ICF
Date: September 15, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: MYL914 through MYL933

COLLECTION DATE: July 14 and 15, 1993
SAMPLE RECEIPT DATE: July 17, 1993

CONCENTRATION & MATRIX: 20 Low Concentration Groundwater Samples

FIELD QC: Field Blanks (FB): MYL924
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): MYL927 and MYL928

LABORATORY QC: Matrix Spike: MYL914
Duplicates: MYL914
ICP Serial Dilution: MYL914

ANALYSIS: RAS Total Metals

Analyte		Sample Preparation and Digestion Date	Analysis Date
ICP Metals		August 3, 1993	August 23, 1993
GFAA:	Arsenic	August 3, 1993	August 21, 1993
	Lead	August 3, 1993	August 21 and 22, 1993
	Selenium	August 3, 1993	August 20, 1993
	Thallium	August 3, 1993	August 21, 1993
Mercury		August 4, 1993	August 4, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: The results for thallium in all of the samples were rejected due to a 27.0% matrix spike recovery.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: Field duplicate samples MYL927 and MYL928 were not designated as field duplicates on the Field QA/QC Summary Form. As the station location numbers appeared to indicate that these were field duplicates, the Regional Sample Control Coordinator (RSCC) contacted the sampler to verify that these were field duplicate samples.

OTHER: None

ADDITIONAL COMMENTS:

All of the method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) have been met.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the EPA CLP Inorganic SOW (ILM02.1), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	Yes	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	No	A,B
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	No	G
10. GFAA QC Analysis	No	D
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	No	E
12. Sample Quantitation	Yes	C,F,H
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are rejected because of matrix spike recovery results outside method QC limits. The results are flagged "R" in Table 1A.

- Thallium in all of the samples

Matrix spike sample analysis provides information about the effect of the sample matrix on sample preparation and measurement. The matrix spike recovery result for thallium in QC sample MYL914 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for thallium is presented below and is based on an ideal recovery of 100%.

Analyte	MYL914 % Recovery	MYL914 % Bias
Thallium	27.0	-73.0

The results reported for thallium in all of the samples were below the instrument detection limit (IDL) and are considered unacceptable as less than 30% of the matrix spike was recovered. The low matrix spike recovery indicates an analytical deficiency and false negatives may exist.

B. The following results are estimated because of matrix spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Lead and selenium in all of the samples

The matrix spike sample analysis provides information about the effect of the sample matrix on the digestion and measurement methodology. The matrix spike recovery results for lead and selenium in QC sample MYL914 did not meet the 75-125% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	MYL914 % Recovery	MYL914 % Bias
Lead	32.5	-67.5
Selenium	52.0	-48.0

Results above the IDL are considered quantitatively uncertain. The results reported for lead and selenium in all of the samples may be biased low, and where non-detected, false negatives may exist.

C. The following results are estimated and are flagged "J" in Table 1A.

- All results above the instrument detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the instrument detection limit (IDL) but below the contract required detection limit (CRDL) are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

D. The following results are estimated because of GFAA analytical spike recovery results outside method QC limits. The results are flagged "J" in Table 1A.

- Arsenic in samples MYL914, MYL918 through MYL923, MYL926, MYL927, and MYL929 through MYL931
- Lead in samples MYL914 through MYL917, MYL919 through MYL924, MYL927 through MYL929, MYL932, and MYL933
- Selenium in samples MYL914 through MYL923, and MYL925 through MYL933
- Thallium in samples MYL921 through MYL923 and MYL930 through MYL932

Arsenic, lead, selenium, and thallium were analyzed by the graphite furnace atomic absorption (GFAA) technique, which requires that a post-digestion analytical spike be performed for each sample to establish the accuracy of the individual analytical determination. The analytical spike recovery results for arsenic, lead, selenium, and thallium in the samples listed above did not meet the 85-115% criteria for accuracy. The percent recovery and possible percent bias for each analyte is presented below and is based on an ideal recovery of 100%.

Analyte	Sample Number	% Recovery	% Bias
Arsenic	MYL914	81.5	-18.5
	MYL918	84.5	-15.5
	MYL919	78.0	-22.0
	MYL920	83.5	-16.5
	MYL921	84.5	-15.5
	MYL922	84.0	-16.0
	MYL923	65.0	-35.0
	MYL926	83.5	-16.5
	MYL927	84.5	-15.5
	MYL929	83.5	-16.5
	MYL930	84.5	-15.5
	MYL931	81.5	-18.5
Lead	MYL914	81.0	-19.0
	MYL915	77.0	-23.0
	MYL916	84.0	-16.0
	MYL917	74.0	-26.0
	MYL919	82.0	-18.0
	MYL920	84.5	-15.5
	MYL921	77.0	-23.0
	MYL922	83.5	-16.5
	MYL923	80.0	-20.0
	MYL924	83.0	-17.0

Analyte	Sample Number	% Recovery	% Bias
Lead	MYL927	81.0	-19.0
	MYL928	84.0	-16.0
	MYL929	80.5	-19.5
	MYL932	55.0	-45.0
	MYL933	80.0	-20.0
Selenium	MYL914	45.0	-55.0
	MYL915	43.0	-57.0
	MYL916	64.0	-36.0
	MYL917	65.0	-35.0
	MYL918	78.0	-22.0
	MYL919	60.0	-40.0
	MYL920	53.0	-47.0
	MYL921	46.0	-54.0
	MYL922	60.0	-40.0
	MYL923	48.0	-52.0
	MYL925	68.0	-32.0
	MYL926	76.0	-24.0
	MYL927	73.0	-27.0
	MYL928	77.0	-23.0
	MYL929	81.0	-19.0
	MYL930	81.0	-19.0
	MYL931	75.0	-25.0
	MYL932	74.0	-26.0
	MYL933	77.0	-23.0
Thallium	MYL921	82.5	-17.5
	MYL922	83.0	-17.0
	MYL923	45.0	-55.0
	MYL930	83.5	-16.5
	MYL931	83.5	-16.5
	MYL932	75.5	-24.5

The post-digestion spike recovery results for arsenic, lead, selenium, and thallium in the samples listed above show an analytical deficiency. Results above the IDL are considered quantitatively uncertain. The results reported for arsenic, lead, selenium, and thallium in the samples listed above may be biased low, and where non-detected, false negatives may exist.

The post-digestion analytical spike recovery results of 76.5% for lead and 52.0% for selenium in duplicate sample MYL914-D, and 75.0% for arsenic and 135.0% for selenium in the laboratory control sample (LCS) also did not meet the 85-115% criteria for accuracy.

It should be noted that all of the sample results for thallium were previously rejected. Please refer to Comment A.

E. The following results are estimated because of ICP serial dilution results outside method QC limits. The results are flagged "J" in Table 1A.

- Barium in all of the samples

A five fold dilution of the laboratory QC sample is performed in association with the ICP procedure to indicate whether interference exists due to sample matrix effects. If the analyte concentration is sufficiently high (minimally a factor of 50 above the IDL in the original sample), the five fold serial dilution must agree within 10% of the original results after correction for dilution. The percent difference of the ICP serial dilution analysis of sample MYL914 did not meet the less than 10% criteria for the analyte shown below.

Analyte	MYL914 % Difference
Barium	15.1

The results reported for barium in all of the samples are considered quantitatively uncertain. Chemical and physical interferences may exist due to sample matrix effects.

F. Due to poor analytical spike recoveries, the following samples were diluted and the quantitation limits for the analytes shown below have been raised.

- Arsenic in sample MYL932
- Lead in samples MYL914 through MYL923, and MYL925 through MYL931, and MYL933
- Selenium in samples MYL916 through MYL919, and MYL925 through MYL933
- Thallium in samples MYL914 through MYL922 and MYL925 through MYL933

Analytical spikes are post-digestion spikes prepared prior to analysis by adding a known quantity of the analyte to an aliquot of the digested sample. Arsenic, lead, selenium, and thallium were analyzed by the GFAA technique, which requires the analysis of analytical spikes. The samples for lead, selenium, and thallium listed above were diluted by a factor of ten because the spike recovery obtained in the original analysis was less than 40%. The low percent recoveries obtained for lead, selenium, and thallium may be due to chemical or physical interferences. Dilution of the samples is performed to reduce any matrix interferences which may be present and which may be responsible for the low analytical spike recovery. Consequently, the quantitation limits reported in Table 1A for lead, selenium, and thallium in the samples listed above were raised by the dilution factor.

Sample MYL932 was analyzed at a 16X dilution due to high concentration in the sample. The result for arsenic in the diluted analysis of this sample was between the IDL and the CRDL. The results for lead in the diluted analyses of samples MYL917 and MYL923 were also between the IDL and the CRDL. Therefore these results, which are greater than the CRDL when multiplied by the dilution factor, have been flagged "L" (see Comment C).

G. A 147 relative percent difference (RPD) was obtained for iron in the analysis of field duplicate pair samples MYL927 and MYL928. The analysis of field duplicate samples is a measure of both field and analytical precision. The results are expected to vary more than laboratory duplicates (±20 RPD or ±CRDL criteria for precision) since sampling variability is included in the measurement. The imprecision in the results of the analysis of the field duplicate pair may be due to the sample matrix, high levels of solids in the sample, poor sampling or laboratory technique, or method defects. The effect on the quality of the data is not known.

H. High CRDL standard recoveries of 150% for mercury; 157% (initial) and 144% (final) for chromium; and 529% (initial) and 538% (final) for zinc were reported for the analyses of the samples in this SDG. While there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL. This problem indicates an analytical uncertainty and possible high bias for the results for mercury in samples MYL914, MYL921, and MYL932, and for zinc in sample MYL920, which were near the detection limits. The results for chromium in all of the samples were below the detection limit, and are not affected.

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 15, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW-001-GW-01			DW-001-GW-02			DW-001-GW-03			DW-001-GW-04			DW-001-GW-05			DW-001-GW-06			DW-001-GW-07		
Sample I.D.	MYL914			MYL915			MYL916			MYL917			MYL918			MYL919			MYL920		
Date of Collection	07/14/93			07/14/93			07/14/93			07/14/93			07/14/93			07/14/93			07/14/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U		
Antimony	50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U		
Arsenic	5.0 L	J	CD	2.2 U			2.4 L	J	C	2.2 U			2.2 U	J	D	7.4 L	J	CD	2.2 U	J	D
Barium	91.9 L	J	CE	35.1 L	J	CE	80.4 L	J	CE	61.9 L	J	CE	28.0 L	J	CE	42.9 L	J	CE	124 L	J	CE
Beryllium	2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U		
Cadmium	2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U		
Calcium	144000			108000			88000			71100			114000			73900			143000		
Chromium	4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U		
Cobalt	11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U		
Copper	12.0 L	J	C	48.3			11.8 L	J	C	11.0 L	J	C	19.8 L	J	C	6.2 L	J	C	2.7 U		
Iron	55.8 L	J	C	218			189			164			416			1910			72.5 L	J	C
Lead	11.0 U	J	BDF	11.0 U	J	BDF	11.0 U	J	BDF	14.0 L	J	BCDF	11.0 U	J	BF	11.0 U	J	BDF	11.0 U	J	BDF
Magnesium	31700			20300			17800			16800			23200			15000			31600		
Manganese	5.4 U			8.8 L	J	C	6.0 L	J	C	6.0 L	J	C	8.7 L	J	C	21.8			5.4 U		
Mercury	0.20		H	0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U		
Nickel	28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U		
Potassium	3830 L	J	C	6260			5120			6040			7060			4920 L	J	C	2440 L	J	C
Selenium	1.5 U	J	BD	1.5 U	J	BD	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	1.5 U	J	BD
Silver	3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U		
Sodium	55900			55600			58800			23600			87200			57200			59400		
Thallium	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF
Vanadium	8.5 U			8.5 U			10.6 L	J	C	14.7 L	J	C	9.4 L	J	C	10.8 L	J	C	8.5 U		
Zinc	18.3 U			1210			18.3 U			70.5			410			902			21.1		H

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 15, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW-001-GW-08			DW-001-GW-09			DW-001-GW-10			DW-001-GW-11			DW-002-GW-01			DW-002-GW-02			DW-002-GW-03		
Sample I.D.	MYL921			MYL922			MYL923			MYL924 FB			MYL925			MYL926			MYL927 D1		
Date of Collection	07/14/93			07/14/93			07/14/93			07/14/93			07/15/93			07/15/93			07/15/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U		
Antimony	50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U			50.6 U		
Arsenic	2.2 U	J	D	2.2 U	J	D	4.2 L	J	CD	2.2 U			2.2 U			2.2 U	J	D	2.2 U	J	D
Barium	82.0 L	J	CE	92.9 L	J	CE	64.7 L	J	CE	1.8 U	J	E	24.6 L	J	CE	37.3 L	J	CE	34.5 L	J	CE
Beryllium	2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U		
Cadmium	2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U		
Calcium	161000			147000			53700			341 L	J	C	137000			136000			128000		
Chromium	4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U		
Cobalt	11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U		
Copper	5.4 L	J	C	10.1 L	J	C	901			4.6 L	J	C	11.8 L	J	C	9.1 L	J	C	2.7 U		
Iron	690			572			75.5 L	J	C	54.8 L	J	C	476			340			928		G
Lead	11.0 U	J	BDF	11.0 U	J	BDF	15.0 L	J	BCDF	1.1 U	J	BD	11.0 U	J	BF	11.0 U	J	BF	11.0 U	J	BDF
Magnesium	33600			31700			12000			42.2 L	J	C	34500			35200			33300		
Manganese	6.3 L	J	C	5.4 U			5.4 U			5.4 U			5.4 U			6.2 L	J	C	10.2 L	J	C
Mercury	0.20		H	0.20 U			0.20 U			0.20 U			0.20 U			0.20 U			0.20 U		
Nickel	28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U		
Potassium	3450 L	J	C	3760 L	J	C	5240			433 U			1940 L	J	C	1890 L	J	C	2020 L	J	C
Selenium	1.5 U	J	BD	1.5 U	J	BD	1.5 U	J	BD	1.5 U	J	B	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF
Silver	3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U		
Sodium	56500			55500			44000			542 L	J	C	57500			70600			71600		
Thallium	16.0 U	R	ADF	16.0 U	R	ADF	1.6 U	R	AD	1.6 U	R	A	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	AF
Vanadium	8.5 U			8.5 U			13.5 L	J	C	8.5 U			8.5 U			8.5 U			8.5 U		
Zinc	134			18.3 U			50.5			18.3 U			94.5			384			413		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Commen[illegible] Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrume[illegible]ection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 15, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location	DW-002-GD-03			DW-002-GW-04			DW-002-GW-05			DW-002-GW-06			DW-002-GW-07			DW-002-GW-08			Lab Blank		
Sample I.D.	MYL928 D1			MYL929			MYL930			MYL931			MYL932			MYL933					
Date of Collection	07/15/93			07/15/93			07/15/93			07/15/93			07/15/93			07/15/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U			41.4 U		
Antimony	50.6 U			50.6 U			50.6 U			57.0 L	J	C	50.6 U			50.6 U			50.6 U		
Arsenic	2.2 U			2.2 U	J	D	2.2 U	J	D	2.2 U	J	D	138 L	J	CF	2.2 U			2.2 U		
Barium	31.4 L	J	CE	34.7 L	J	CE	34.9 L	J	CE	35.7 L	J	CE	181 L	J	CE	24.4 L	J	CE	1.8 U		
Beryllium	2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U			2.1 U		
Cadmium	2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U			2.9 U		
Calcium	130000			208000			204000			224000			60100			156000			72.0 L	J	C
Chromium	4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U			4.4 U		
Cobalt	11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U			11.3 U		
Copper	6.3 L	J	C	2.7 U			7.4 L	J	C	2.7 U			31.2			5.3 L	J	C	2.7 U		
Iron	141		G	189			176			236			56000			147			15.0 U		
Lead	11.0 U	J	BDF	11.0 U	J	BDF	11.0 U	J	BF	11.0 U	J	BF	5.4	J	BD	11.0 U	J	BDF	27.4 U		
Magnesium	34000			55200			53900			58400			11900			29300			33.2 U		
Manganese	8.1 L	J	C	5.4 U			5.4 U			7.5 L	J	C	583			16.3			5.4 U		
Mercury	0.20 U			0.20 U			0.20 U			0.20 U			0.20		H	0.20 U			0.20 U		
Nickel	28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U			28.5 U		
Potassium	1890 L	J	C	1450 L	J	C	1620 L	J	C	1710 L	J	C	3220 L	J	C	5490			436 L	J	C
Selenium	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	15.0 U	J	BDF	1.5 U		
Silver	3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U			3.4 U		
Sodium	73500			44500			43300			45900			41200			80200			29.4 U		
Thallium	16.0 U	R	AF	16.0 U	R	AF	16.0 U	R	ADF	16.0 U	R	ADF	16.0 U	R	ADF	16.0 U	R	AF	1.6 U		
Vanadium	8.5 U			9.3 L	J	C	9.5 L	J	C	8.5 L	J	C	87.0			8.5 U			8.5 U		
Zinc	419			329			662			165			67.1			53.4			18.3 U		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
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ANALYTICAL RESULTS
TABLE 1A

Case No.: 20292 Memo #01
Site: Carson River
Lab.: Associated Laboratories, Inc. (ALI)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: September 15, 1993

Analysis Type: Low Concentration Groundwater Samples for RAS Total Metals

Concentration in ug/L

Station Location / Sample I.D. / Date of Collection	IDL			CRDL																	
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Aluminum	41.4			200																	
Antimony	50.6			60.0																	
Arsenic	2.2			10.0																	
Barium	1.8			200																	
Beryllium	2.1			5.0																	
Cadmium	2.9			5.0																	
Calcium	45.1			5000																	
Chromium	4.4			10.0																	
Cobalt	11.3			50.0																	
Copper	2.7			25.0																	
Iron	15.0			100																	
Lead	1.1			3.0																	
Magnesium	33.2			5000																	
Manganese	5.4			15.0																	
Mercury	0.20			0.20																	
Nickel	28.5			40.0																	
Potassium	433			5000																	
Selenium	1.5			5.0																	
Silver	3.4			10.0																	
Sodium	29.4			5000																	
Thallium	1.6			10.0																	
Vanadium	8.5			50.0																	
Zinc	18.3			20.0																	

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Commen[illegible] Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrume[illegible]ction Limit for Waters, MDL-Method Detection Limit for Soils.

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20292 Memo #01 LABORATORY ALI

SDG NO. MYL914 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 15, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES 20 WATER ____ SOIL ____ OTHER

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES	O	O	O	____
2. CALIBRATION	O	O	O	____
3. BLANKS	O	O	O	____
4. ICP INTERFERENCE CHECK SAMPLE (ICS)	O			
5. LABORATORY CONTROL SAMPLE (LCS)	O	O	O	____
6. DUPLICATE ANALYSIS	O	O	O	____
7. MATRIX SPIKE ANALYSIS	O	Z/M	O	____
8. METHOD OF STANDARD ADDITION (MSA)		N/A		
9. ICP SERIAL DILUTION	X			
10. SAMPLE QUANTITATION	O	O	O	____
11. SAMPLE VERIFICATION	O	O	O	____
12. GFAA ANALYTICAL SPIKE		M		
13. OVERALL ASSESSMENT	X	Z/M	O	____

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [ ]FYI [X]Attention [X]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. 20292 Memo #01 LABORATORY ALI

SDG NO. MYL914 SITE NAME Carson River

SOW NO. ILM02.1 REVIEW COMPLETION DATE September 15, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES 20 WATER _____ SOIL _____ OTHER

TPO ACTION: The results for thallium in all of the samples were rejected due to a 27.0% matrix spike recovery.

TPO ATTENTION: Field duplicate samples MYL927 and MYL928 were not designated as field duplicates on the Field QA/QC Summary Form. As the station location numbers appeared to indicate that these were field duplicates, the Regional Sample Control Coordinator (RSCC) contacted the sampler to verify that these were field duplicate samples.

AREAS OF CONCERN: High CRDL standard recoveries of 150% for mercury, 157% (initial) and 144% (final) for chromium, and 529% (initial) and 538% (final) were reported for the analyses of the samples in this SDG. While there are no criteria established for CRDL standard recoveries, high recoveries may indicate high bias for sample results near the CRDL.

Total Mercury: Air

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 8, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 8041Y-01 Memo #02
SDG NO.:	SY8383
LABORATORY:	RMC Environmental Services, Inc. (RMC)
ANALYSIS:	SAS Mercury in Hopcalite Air Filter Tubes
SAMPLE NO.:	20 Air Filter Samples (SY8364 through SY8383)
COLLECTION DATE:	August 9, 10, and 11, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region III
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: SAS 8041Y-01 Memo #02
Site: Carson River
Laboratory: RMC Environmental Services, Inc. (RMC)
Reviewer: Chris Davis, ESAT/ICF
Date: November 8, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY8364 through SY8383

COLLECTION DATE: August 9, 10, and 11, 1993
SAMPLE RECEIPT DATE: August 16, 1993

CONCENTRATION & MATRIX: 20 Low Concentration Hopcalite Air Filter Tubes

FIELD QC: Field Blanks (FB): SY8369 and SY8378
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): SY8366 and SY8367
Duplicates (D2): SY8370 and SY8371
Duplicates (D3): SY8382 and SY8383

LABORATORY QC: Matrix Spike: Performed on Unused Hopcalite Filter Tubes
Duplicates: Not Applicable

ANALYSIS: SAS Mercury in Hopcalite Air Filter Tubes

Analyte	Sample Preparation and Digestion Date	Analysis Date
Mercury	August 20, 1993	August 23, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: All of the results in all of the samples and blanks were incorrectly calculated. The laboratory calculated final results in µg/Tube using the formula given in the Special Analytical Services (SAS) Client Request Form (CRF) and in NIOSH Method 6009, which employs analytical results in µg/aliquot of digestate. As

the laboratory employed analytical results in ug/L of digestate in the formula instead of μg/aliquot, the final results in μg/Tube were all 10X too high. All results were recalculated and all of the Form Is, IIIs, Vs, and Xs in the data package were resubmitted.

ADDITIONAL COMMENTS:

Unused hopcalite air filter tubes from the same batch as the samples were analyzed as blanks. The average of the results from these blanks were subtracted from the results for each sample. The results for the blank filter tubes and for the sample filter tubes were generally slightly greater than the contract required detection limit (CRDL). Although the results for several sample filter tubes were greater than the results for the blank filter tubes, the blank-subtracted results for all of the samples were less than the method detection limit (MDL), with the exception of sample SY8365, which was equal to the detection limit.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for total mercury in hopcalite air filter tubes by NIOSH Method 6009, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. Unused hopcalite air filter tubes from the same batch as the samples were analyzed as blanks. The average of the results from these blanks were subtracted from the results for each sample. The results for the blank filter tubes and for the sample filter tubes were generally slightly greater than the CRDL. Although the results for several sample filter tubes were greater than the results for the blank filter tubes, the blank-subtracted results for all of the samples were less than the MDL, with the exception of sample SY8365, which was equal to the detection limit.

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 8041Y-01 Memo #02
Site: Carson River
Lab.: RMC Environmental Services, Inc. (RMC)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: November 8, 1993

Analysis Type: Hopcalite Air Filter Tube Samples for SAS Total Mercury

Concentration in ug/Tube and mg/m3*

Station Location	DA01AV001			DA01AV002			DA01AV003			DA01AV004			DA01AV005			DA01AV006			DA01AV007		
Sample I.D.	SY8364			SY8365			SY8366 D1			SY8367 D1			SY8368			SY8369 FB			SY8370 D2		
Date of Collection	08/09/93			08/09/93			08/09/93			08/09/93			08/09/93			08/09/93			08/10/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury (ug/Tube)	0.025 U		A	0.025		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A
Mercury (mg/m3)*	0.00021 U		A	0.00021		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00023 U		A

Station Location	DA01AV008			DA01AV012			DA01AV011			DA01AV010			DA01AV014			DA01AV009			DA01AV013		
Sample I.D.	SY8371 D2			SY8372			SY8373			SY8374			SY8375			SY8376			SY8377		
Date of Collection	08/10/93			08/10/93			08/10/93			08/10/93			08/10/93			08/10/93			08/10/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury (ug/Tube)	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A
Mercury (mg/m3)*	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00025 U		A

Sample results are blank subtracted.
**Media Blank - Unused Hopcalite Air Filter Tubes
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
MDL-Method Detection Limit

* mg/m3 = Milligrams Per Cubic Meter of Air Sampled
SAS - Special Analytical Services
D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 8041Y-01 Memo #02
Site: Carson River
Lab.: RMC Environmental Services, Inc. (RMC)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: November 8, 1993

Analysis Type: Hopcalite Air Filter Tube Samples for SAS Total Mercury

Concentration in ug/Tube and mg/m3*

Station Location	DA01AV024			DA01AV015			DA01AV016			DA01AV017			DA01AV018			DA01AV019			**Media Blank #1		
Sample I.D.	SY8378 FB			SY8379			SY8380			SY8381			SY8382 D3			SY8383 D3					
Date of Collection	08/10/93			08/11/93			08/11/93			08/11/93			08/11/93			08/11/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury (ug/Tube)	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.075		
Mercury (mg/m3)*	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	N/A		

Sample I.D.	**Media Blank #2			MDL			SAS CRDL														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury (ug/Tube)	0.075			0.025			0.010														

Sample results are blank subtracted.
**Media Blank - Unused Hopcalite Air Filter Tubes
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
MDL-Metho[illegible]ction Limit
N/A - Not A[illegible]ble

* mg/m3 = Milligrams Per Cubic Meter of Air Sampled
SAS - Special Analytical Services
D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 8041Y-01 Memo #02 LABORATORY RMC

SDG NO. SY8383 SITE NAME Carson River

SOW NO. Not Applicable REVIEW COMPLETION DATE November 8, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER _____ SOIL 20 HOPCALITE AIR FILTER TUBES

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			0	
2. CALIBRATION			0	
3. BLANKS			0	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			0	
6. DUPLICATE ANALYSIS			0	
7. MATRIX SPIKE ANALYSIS			0	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			0	
11. SAMPLE VERIFICATION			0	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			0	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO ATTENTION: All of the results in all of the samples and blanks were incorrectly calculated. The laboratory calculated final results in µg/Tube using the formula given in the Special Analytical Services (SAS) Client Request Form (CRF) and in NIOSH Method 6009, which employs analytical results in µg/aliquot of digestate. As the laboratory employed analytical results in ug/L of digestate in the formula instead of µg/aliquot, the final results in µg/Tube were all 10X too high. All results were recalculated and all of the Form Is, IIIs, Vs, and Xs in the data package were resubmitted.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: October 25, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Debaack

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. Were 20 mL aliquots of digestate analyzed, as per the method?
2. The Form IIIs were not correctly filled out, as the results for the calibration blanks were listed as 0.0 U µg/L, not 0.2 U µg/L (or 0.1 U µg/L; see Item #3), and the results for the preparation blanks were listed as 0.0003 µg/L, not 0.3 µg/L.
3. Is the instrument detection limit (IDL) 0.1 µg/L or 0.2 µg/L? The laboratory ran a 0.1 µg/L calibration standard, and quantitated all non-detected results using the 0.1 µg/L IDL, however, the IDL was reported as 0.2 µg/L on Form X. If the IDL is 0.1 µg/L, please resubmit Form X for both data packages. If the IDL is 0.2 µg/L, please double all non-detected results (see Item #4).
4. All of the results in all of the samples, spike samples, and preparation blanks were incorrectly calculated. The laboratory results were in µg/L, whereas the method calls for quantitation of results in µg/aliquot of digestate analyzed. The laboratory calculated sample results using the formula given in the SAS CRF for analytical results in µg/aliquot:

   C (µg/L) = W (µg/aliquot) × V_s/V_A

   Where C = concentration of mercury in the sample, W = µg mercury in the aliquot analyzed, V_s = total volume of sample digestate, and V_A = volume of the aliquot of sample digestate analyzed (20 mL). To convert this formula for analytical results in µg/L (X), substitute the following for W (This will effectively remove the size of the sample aliquot and the results in µg/aliquot from the formula):

   W (µg/aliquot) = X (µg/L) × (0.020 L/aliquot) Thus: W = X/50

   Thus, the results reported by the laboratory were all 50X too high. The corrected results for the non-detects will be 0.005 µg/tube (0.25 U µg/tube ÷ 50), which is one half of the 0.01 µg/tube CRDL specified in the SAS CRF. As the laboratory used an IDL of 0.1 µg/L in the original calculations for the non-detects, which is one half of the 0.2 µg/L IDL required to meet the SAS CRDL, this would appear to be correct.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

If the IDL for these analyses is 0.2 µg/L, as reported on Form X (see Item #3), the results for the non-detected results would be 0.01 U µg/tube.

Please correct all of the results, and resubmit the pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs (if appropriate) in the data packages, and the pages of raw data with the calculations listed in the right hand columns. Be sure the results for the non-detected results correspond to the IDL listed on Form X. Please FEDEX me a copy of these resubmissions. If you have any further questions, or disagree with the above assessment, please contact me at (415) 882-3186.

Summary of Resolution:

1-4. All sample, spike sample, and preparation blank results were recalculated. The pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs (if appropriate) in the data packages, and the pages of raw data with the calculations listed in the right hand columns were corrected and resubmitted. ICF/ESAT received the resubmission through the EPA on 10/29/93.

Signature

October 29, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: October 26, 27, and 28, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Debaack

Region: IX

Regional Contact: Chris Davis

Calls Initiated By: X Laboratory _____ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. 10/26/93: The laboratory is very busy and is unable to send out the corrections until tomorrow, if this is O.K. with the validator.
2. 10/27/93: A) The laboratory wishes to confirm the values for the resubmissions.
   B) For the results in mg/m^3, how many significant figures should be reported? Please go over the calculations.
   C) The wrong wavelength is reported on Form X.
   D) The laboratory will send out the resubmissions this afternoon or tomorrow.
3. 10/28/93: The laboratory wishes to know who gets what copies of the resubmissions.

Summary of Resolution:

1. Yes, this is O.K.
2. A) The blanks are 0.015 µg/tube. Samples are 0.005 U µg/tube. Sample SY8365 is 0.005 µg/tube. ICV, CCV, and blanks can be reported in µg/L. The IDL is 0.1 µg/L.
   B) As the results are less than 0.1, report results to 2 significant figures. Here is a sample calculation:

   0.005 µg/tube × 1 tube/480 min × 1 min/247.9 mLs Air × 1000 mLs/L = 0.000042 µg/L = 0.000042 mg/m^3

   C) The laboratory will correct the wavelength on the resubmitted Form Xs.
   D) O.K.
3. ICF/ESAT will end up with the originals. CC Steve Remaley and SMO.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

All sample, spike sample, and preparation blank results were recalculated. The pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs in the data packages, and the pages of raw data with the calculations listed in the right hand columns were corrected and resubmitted. ICF/ESAT received the resubmission through the EPA on 10/29/93.

Chris Lewis
Signature

October 29, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: November 3, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Ovalman

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

The validator would like to ask the analyst several questions.

1. Was NIOSH Method 6009 used for these analyses?
2. Were the calibration standards prepared and run as 0.1, 0.2, 0.5 µg/L, etc. in 100 mL solutions?
3. Were the samples run as 20 mL of digestate diluted to 100 mL?
4. If yes to questions 2 and 3, a 5X dilution factor needs to be applied in addition to the corrections previously discussed and submitted. Please resubmit all of the previous resubmissions corrected for the 5X dilution. Thus, all sample, blank, and spike results will now be 5X greater than the resubmitted results, and they will be 10X less than the original results (instead of 50X less).

Summary of Resolution:

1-3. Yes.

4. The analyst agrees. The laboratory resubmitted the necessary forms and worksheets, and ICF/ESAT received copies of the resubmissions by FAX on November 5 and 8, 1993. (See TRL #4.)

Signature

November 8, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: November 5, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. I am checking to see when the corrections will be sent. Let us confirm the changes to be made.
2. The results from your 10/29/93 resubmission for the samples and the preparation blanks on the Form Is and the spreadsheets (page 4 of each data package) should all be multiplied by 5. Thus, the sample results will all be 0.025 U µg/Tube (except sample SY8365, which will be 0.025 µg/Tube). The results for the preparation blanks will be 0.075 µg/Tube. The detection limits on the Form Is will all be 0.025 µg/Tube.
3. The resubmitted Form IIIs still have 0.0 µg/L for the initial and continuing calibration blanks (ICB/CCB) in SDG SY8389, and are incorrectly listed as 0.015 µg/L in SDG SY8383, whereas the results should be 0.1 U µg/L. The preparation blank results are listed as 0.3 U µg/L, whereas they should be 0.3 µg/L (no "U" qualifier).
4. The resubmitted Form Vs were changed to results in µg/Tube, but the heading with concentration units says µg/L. As the percent recoveries are the same, and it is acceptable to report the results in µg/L, let us use the original Form Vs. The resubmitted Form Vs are not to be used, as per this conversation, and no resubmission is necessary for the Form Vs. However, it is a good idea to include copies of the original Form Vs in your resubmission to the EPA so their copies are correct.
5. Thus, the final resubmission should include the spreadsheet on page 4 of each data package, and Forms I and III, as well as copies of the original Form Vs. Thank you.

Summary of Resolution:

1-5. The laboratory resubmitted the necessary forms and worksheets, and ICF/ESAT received copies of the resubmissions by FAX on November 5 and 8, 1993.

Chris Davis — November 8, 1993

Signature — Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: November 8, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 8041Y-01 Memo #01
SDG NO.:	SY8389
LABORATORY:	RMC Environmental Services, Inc. (RMC)
ANALYSIS:	SAS Mercury in Hopcalite Air Filter Tubes
SAMPLE NO.:	6 Air Filter Samples (SY8384 through SY8389)
COLLECTION DATE:	August 11 and 12, 1993
REVIEWER:	Chris Davis, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Stevie Wilding, TPO USEPA Region III
Steve Remaley, USEPA Region IX

TPO: [ ]FYI [X]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

Data Validation Report

Case No.: SAS 8041Y-01 Memo #01
Site: Carson River
Laboratory: RMC Environmental Services, Inc. (RMC)
Reviewer: Chris Davis, ESAT/ICF
Date: November 8, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY8384 through SY8389

COLLECTION DATE: August 11 and 12, 1993
SAMPLE RECEIPT DATE: August 16, 1993

CONCENTRATION & MATRIX: 6 Low Concentration Hopcalite Air Filter Tubes

FIELD QC: Field Blanks (FB): SY8387 and SY8389
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: Performed on Unused Hopcalite Filter Tubes
Duplicates: Not Applicable

ANALYSIS: SAS Mercury in Hopcalite Air Filter Tubes

Analyte	Sample Preparation and Digestion Date	Analysis Date
Mercury	August 20, 1993	August 23, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: None

TPO ATTENTION:

METHOD NON-COMPLIANCE: None

SAMPLING ISSUES: None

OTHER: All of the results in all of the samples and blanks were incorrectly calculated. The laboratory calculated final results in µg/Tube using the formula given in the Special Analytical Services (SAS) Client Request Form (CRF) and in NIOSH Method 6009, which employs analytical results in µg/aliquot of digestate. As the laboratory employed analytical results in ug/L of digestate in the formula instead of µg/aliquot, the final results in µg/Tube

were all 10X too high. All results were recalculated and all of the Form Is, IIIs, Vs, and Xs in the data package were resubmitted.

ADDITIONAL COMMENTS:

Unused hopcalite air filter tubes from the same batch as the samples were analyzed as blanks. The average of the results from these blanks were subtracted from the results for each sample. The results for the blank filter tubes and for the sample filter tubes were generally slightly greater than the contract required detection limit (CRDL). Although the results for several sample filter tubes were greater than the results for the blank filter tubes, the blank-subtracted results for all of the samples were less than the method detection limit (MDL).

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS CRF for total mercury in hopcalite air filter tubes by NIOSH Method 6009, and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," (October, 1989).

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	N/A	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. Unused hopcalite air filter tubes from the same batch as the samples were analyzed as blanks. The average of the results from these blanks were subtracted from the results for each sample. The results for the blank filter tubes and for the sample filter tubes were generally slightly greater than the CRDL. Although the results for several sample filter tubes were greater than the results for the blank filter tubes, the blank-subtracted results for all of the samples were less than the MDL.

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 8041Y-01 Memo #01
Site: Carson River
Lab.: RMC Environmental Services, Inc. (RMC)
Reviewer: Chris Davis, ESAT/ICF Technology, Inc.
Date: November 8, 1993

Analysis Type: Hopcalite Air Filter Tube Samples for SAS Total Mercury

Concentration in ug/Tube and mg/m3*

Station Location	DA01AC020			DA01AC021			DA01AC022			DA01AC023			DA01AC025			DA01AC026			**Media Blank #1		
Sample I.D.	SY8384			SY8385			SY8386			SY8387 FB			SY8388			SY8389					
Date of Collection	08/11/93			08/11/93			08/11/93			08/11/93			08/12/93			08/12/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury (ug/Tube)	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.025 U		A	0.075		
Mercury (mg/m3)*	0.00021 U		A	0.00022 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	0.00021 U		A	N/A		

Sample I.D.	**Media Blank #2			MDL			SAS CRDL														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.075			0.025			0.010														

Sample results are blank subtracted.
**Media Blank - Unused Hopcalite Air Filter Tubes
Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
MDL-Method Detection Limit
N/A - Not Applicable

* mg/m3 = Milligrams Per Cubic Meter of Air Sampled
SAS - Special Analytical Services
D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [ ]FYI [X]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 8041Y-01 Memo #01 LABORATORY RMC

SDG NO. SY8389 SITE NAME Carson River

SOW NO. Not Applicable REVIEW COMPLETION DATE November 8, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Chris Davis

NO. OF SAMPLES _____ WATER _____ SOIL 6 HOPCALITE AIR FILTER TUBES

	ICP	GFAA	Hg	Cyanide
1. HOLDING TIMES			0	
2. CALIBRATION			0	
3. BLANKS			0	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			0	
6. DUPLICATE ANALYSIS			0	
7. MATRIX SPIKE ANALYSIS			0	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			0	
11. SAMPLE VERIFICATION			0	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			0	

O = No problems or minor problems that affect data quality.
X = No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M = More than about 5% of the data points are qualified as estimates.
Z = More than about 5% of the data points have been rejected.
N/A = Not Applicable.

TPO ATTENTION: All of the results in all of the samples and blanks were incorrectly calculated. The laboratory calculated final results in µg/Tube using the formula given in the Special Analytical Services (SAS) Client Request Form (CRF) and in NIOSH Method 6009, which employs analytical results in µg/aliquot of digestate. As the laboratory employed analytical results in ug/L of digestate in the formula instead of µg/aliquot, the final results in µg/Tube were all 10X too high. All results were recalculated and all of the Form Is, IIIs, Vs, and Xs in the data package were resubmitted.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: October 25, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Debaack

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. Were 20 mL aliquots of digestate analyzed, as per the method?
2. The Form IIIs were not correctly filled out, as the results for the calibration blanks were listed as 0.0 U µg/L, not 0.2 U µg/L (or 0.1 U µg/L; see Item #3), and the results for the preparation blanks were listed as 0.0003 µg/L, not 0.3 µg/L.
3. Is the instrument detection limit (IDL) 0.1 µg/L or 0.2 µg/L? The laboratory ran a 0.1 µg/L calibration standard, and quantitated all non-detected results using the 0.1 µg/L IDL, however, the IDL was reported as 0.2 µg/L on Form X. If the IDL is 0.1 µg/L, please resubmit Form X for both data packages. If the IDL is 0.2 µg/L, please double all non-detected results (see Item #4).
4. All of the results in all of the samples, spike samples, and preparation blanks were incorrectly calculated. The laboratory results were in µg/L, whereas the method calls for quantitation of results in µg/aliquot of digestate analyzed. The laboratory calculated sample results using the formula given in the SAS CRF for analytical results in µg/aliquot:

   $C\ (\mu g/L) = W\ (\mu g/aliquot) \times V_s/V_A$

   Where C = concentration of mercury in the sample, W = µg mercury in the aliquot analyzed, V_s = total volume of sample digestate, and V_A = volume of the aliquot of sample digestate analyzed (20 mL). To convert this formula for analytical results in µg/L (X), substitute the following for W (This will effectively remove the size of the sample aliquot and the results in µg/aliquot from the formula):

   $W\ (\mu g/aliquot) = X\ (\mu g/L) \times (0.020\ L/aliquot)$ Thus: $W = X/50$

   Thus, the results reported by the laboratory were all 50X too high. The corrected results for the non-detects will be 0.005 µg/tube (0.25 U µg/tube ÷ 50), which is one half of the 0.01 µg/tube CRDL specified in the SAS CRF. As the laboratory used an IDL of 0.1 µg/L in the original calculations for the non-detects, which is one half of the 0.2 µg/L IDL required to meet the SAS CRDL, this would appear to be correct.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGICNAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

If the IDL for these analyses is 0.2 µg/L, as reported on Form X (see Item #3), the results for the non-detected results would be 0.01 U µg/tube.

Please correct all of the results, and resubmit the pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs (if appropriate) in the data packages, and the pages of raw data with the calculations listed in the right hand columns. Be sure the results for the non-detected results correspond to the IDL listed on Form X. Please FEDEX me a copy of these resubmissions. If you have any further questions, or disagree with the above assessment, please contact me at (415) 882-3186.

Summary of Resolution:

1-4. All sample, spike sample, and preparation blank results were recalculated. The pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs (if appropriate) in the data packages, and the pages of raw data with the calculations listed in the right hand columns were corrected and resubmitted. ICF/ESAT received the resubmission through the EPA on 10/29/93.

Chris Lewis
Signature

October 29, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: October 26, 27, and 28, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Debaack

Region: IX

Regional Contact: Chris Davis

Calls Initiated By: X Laboratory _____ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. 10/26/93: The laboratory is very busy and is unable to send out the corrections until tomorrow, if this is O.K. with the validator.
2. 10/27/93: A) The laboratory wishes to confirm the values for the resubmissions.
   B) For the results in mg/m^3, how many significant figures should be reported? Please go over the calculations.
   C) The wrong wavelength is reported on Form X.
   D) The laboratory will send out the resubmissions this afternoon or tomorrow.
3. 10/28/93: The laboratory wishes to know who gets what copies of the resubmissions.

Summary of Resolution:

1. Yes, this is O.K.
2. A) The blanks are 0.015 µg/tube. Samples are 0.005 U µg/tube. Sample SY8365 is 0.005 µg/tube. ICV, CCV, and blanks can be reported in µg/L. The IDL is 0.1 µg/L.
   B) As the results are less than 0.1, report results to 2 significant figures. Here is a sample calculation:

   0.005 µg/tube × 1 tube/480 min × 1 min/247.9 mLs Air × 1000 mLs/L = 0.000042 µg/L = 0.000042 mg/m^3

   C) The laboratory will correct the wavelength on the resubmitted Form Xs.
   D) O.K.
3. ICF/ESAT will end up with the originals. CC Steve Remaley and SMO.

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

All sample, spike sample, and preparation blank results were recalculated. The pages of calculations (page 4 of both data packages), all of the Form Is, IIIs, Vs, and Xs in the data packages, and the pages of raw data with the calculations listed in the right hand columns were corrected and resubmitted. ICF/ESAT received the resubmission through the EPA on 10/29/93.

Signature

October 29, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: November 3, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn and John Ovalman

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

The validator would like to ask the analyst several questions.

1. Was NIOSH Method 6009 used for these analyses?
2. Were the calibration standards prepared and run as 0.1, 0.2, 0.5 µg/L, etc. in 100 mL solutions?
3. Were the samples run as 20 mL of digestate diluted to 100 mL?
4. If yes to questions 2 and 3, a 5X dilution factor needs to be applied in addition to the corrections previously discussed and submitted. Please resubmit all of the previous resubmissions corrected for the 5X dilution. Thus, all sample, blank, and spike results will now be 5X greater than the resubmitted results, and they will be 10X less than the original results (instead of 50X less).

Summary of Resolution:

1-3. Yes.

4. The analyst agrees. The laboratory resubmitted the necessary forms and worksheets, and ICF/ESAT received copies of the resubmissions by FAX on November 5 and 8, 1993. (See TRL #4.)

Chris Davis
Signature

November 8, 1993
Date

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

In Reference to Case No(s).:

SAS 8041Y-01 Memos #01 and #02

Contract Laboratory Program
REGIONAL/LABORATORY COMMUNICATION SYSTEM
Telephone Record Log

Date of Call: November 5, 1993

Laboratory Name: RMC Environmental Services Inc.(RMC)

Lab Contact: Helen McMinn

Region: IX

Regional Contact: Chris Davis

Call Initiated By: _____ Laboratory __X__ Region

In reference to data for the following sample number(s):
SY8364 through SY8389 (SDG #s SY8383 and SY8389)

Summary of Questions/Issues Discussed:

1. I am checking to see when the corrections will be sent. Let us confirm the changes to be made.
2. The results from your 10/29/93 resubmission for the samples and the preparation blanks on the Form Is and the spreadsheets (page 4 of each data package) should all be multiplied by 5. Thus, the sample results will all be 0.025 U µg/Tube (except sample SY8365, which will be 0.025 µg/Tube). The results for the preparation blanks will be 0.075 µg/Tube. The detection limits on the Form Is will all be 0.025 µg/Tube.
3. The resubmitted Form IIIs still have 0.0 µg/L for the initial and continuing calibration blanks (ICB/CCB) in SDG SY8389, and are incorrectly listed as 0.015 µg/L in SDG SY8383, whereas the results should be 0.1 U µg/L. The preparation blank results are listed as 0.3 U µg/L, whereas they should be 0.3 µg/L (no "U" qualifier).
4. The resubmitted Form Vs were changed to results in µg/Tube, but the heading with concentration units says µg/L. As the percent recoveries are the same, and it is acceptable to report the results in µg/L, let us use the original Form Vs. The resubmitted Form Vs are not to be used, as per this conversation, and no resubmission is necessary for the Form Vs. However, it is a good idea to include copies of the original Form Vs in your resubmission to the EPA so their copies are correct.
5. Thus, the final resubmission should include the spreadsheet on page 4 of each data package, and Forms I and III, as well as copies of the original Form Vs. Thank you.

Summary of Resolution:

1-5. The laboratory resubmitted the necessary forms and worksheets, and ICF/ESAT received copies of the resubmissions by FAX on November 5 and 8, 1993.

Signature: _____ Date: November 8, 1993

Distribution: (1) Lab Copy, (2) Region Copy, (3) SMO Copy

Total Mercury: Plant Tissue

160 Spear Street, Suite 1380
San Francisco, CA
94105-1535
415/882-3000
Fax 415/882-3199

ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: October 22, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7877Y-03 Memo #01
SDG NO.:	SY7125
LABORATORY:	Hazleton Environmental Services, Inc. (HAZLET)
ANALYSIS:	SAS Mercury
SAMPLE NO.:	20 Plant Tissue Samples (SY7125 through SY7144)
COLLECTION DATE:	August 18, 1993
REVIEWER:	Rameen Moezzi, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Pat Churilla, TPO USEPA Region V

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-9201/7877Y3M1.RPT

Data Validation Report

Case No.: SAS 7877Y-03 Memo #01
Site: Carson River
Laboratory: Hazleton Environmental Services, Inc. (HAZLET)
Reviewer: Rameen Moezzi, ESAT/ICF
Date: October 22, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY7125 through SY7144

COLLECTION DATE: August 18, 1993
SAMPLE RECEIPT DATE: August 20, 1993

CONCENTRATION & MATRIX: 20 Low Concentration Plant Tissue Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: SY7128
Duplicates: SY7128

ANALYSIS: SAS Mercury

Analyte	Sample Preparation and Digestion Date	Analysis Date
Mercury	September 14, 1993	September 14, 1993
Percent Solids	Not Applicable	September 8, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7125 through SY7128, SY7132 through SY7139, and SY7141 through SY7144 is unknown.

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) and in the SAS contract have been met.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS Client Request Form (CRF) for mercury in plant tissue, the EPA Contract Laboratory Program Inorganic Statement of Work (ILM03.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	Yes	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A,B
13. Sample Result Verification	Yes	

N/A = Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL), but below the contract required detection limit (CRDL) specified in the EPA CLP Inorganic SOW (ILM03.0), are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Samples SY7127 and SY7141 had results for mercury between the MDL and the CRDL before correction for percent solids.

B. According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7125 through SY7128, SY7132 through SY7139, and SY7141 through SY7144 is unknown.

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7877Y-03 Memo #01
Site: Carson River
Lab.: Hazleton Environmental Services, Inc. (HAZLET)
Reviewer: Rameen Moezzi, ESAT/ICF Technology, Inc.
Date: October 22, 1993

Analysis Type: Plant Tissue for SAS Mercury

Concentration in mg/Kg (Dry weight basis)

Station Location	AG002-VG-01-A			AG002-02-A			AG002-VG-03-A			AG002-VG-04-A			AG002-VG-05-A			AG002-VG-06-A			AG004-VG-01-A		
Sample I.D.	SY7125			SY7126			SY7127			SY7128			SY7129			SY7130			SY7131		
Date of Collection	08/18/93			08/18/93			08/18/93			08/18/93			08/18/93			08/18/93			08/18/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.51 U		B	0.34 U		B	0.27 L	J	AB	1.0 U		B	2.3			1.3			2.1		
Percent Solids	7.4 %			12.1 %			14.5 %			4.1 %			17.8 %			49.1 %			10.3 %		

Station Location	AG004-VG-02-A			AG004-VG-03-A			AG004-VG-004-A			AG005-VG-04-A			AG005VG-03-A			AG005-VG-02-A			AG005-VG-01-A		
Sample I.D.	SY7132			SY7133			SY7134			SY7135			SY7136			SY7137			SY7138		
Date of Collection	08/18/93			08/18/93			08/18/93			08/18/93			08/18/93			08/18/93			08/18/93		
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.99		B	0.20 U		B	0.67 U		B	0.21 U		B	1.2 U		B	0.53 U		B	1.2 U		B
Percent Solids	12.1 %			19.2 %			6.1 %			19.2 %			3.8 %			7.1 %			3.8 %		

Station Location	AG007-VG-01-A			AG007-VG-02-A			AG007-VG-03-A			AG007-VG-04-A			AG007-VG-05-A			AG009-VG-01-A					
Sample I.D.	SY7139			SY7140			SY7141			SY7142			SY7143			SY7144			Lab Blank		
Date of Collection	08/18/93			08/18/93			08/18/93			08/18/93			08/18/93			08/18/93					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	1.0 U		B	8.0			0.87 L	J	AB	1.0		B	0.20		B	0.35 U		B	0.04 U		
Percent Solids	4.1 %			8.0 %			5.6 %			9.9 %			34.0 %			12.9 %			N/A		

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not Applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

ANALYTICAL RESULTS
TABLE 1A

Case No.: SAS 7877Y-03 Memo #01
Site: Carson River
Lab.: Hazleton Environmental Services, Inc. (HAZLET)
Reviewer: Rameen Moezzi, ESAT/ICF Technology, Inc.
Date: October 22, 1993

Analysis Type: Plant Tissue for SAS Mercury

Concentration in mg/Kg (Dry weight basis)

Sample I.D.	MDL			SAS CRDL			CLP Inorganic SOW CRDL														
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.04			0.05			0.10														
Station Location Sample I.D. Date of Collection																					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Station Location Sample I.D. Date of Collection																					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not applicable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7877Y-03 Memo #01 LABORATORY HAZLET

SDG NO. SY7125 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE October 22, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Rameen Moezzi

NO. OF SAMPLES _____ WATER _____ SOIL 20 PLANT TISSUE

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES			O	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			O	
7. MATRIX SPIKE ANALYSIS			O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [X]FYI [ ]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7877Y-03 Memo #01 LABORATORY HAZLET

SDG NO. SY7125 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE October 22, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Rameen Moezzi

NO. OF SAMPLES _____ WATER _____ SOIL 20 PLANT TISSUE

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7125 through SY7128, SY7132 through SY7139, and SY7141 through SY7144 data is unknown.

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ICF TECHNOLOGY INCORPORATED

MEMORANDUM

TO: Sean Hogan
Environmental Engineer
South Bay Section, H-6-3

THROUGH: Richard Bauer
Environmental Scientist
Quality Assurance Management Section (QAMS), P-3-2

FROM: Margie D. Weiner MDW
Senior Data Review Oversight Chemist
Environmental Services Assistance Team (ESAT)

DATE: October 22, 1993

SUBJECT: Review of Analytical Data

Attached are comments resulting from ESAT Region IX review of the following analytical data:

SITE:	Carson River
EPA SSI NO.:	R6
CERCLIS I.D. NO.:	NVD980813646
CASE/SAS NO.:	SAS 7877Y-03 Memo #02
SDG NO.:	SY7145
LABORATORY:	Hazleton Environmental Services, Inc. (HAZLET)
ANALYSIS:	SAS Mercury
SAMPLE NO.:	4 Plant Tissue Samples (SY7145 through SY7148)
COLLECTION DATE:	August 18, 1993
REVIEWER:	Rameen Moezzi, ESAT/ICF

If there are any questions, please contact Margie D. Weiner (ESAT/ICF) at (415) 882-3061, or Richard Bauer (QAMS/EPA) at (415) 744-1499.

Attachment

cc: Pat Churilla, TPO USEPA Region V

TPO: [X]FYI [ ]Attention [ ]Action

SAMPLING ISSUES: [ ]Yes [X]No

ESAT-QA-9A-9202/7877Y3M2.RPT

Data Validation Report

Case No.: SAS 7877Y-03 Memo #02
Site: Carson River
Laboratory: Hazleton Environmental Services, Inc. (HAZLET)
Reviewer: Rameen Moezzi, ESAT/ICF
Date: October 22, 1993

I. Case Summary

SAMPLE INFORMATION: SAMPLE #: SY7145 through SY7148

COLLECTION DATE: August 18, 1993
SAMPLE RECEIPT DATE: August 20, 1993

CONCENTRATION & MATRIX: 4 Low Concentration Plant Tissue Samples

FIELD QC: Field Blanks (FB): None
Equipment Blanks (EB): None
Background Samples (BG): None
Duplicates (D1): None

LABORATORY QC: Matrix Spike: SY7145
Duplicates: SY7145

ANALYSIS: SAS Mercury

Analyte	Sample Preparation and Digestion Date	Analysis Date
Mercury	September 14, 1993	September 14, 1993
Percent Solids	Not Applicable	September 8, 1993

TPO ACTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

TPO ATTENTION:

METHOD NON-COMPLIANCE: None.

SAMPLING ISSUES: None.

OTHER: None.

ADDITIONAL COMMENTS:

According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7145 and SY7146 is unknown.

All method requirements specified in the EPA Contract Laboratory Program (CLP) Inorganic Statement of Work (SOW) and in the SAS contract have been met.

The analytical results with qualifications are listed in Table 1A. The definitions of the data qualifiers used in Table 1A are listed in Table 1B. This report was prepared in accordance with the SAS Client Request Form (CRF) for mercury in plant tissue, the EPA Contract Laboratory Program Inorganic Statement of Work (ILM03.0), and the EPA Draft Document "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

II. Validation Summary

The data were evaluated based on the following parameters:

Parameter	Acceptable	Comment
1. Data Completeness	Yes	
2. Sample Preservation and Holding Times	Yes	
3. Calibration	Yes	
a. Initial Calibration Verification		
b. Continuing Calibration Verification		
c. Calibration Blank		
4. Blanks	Yes	
a. Laboratory Preparation Blank		
b. Field Blank		
c. Equipment Blank		
5. ICP Interference Check Sample Analysis	N/A	
6. Laboratory Control Sample Analysis	Yes	
7. Spiked Sample Analysis	Yes	
8. Laboratory Duplicate Sample Analysis	Yes	
9. Field Duplicate Sample Analysis	N/A	
10. GFAA QC Analysis	Yes	
a. Duplicate Injections		
b. Analytical Spikes		
c. Method of Standard Addition		
11. ICP Serial Dilution Analysis	N/A	
12. Sample Quantitation	Yes	A,B
13. Sample Result Verification	Yes	

N/A - Not Applicable

III. Validity and Comments

A. The following results are estimated and are flagged "J" in Table 1A.

- All results above the method detection limit but below the contract required detection limit (denoted with an "L" qualifier)

Results above the method detection limit (MDL), but below the contract required detection limit (CRDL) specified in the EPA CLP Inorganic SOW (ILM03.0), are considered qualitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

Samples SY7145 and SY7146 had results for mercury between the MDL and the CRDL before correction for percent solids.

B. According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7145 and SY7146 is unknown.

ANALYTICA ESULTS
TABLE 1A

Case No.: SAS 7877Y-03 Memo #02
Site: Carson River
Lab.: Hazleton Environmental Services, Inc. (HAZLET)
Reviewer: Rameen Moezzi, ESAT/ICF Technology, Inc.
Date: October 22, 1993

Analysis Type: Plant Tissue for SAS Mercury

Concentration in mg/Kg (Dry weight basis)

Station Location	AG009-VG-02-A			AG009-VG-03-A			MS011-AG-01-A			MS011-AG-02-A			Lab Blank			MDL			SAS CRDL		
Sample I.D.	SY7145			SY7146			SY7147			SY7148											
Date of Collection	08/18/93			08/18/93			08/18/93			08/18/93											
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.30 L	J	AB	0.30 L	J	AB	0.80			0.56			0.04 U			0.04			0.05		
Percent Solids	15.7 %			19.2 %			28.4 %			31.8 %			N/A			N/A			N/A		

Station Location	CLP Inorganic																				
Sample I.D.	RAS CRDL																				
Date of Collection																					
Parameter	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com	Result	Val	Com
Mercury	0.10																				

Val-Validity Refer to Data Qualifiers in Table 1B
Com.-Comments Refer to the Corresponding Section in the Narrative for each letter.
IDL-Instrument Detection Limit for Waters, MDL-Method Detection Limit for Soils.
N/A-Not ‘icable

D1, D2, etc.-Field Duplicate Pairs
FB-Field Blank, EB-Equipment Blank, TB-Travel Blank, BG-Background
CRDL-Contract Required Detection Limit

TABLE 1B

DATA QUALIFIER DEFINITIONS FOR INORGANIC DATA REVIEW

The definitions of the following qualifiers are prepared in accordance with the EPA draft document, "Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses," October, 1989.

NO QUALIFIER indicates that the data are acceptable both qualitatively and quantitatively.

U The analyte was analyzed for but was not detected above the level of the reported value. The reported value is the Instrument Detection Limit (IDL) for waters and the Method Detection Limit (MDL) for soils for all the analytes except Cyanide (CN) and Mercury (Hg). For CN and Hg, the reported value is the Contract Required Detection Limit (CRDL).

L The analyte was analyzed for but results fell between the IDL for waters or the MDL for soils and the CRDL. Results are estimated and are considered qualitatively acceptable but quantitatively unreliable due to uncertainties in the analytical precision near the limit of detection.

J The analyte was analyzed for and was positively identified, but the reported numerical value may not be consistent with the amount actually present in the environmental sample.

R The analyte was analyzed for, but the presence <u>or</u> absence of the analyte has not been verified. Resampling and reanalysis are necessary to confirm or deny the presence of the analyte.

UJ A combination of the "U" and the "J" qualifier. The analyte was analyzed for but was not detected above the reported value. The reported value may not accurately or precisely represent the sample IDL or MDL.

TPO: [X]FYI [ ]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7877Y-03 Memo #02 LABORATORY HAZLET

SDG NO. SY7145 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE October 22, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Rameen Moezzi

NO. OF SAMPLES _____ WATER _____ SOIL 4 PLANT TISSUE

	ICP	GFAA	Hg	Cyanide
1. PRESERVATION AND HOLDING TIMES			O	
2. CALIBRATION			O	
3. BLANKS			O	
4. ICP INTERFERENCE CHECK SAMPLE (ICS)				
5. LABORATORY CONTROL SAMPLE (LCS)			O	
6. DUPLICATE ANALYSIS			O	
7. MATRIX SPIKE ANALYSIS			O	
8. METHOD OF STANDARD ADDITION (MSA)				
9. ICP SERIAL DILUTION				
10. SAMPLE QUANTITATION			O	
11. SAMPLE VERIFICATION			O	
12. GFAA ANALYTICAL SPIKE				
13. OVERALL ASSESSMENT			O	

O - No problems or minor problems that affect data quality.
X - No more than about 5% of the data points have limitations on data quality. Data points are either qualified as estimates or rejected.
M - More than about 5% of the data points are qualified as estimates.
Z - More than about 5% of the data points have been rejected.
N/A - Not Applicable.

TPO: [X]FYI [ ]Attention [ ]Action Region IX

INORGANIC REGIONAL DATA ASSESSMENT

CASE NO. SAS 7877Y-03 Memo #02 LABORATORY HAZLET

SDG NO. SY7145 SITE NAME Carson River

SOW NO. ILM03.0 REVIEW COMPLETION DATE October 22, 1993

REVIEWER [ ] ESD [X] ESAT REVIEWER'S NAME Rameen Moezzi

NO. OF SAMPLES _____ WATER _____ SOIL 4 PLANT TISSUE

TPO ACTION: None.

TPO ATTENTION: None.

AREAS OF CONCERN: According to the SOW (ILM03.0), in order to verify linearity near the CRDL, the laboratory must analyze an AA standard at the CRDL or the IDL, whichever is greater, at the beginning of each sample analysis run, but not before the initial calibration verification (ICV). The laboratory analyzed a CRDL standard at the concentration of the RAS CRDL (0.2 μg/L) rather than the SAS CRDL (0.1 μg/L). Therefore, the linearity near the CRDL of 0.1 μg/L for mercury could not be verified. The effect on the quality of the mercury results for samples SY7145 and SY7146 is unknown.

Bureau of Reclamation
Reports

LAHONTAN RESERVOIR
AIR SAMPLING
AND QUALITY ASSESSMENT PLAN

Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

July 1993

PROJECT/TASK ORGANIZATION

The investigation of air quality in regards to metals in particulates at Lahontan Reservoir (LR) will be conducted by MP-470 staff of the Bureau of Reclamation's (Reclamation) Mid-Pacific Regional Office in Sacramento, California, with the aid of staff from Reclamation's Lahontan Basin Project Office in Carson City, Nevada. The investigation is being performed at the request of the Lahontan Basin Project Office through Reclamation's Mid-Pacific Hazardous Waste Coordinator (MP-405). MP-470 personnel involved include Chief of the Quality Assurance Branch (project head) and physical scientists specialized in field sampling and quality assurance/quality control (QA/QC). Air filters are being provided by the Desert Research Institute located in Reno, Nevada, and analytical services are being provided by CH2M Hill Laboratory in Redding, California.

PROBLEM DEFINITION/BACKGROUND

This initial air sampling/quality assessment plan focuses on the exposed beach areas surrounding Lahontan Reservoir and is being conducted to determine 1) whether or not a Site Safety Plan is needed for employees working at LR, and 2) if a public health threat exists. The assessment will determine the level of Total Suspended Particulates (TSP), levels of particulate matter with a diameter of 10 micrometers or less (PM10), and the concentrations of lead, arsenic, mercury and other heavy metals possibly present in the air at major beach areas of LR. An additional air sampler located at the State of Nevada Air Resources building in Carson City is being utilized as a control.

As a result of elevated mercury levels in wildlife and sediment found in the Carson River watershed, as well as in the fish and water at LR, LR has been included as part of the Carson River Mercury Superfund Site by the U.S. Environmental Protection Agency (EPA). EPA estimates that over 7000 tons of mercury was released into the Carson River watershed as part of the gold and silver mining operations. Mining in the Carson River drainage basin commenced in 1850 when placer gold deposits were discovered in the Comstock Lode near Virginia City, Nevada. Mercury introduced into the region in the late 1800's to process gold and silver ore from the Comstock Lode is thought to be the primary source of mercury contamination in the Carson River drainage basin.

Lahontan Reservoir, owned by the U.S. Bureau of Reclamation encompasses approximately 41,500 acres. LR is located in west central Nevada, south of highway 50, between Carson City and Fallon, Nevada. Located on the Carson River, LR can store 314,000 acre-feet of water. Water from the Carson River and water diverted from the Truckee River provide most of the water supply for LR. LR is also a multiuse unit of the Nevada State Park System. Swimming, fishing, boating, water skiing, camping, and picnicking are popular activities in and around LR.

The Carson River drains 3,980 square miles in east-central California and west-central Nevada. The Carson River begins in the eastern Sierra Nevada Mountain Range, south of Lake Tahoe and generally flows north eastward and eastward to the Carson Sink. The flow of the Carson River is interrupted west of Fallon, Nevada by Lahontan Reservoir, part of the Newland's Irrigation Project. Below Lahontan Dam, flow is routed through a complex network of ditches, drains, and canals. Irrigation return flow eventually discharges to Carson Lake, Stillwater National Wildlife Refuge, or the Carson Sink.

The air monitoring program at Lahontan Reservoir is being performed in conjunction with MP-470's water and soil investigations of Lahontan Reservoir, Indian Lakes, and Carson Lake Pasture, all sites within the Carson River watershed.

PROJECT/TASK OBJECTIVES AND DESCRIPTION

The objective of this investigation is to determine whether the airborne material in the beach areas of LR presents a health hazard to employees working at LR and to the public visiting LR.

The field work is scheduled to commence on July 7, 1993 and to be completed by approximately November, 1993. Laboratory turnaround time is scheduled for 30 days from the receipt of the sample to receipt of a data package. Approved sample results will be available by August 1993. Data evaluation is estimated to take another 14 days after sample results are received. A Quality Assurance Summary Report will accompany each data package with an interpretation of the results provided by Reclamation's Mid-Pacific Region QA personnel.

DATA QUALITY OBJECTIVES FOR MEASUREMENT

As this investigation is designed to determine the potential threat to human health, data collection activities require a high degree of qualitative and quantitative accuracy. To achieve this high degree of quality assurance, the samples will be analyzed and results validated by EPA methods and procedures to ensure that data are verifiable and defensible. Decisions and actions based on the data produced by this investigation must be made with a high degree of confidence in the quality of the data.

DOCUMENTATION AND RECORDS

The final data report for the LR air monitoring program will include all TSP and PM10 results, all worst case analytical results for individual metals, and quality assurance summary reviews. Documentation backing this data will include results of instrument calibrations and laboratory QC checks such as duplicates, spikes, and method blanks. External check sample results including collocated samples and blank control filters, as well as field sampling narrative documenting any notable problems or occurrences during sample collection, will be on file with Reclamation's Mid-Pacific Region Quality Assurance Branch or Lahontan Basin Projects Office.

SAMPLING PROCESS DESIGN

The air sampling plan (including QA) will entail collecting a total of 10 samples per sampling episode, with samplers to run on the EPA National Air Monitoring schedule every six days. Two samplers will run at each sampling location, one TSP and one PM-10 sampler. One site will include a collocated station with one additional TSP and PM10 sampler for a total of four samplers. A blank filter will be incorporated into each sample batch before sending the filters to the laboratory for weighing and analysis.

The sites selected were the picnic grounds adjacent to Lahontan Dam, the North Shore Marina, Beach 3, and Beach 7. These sites were selected because of their high usage by the public, as well as security and availability of electric power for the samplers. Placing the samplers atop the restroom/shower buildings reduces the possibilities of vandalism or tampering, and reduces the logistical problems of running electrical lines to the stations. These locations also meet the criteria prescribed for sampling locations and collocated stations in the 40 CFR Part 50, EPA regulations for air monitoring.

SAMPLE HANDLING AND CHAIN OF CUSTODY REQUIREMENTS

A logbook will be used to record the following: conditions under which the samples are collected; person(s) collecting the samples; time and date of collection; sample identification number, weather conditions, wind speed and direction. Additional wind speed and direction data will be obtained from the Reno Airport and/or Fallon Naval Air Station. Field sheets will be used to record the identification of the sample, collection date, and names of person(s) collecting the sample. Dixon charts will record pertinent sampler information for each run including the duration and volume of air flow through the filter. A chain of custody sheet will be used to record the sample identification, number of filters, analyses to be performed and dates and times documenting transfer of filter custody. The log book will be kept at Reclamation's Carson City Office. The chain of custody will accompany the samples from the site to the laboratory with a copy being filed in Carson City and in Sacramento.

ANALYTICAL METHODS REQUIREMENTS

Samples will be weighed, then digested by CH2M Hill Laboratory following EPA Method 3050, method for soil digestion found in the manual "Test Methods for Evaluating Solid Waste," SW-846. Samples will then be analyzed by graphite furnace for arsenic, cadmium, chromium, lead, and silver. Mercury will be analyzed by cold vapor, and nickel will be analyzed by ICP. Copper will first be analyzed by graphite furnace, then by ICP if results are greater than 15 ug/filter, or 5 times the detection limit.

QUALITY CONTROL REQUIREMENTS

As a check on contamination, a blank filter will be incorporated into the sample batches prior to submittal to the contract laboratory. The difference or relative percent difference between the regular and collocated station will be calculated for each batch and compared to the precision criteria set forth in the 40 CFR Part 50, Appendix J: Within 5 ug/m^3 for concentrations below 80 ug/m^3, and within 7 percent for concentrations above 80 ug/m^3.

Internal quality control checks will be required by Reclamation to be reported with each batch of sample results. These results must include duplicates and spikes to be performed on Reclamation samples, preparation blanks, laboratory control sample results, and calibration results. The quality control results will be evaluated by MP-470 QA staff according to criteria required by Mid-Pacific Region for soils (attached).

INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

Laboratory protocol for instrument maintenance procedures is specified in CH2M Hill's laboratory manual. An on-site system audit was performed by Reclamation's MP-470 QA personnel in December 1991, and instrumentation was found to be up-to-date with well documented logbooks and service contracts with manufacturers in place.

INSTRUMENT CALIBRATION AND FREQUENCY

PM-10 and TSP samplers will be calibrated at intervals of every three months, or at such time as there is an equipment malfunction or interruption of power to the stations. CH2M Hill specifies instrument calibration procedures in the laboratory manual and results of calibrations are included in each batch of sample results.

DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

All data from the analyses will include a complete data package with quality control, blank, spike and duplicate, calibration, and run information. These results must meet the criteria specified in Reclamation Mid-Pacific Criteria for soils. Data not meeting these criteria will be qualified accordingly, and a narrative summary of the review will be provided with the sample results.

HEALTH AND SAFETY PLAN

Emergency medical facilities are located in Fallon and Carson City. All Reclamation personnel involved in this study have up to date first aid training. A first aid kit is located in each Reclamation vehicle.

Mid-Pacific Region
U.S. DEPARTMENT OF THE INTERIOR
2800 COTTAGE WAY
SACRAMENTO CA 95825-1898

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SUBJECT Indian Lakes Data

REMARKS Water samples on page 13 and 14

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INDIAN LAKES
SOIL AND WATER INVESTIGATION

Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

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INDIAN LAKES
SAMPLING AND ANALYSIS PLAN

Department of Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

June 1993

PROJECT/TASK ORGANIZATION

The investigation of the Indian Lakes Initial Site Assessment (IL) will be conducted by MP-470 staff of the Bureau of Reclamation's (Reclamation) Mid-Pacific Regional Office in Sacramento, California. The investigation is being performed at the request of Reclamation's Lahontan Basin Project Office in Carson City , Nevada through Reclamation's Mid-Pacific Hazardous Waste Coordinator (MP-405). MP-470 personnel involved include Chief of the Quality Assurance Branch (project head) and physical scientists specialized in field sampling and quality assurance/quality control (QA/QC). Analytical laboratory services are being provided by CH2MHILL's laboratory in Redding, California.

PROBLEM DEFINITION/BACKGROUND

This initial site assessment sampling plan focuses on the area defined as Indian Lakes (see figure 1) and will include soil and water sampling. The investigation is being conducted to determine 1) the extent of any mercury contamination at IL (IL is part of the Carson River Superfund site) 2) if a public health threat exists 3) whether there is any other trace metal contaminants present at concentrations that would prevent the transfer of IL to the State of Nevada or the Bureau of Land Management. The assessment will determine the location and extent of contamination associated with lead, arsenic, mercury and other heavy metals possibly present in the surface soil (0-6") and of the surface water from the water bodies at IL.

As a result of elevated mercury levels in wildlife and sediment found in the Carson River watershed, IL has been included as part of the Carson River Mercury Super fund Site by the U.S. Environmental Protection Agency (EPA). EPA estimates that over 7000 tons of mercury was released into the Carson River watershed as part of the gold and silver mining operations. Mining in the Carson River drainage basin commenced in 1850 when placer gold deposits were discovered in the Comstock Lode near Virginia City, Nevada. Mercury introduced into the region in the late 1800's to process gold and silver ore from the Comstock Lode is thought to be the primary source of mercury contamination in the Carson River drainage basin. The Carson River drains 3,980 square miles in east-central California and west-central Nevada. The Carson River begins in the eastern Sierra Nevada Mountain range, south of Lake Tahoe and generally flows north eastward and eastward to the Carson Sink. The flow of the Carson River is interrupted west of Fallon, Nevada by Lahontan Reservoir, part of the Newland's Irrigation Project. Below Lahontan Dam, flow is routed through a complex network of ditches, drains, and canals. Irrigation flow eventually discharges to Carson Lake, Stillwater National Wildlife Management Area, or the Carson Sink.

The Indian Lakes area being investigated is part of the Stillwater National Wildlife Management Area and is owned by the U.S. Bureau of Reclamation. IL is located in west central Nevada, approximately 5 miles north of highway 50 and 4 miles east of the town of Fallon, Nevada. IL encompasses approximately 15,000 acres and numerous small lakes (Big Indian, Papoose, Likes, Upper, and Twin Lakes). The Carson River also bisects the northwest corner of the IL area. Water from the Carson River and drainage water from the Newlands Project provide most of the water supply for IL. IL is a multiuse area with hunting, camping, and picnicking being the most popular activities.

PROJECT/TASK OBJECTIVES AND DESCRIPTION

The objective of this investigation is to determine whether the soil and/or water in the IL area exceeds the EPA's hazardous waste level criterion for

mercury, whether there is the possibility of mercury bioaccumulation to organisms, whether there is a health hazard to employees working at IL and to the public visiting IL and whether there are any other trace elements of concern in the IL area.

The field work is scheduled to commence on May 4, 1993 and be completed by May 18, 1993. Laboratory turnaround time is scheduled for 30 days from the receipt of the last sample to receipt of a full data package. Approved sample results will be available by June 9, 1993. Data evaluation and map generation is estimated to take another 14 days after sample results are received.

DATA QUALITY OBJECTIVES FOR MEASUREMENT

As the objective of this investigation involves health and safety concerns, data collection activities require a high degree of qualitative and quantitative accuracy. Samples will be taken in accordance with EPA approved sampling methods, and analyzed following EPA approved analytical methods by CH2M Hill Laboratory, located in Redding, California. Decisions and actions based on the data produced by this investigation must be made with a high degree of confidence in the quality and validity of the data. Therefore, the Quality Assurance Section of MP-705 will validate and assess all external quality assurance data and all internal laboratory quality control data before results are released.

DOCUMENTATION AND RECORDS

The final data report for the IL will include analytical results and a quality assurance summary review. Documentation backing this data will include results of instrument calibrations and laboratory QC checks such as duplicates, matrix spikes, and preparation blanks or method blanks. External QA sample results and summary review, as well as a field sampling narrative documenting any notable problems or occurrences during sample collection, will also be on file with Reclamation's Mid-Pacific Region Quality Assurance Branch.

SAMPLING PROCESS DESIGN

The soil sampling plan (including QA) will entail collecting a total of 32 samples. 22 soil samples will be collected at 0-6". 4 soil samples will be collected at 21-27" and the remaining samples will be part of the QA process. In addition, a total of 9 water samples (of which 3 are QA) will be collected.

The majority of the soil samples are being collected at the 0-6" depth because it is believed this depth presents the highest possible risk to human health from airborne exposure, dermal contact, and possible ingestion. This level will also probably contain the highest concentration of trace elements that could be bioaccumulated or taken up by plant roots. The 21-27" depth is being investigated to provide data on trace elements in the soil which may be accumulated by plant uptake in that rooting zone (the 21-27" zone was investigated because it is believed that zone represents the deepest most of the roots will be found). Water samples will be taken from the major water bodies in the IL area and will be analyzed for trace elements.

Composite soil samples (3 sites spaced linear 50 feet apart) will be taken using a Oakfield stainless steel soil push tube from 0-6". A stainless steel bucket hand auger will be used to collect the composite soil samples from 21-27". The push tube and/or auger will be cleaned and rinsed 3 times with deionized water between each new site. All sampling methods will be in accordance with EPA approved methods. The soil samples will be collected in

32 oz plastic wide mouth containers. Water samples will be collected into the appropriate container (glass for Hg and high density polyethylene for the other metals). Each container will be labeled with a site specific identification number, date of collection, time of collection, analysis requested, and any preservation method. A certificate of analysis for container contamination will be filed at Reclamation's Mid-Pacific Regional Office (MP-470) located at 2800 Cottage Way, Sacramento, California. The sample containers will be placed in a cooler (that is cooled to 4 degrees C) with two chain of custody seals placed on the cooler to ensure sample security.

SAMPLE HANDLING AND CUSTODY REQUIREMENTS

A logbook will be used to record the following: conditions under which the samples are collected; person(s) collecting the samples; time and date of collection; sample identification number; and sample collection technique. Field sheets will be used to record the identification of the sample, any field measurements taken, collection date, and names of person(s) collecting the sample.

A chain of custody sheet will be used to record the sample identification, number of containers, analyses to be performed and dates and times documenting transfer of sample custody. The log book and the field sample sheets will be kept at Reclamation's MP-470 office located at 2800 Cottage Way, Sacramento, California. The chain of custody will accompany the samples from the site to the laboratory with a copy being filed in Sacramento.

ANALYTICAL METHODS REQUIREMENTS

CH2M Hill Laboratory will be required to adhere to EPA Method 7471 for digestion and analysis of total mercury in soils, and EPA Method 7470 for analysis of mercury in waters. Other metals in soils will be digested following EPA's Method 3050A and analyzed by ICP following the EPA Method 6010, with the exception of selenium which will be analyzed by graphite furnace, EPA Method 7740, for the lower detection limit.

QUALITY CONTROL REQUIREMENTS

As checks on precision, accuracy, and contamination, Reclamation's Mid-Pacific Region QA personnel will incorporate external quality assurance samples into the sample batches prior to submittal to the contract laboratory. These reference samples will include blank soils, certified soil reference materials, and field duplicates. These quality assurance samples will receive sample identification similar to all other samples in order to submit them to the laboratory as blind samples. The quality control criteria for these samples will be the same as that required for the laboratory quality control samples, following Reclamation Mid-Pacific Region's quality assurance guidelines as attached to the data results.

INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE REQUIREMENTS

Laboratory protocol for instrument maintenance procedures is specified in CH2M Hill's laboratory manual, on file with the Quality Assurance Branch. An on-site system audit was performed by Reclamation's MP-705 QA personnel in December 1991, and instrumentation was found to be up-to-date with well documented logbooks and service contracts with manufacturers in place.

INSTRUMENT CALIBRATION AND FREQUENCY

CH2M Hill Laboratory specifies instrument calibration procedures in the laboratory manual mentioned above.

DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

Sample results will be validated by QA personnel against Mid-Pacific Region's quality assurance acceptance criteria. Reanalyses will be requested as necessary where acceptance criteria is not met. Laboratory quality control results as well as external quality assurance sample results will be evaluated and qualified, and a narrative summary of the review and QA results will accompany the sample data report.

ASSESSMENT
of
INDIAN LAKES DATA

The primary objective of the Indian Lakes investigation was to determine whether the mercury level in the soil of this area exceed the Environmental Protection Agency's (EPA's) hazardous waste level criterion. A secondary objective was to assess whether mercury or any of the other 13 chemical constituents monitored pose a threat to either the environment in general or to public health in particular. Results from both of these objectives may also be used in the decision to transfer this land to the State of Nevada or the Bureau of Land Management.

In order to meet both objectives, 21 soil samples were collected at a depth of 0-6 inches and 4 soil samples were collected at 21-27 inches. The soil samples were analyzed for total concentrations of a suite of trace elements and heavy metals.

Assessing the soils in terms of the primary objective found them all to be well below EPA's hazardous waste criterion for total mercury in soil, 20 mg/kg wet weight. The three highest concentrations were 4.1, 2.9, and 0.81 mg/kg respectively. The soils were not measured for the soluable fraction of mercury or any other metals because of similarities between Indian Lakes and the Carson Lake Pasture area in which soils with higher total mercury levels were found to contain minute levels of soluable mercury. Since all soil samples were well below the action level for total mercury and other regulated metals, the soils of the Indian Lakes area should not be classified as hazardous material.

The secondary objective can only be partially fulfilled without additional information. Because there are so many physical and chemical variables that can enhance or reduce the biological pathway and toxicity of chemicals present in the environment, one can only make gross assessments of potential environmental or public health impacts without designing specific studies to accurately measure them.

The first step was a general evaluation of the soil metal and trace element levels by comparing the total concentrations of the different elements in Indian Lakes soils to baseline levels in soils of the Western United States. The baseline levels were established by the U.S. Geological Survey and are described in a publication produced by Tidball and Ebens in 1976.

A comparison of the Indian Lakes soil results to baseline levels show aluminum, barium, beryllium, cadmium, chromium, copper, lead, lithium, nickel, selenium and zinc to be well within the normal range for western soils. However, the mean concentrations of arsenic, boron, and mercury are above the western background mean levels by 42%, 16%, and 1000%, respectively.

The second step in evaluating potential impacts to public health and biota was an assessment of surface water quality data compiled as a result of samples collected from five lakes within the Indian Lakes boundaries. Although the assessment was made somewhat difficult due to high salts in some of the waters interfering with the analytical method, the results did show that arsenic and mercury were at very high levels and selenium at a moderate level. These elements could present an aquatic life problem from chronic exposure and bioaccumulation. In addition, the high arsenic could pose a public health

problem to those who utilize the area for recreation purposes from either ingestion of water, consumption of waterfowl, fish, or other aquatic organisms, or inhalation from airborne dusts. Arsenic has been catagorized as a carcinogen. Finally, boron was also measured at very high levels and may inhibit vegetative growth.

The three major routes of potential human exposure identified above can not be substantiated without additional research. A health risk assessment would require additional studies be performed to determine specific rates of exposure. The type of studies that could provide the data necessary to make a scientifically based human health risk assessment would include ambient and/or personal air monitoring, increased water quality sampling at lakes that see a lot of recreational use (body contact with the water), and monitoring the levels of toxics in the flesh and liver of organisms consumed by the public to determine dietary amounts.

Potential impact to biota, especially waterfowl, could be determined from studies that measure the diets of the organisms and birds that reside or seasonally utilize the Indian Lakes area. The environmental compartments that would have to be measured would include phytoplankton, zooplankton, invertebrates, fish, and various components of the native vegetation.

6/11/93

Indian Lakes Soil Samples
Collected May 4 & 5, 1993
Wet weight, mg/kg

Site	Element	Ag	Al	As	B	Ba	Be	Cd	Cr
IL-01		0.35	6040	3.7	16.2	53.3	0.34	<0.28	5.5
IL-02		<0.24	5080	1.8	14.8	34.3	0.26	<0.28	5.3
IL-04		<0.24	6870	5.0	41.8	44.8	0.33	<0.28	6.3
IL-05		0.24	7800	3.8	53.7	51.1	0.48	0.38	7.3
IL-06		0.30	3830	12.6	21.0	41.5	0.19	<0.28	3.5
IL-07		<0.24	3330	10.5	110	55.2	0.20	<0.28	3.4
IL-08		0.29	2800	9.4	11.4	37.0	0.20	<0.28	3.9
IL-09		<0.24	7120	12.4	15.0	65.1	0.36	<0.28	6.9
IL-11		0.51	23300	18.4	80.4	210	0.90	0.73	17.8
IL-12		0.29	4350	2.0	9.8	65.8	0.28	<0.28	5.3
IL-13		0.52	6980	16.4	11.3	73.6	0.38	<0.28	7.7
IL-14		<0.24	3300	11.6	8.6	56.0	0.27	<0.28	3.9
IL-15		<0.24	3170	6.6	8.2	37.6	0.20	<0.28	3.6
IL-16		0.34	12500	9.4	24.8	104	0.51	0.42	10.1
IL-17		0.32	5680	6.8	45.3	47.8	0.33	<0.28	4.6
IL-18		<0.24	4650	2.2	11.3	38.2	0.27	<0.28	5.2
IL-19		<0.24	2280	8.4	18.6	38.1	0.21	<0.28	2.5
IL-20		<0.24	2490	7.5	21.1	26.6	0.13	<0.28	2.9
IL-21		<0.24	4060	2.6	8.6	48.0	0.24	<0.28	4.6

Indian Lakes Soil Samples
Collected May 4 & 5, 1993
Wet weight, mg/kg

Site	Element	Cu	Hg	Li	Pb	Ni	Se	Zn
IL-01		8.8	0.36	8.8	<5.0	7.7	<0.12	24.6
IL-02		7.1	0.12	7.0	<5.0	4.5	<0.12	19.0
IL-04		12.7	0.10	17.5	7.0	6.6	<0.12	30.0
IL-05		11.2	0.45	13.6	6.4	6.0	<0.12	34.3
IL-06		8.6	2.9	6.4	7.8	4.6	<0.12	18.2
IL-07		6.2	0.24	7.5	<5.0	5.2	<0.12	16.7
IL-08		5.5	0.35	4.9	<5.0	6.7	<0.12	16.1
IL-09		11.4	0.20	10.5	<5.0	7.2	<0.12	29.5
IL-11		39.3	0.47	33.1	13.8	8.2	0.57	85.0
IL-12		6.7	<0.06	6.8	6.9	10.6	<0.12	19.4
IL-13		12.3	0.81	10.0	5.5	8.8	0.24	32.2
IL-14		8.5	0.68	6.0	6.6	6.3	0.23	20.0
IL-15		5.7	0.07	5.3	<5.0	5.4	<0.12	16.5
IL-16		20.3	0.44	19.6	11.2	11.9	0.18	48.3
IL-17		9.9	0.06	10.4	6.3	5.1	<0.12	24.2
IL-18		6.5	<0.06	6.1	<5.0	7.0	<0.12	20.9
IL-19		4.7	0.16	4.3	<5.0	4.6	<0.12	10.6
IL-20		3.9	0.08	4.3	6.0	3.8	<0.12	11.9
IL-21		7.1	<0.06	6.2	5.3	7.2	<0.12	19.7

6/11/93

Indian Lakes Soils
Quality Assurance Summary Review

Twenty-three soil samples were collected from the Indian Lakes area near Fallon, Nevada, on May 4th and 5th, 1993, and were submitted to CH2M Hill Laboratory in Redding, California for analysis by EPA digestion Method 3050. The samples submitted included the following external quality assurance (QA) check samples: one field duplicate, one collocated field sample, two reference soils, and an equipment rinseate blank. The laboratory reported analytical quality control (QC) data which is reviewed here as well.

The field duplicate relative percent differences (RPD's) were all within the Bureau of Reclamation (Reclamation) Mid-Pacific Region's acceptance criteria for soils. The RPD's between the regular sample at site IL-11 and the collocated sample, taken approximately fifty feet away to test the site variability, looked low with the exceptions of boron at 37% RPD, aluminum at 29% RPD, and silver at 28% RPD. All other metals were within 24% RPD or less between the two samples.

The reference soils had acceptable recoveries for all elements but aluminum and boron. Aluminum was barely acceptable in one reference sample (67% recovery), but had an unacceptable recovery (61%) in the other. Boron had high recoveries based on non-certified values in the references of 220% and 148%. However, boron was also present in the preparation blanks at levels of 2.2 and 2.9 mg/kg. When an average of 2.5 mg/kg boron is subtracted from the reference value results, the recoveries are 48% and 120% in the reference samples, indicating that a level of contamination between 1.2 and 2.9 mg/kg of boron may be present in the sample results. Boron results must be reviewed keeping in mind that an average level of possible contamination of 2.0 mg/kg is approximately 24% of the lowest boron sample result of 8.2 mg/kg, and 7% of the overall average boron value of 29.1 mg/kg.

The equipment rinseate blank showed low levels of a few metals such as aluminum and nickel, but these levels are insignificant when compared with the levels of the metals in the soil and would have no effect on the samples.

The laboratory QC results were acceptable with the exception of the boron levels mentioned in the preparation blanks, and a high arsenic spike recovery. A post digestion arsenic spike was performed on the same sample with acceptable results, and as another arsenic spike as well as the reference sample recoveries were acceptable, arsenic results are judged to be valid.

The notable quality assurance results indicate that results of soil samples collected from the Indian Lakes area May 4th and 5th, 1993, are valid and useable data with possible low level (2 mg/kg) boron contamination, and slight low bias of aluminum results.

8/12/93

Indian Lakes Soil Samples
Collected May 18, 1993
Wet weight, mg/kg
"A" Denotes sample taken 0-6" below surface
"B" Denotes sample taken 21-27 " below surface

Site	Element	Ag	Al	As	B	Ba	Be	Cd	Cr
IL-03A		<0.40	7940	12.9	34.0	105	0.32	0.31	6.2
IL-03B		<0.40	17500	5.8	38.5	182	0.48	0.67	9.8
IL-05B		<0.40	5790	4.1	14.6	71.7	0.25	0.22	5.6
IL-10A		<0.40	7690	9.4	11.9	121	0.34	0.26	7.3
IL-10B		<0.40	5250	4.1	7.7	56.5	0.25	0.29	5.0
IL-18B		<0.40	4010	7.6	18.9	61.3	0.29	<0.20	4.4

Indian Lakes Water Samples
Collected May 18, 1993
ug/l

Site	Element	Ag	Al	As	B	Ba	Be	Cd	Cr
IL-08		<2.0	2450	292	7320	195	<1.0	<1.0	<3.0
IL-09		<2.0	11600	248	3250	212	1.4	<1.0	7.5
IL-14		<2.0	140	35.7	439	49.8	<1.0	<1.0	<3.0
IL-19		<2.0	5290	537	24700	341	<1.0	<1.0	4.3
IL-20		<2.0	282	692	26400	112	<1.0	<1.0	<3.0

8/12/93

Indian Lakes Soil Samples
Collected May 18, 1993
Wet weight, mg/kg
"A" Denotes sample taken 0-6" below surface
"B" Denotes sample taken 21-27 " below surface

Site Element	Cu	Hg	Li	Pb	Ni	Se	Zn
IL-03A	19.4	4.1	18.9	5.7	7.8	0.25	38.5
IL-03B	20.3	0.06	58.6	9.0	11.9	<0.12	54.9
IL-05B	10.0	0.08	12.6	<5.0	5.8	<0.12	30.0
IL-10A	14.6	0.60	14.3	6.7	6.7	<0.12	39.7
IL-10B	12.5	0.43	7.4	<5.0	3.6	<0.12	22.7
IL-18B	9.7	<0.06	7.0	<5.0	7.2	0.51	23.0

Indian Lakes Water Samples
Collected May 18, 1993
ug/l

Site Element	Cu	Hg	Li	Pb	Ni	Se	Zn
IL-08	5.3	1.0	199	<25.0	<10.0	14.6	13.1
IL-09	18.8	1.4	134	<25.0	<10.0	<0.60	43.9
IL-14	3.1	0.28	40.0	<25.0	<10.0	<0.60	<4.0
IL-19	16.8	0.56	447	<25.0	15.2	<60.0	29.2
IL-20	<3.0	0.34	251	<25.0	12.4	<60.0	<4.0

8/11/93

Indian Lakes Water and Soils
Quality Assurance Summary Review

On May 18, 1993, an additional eight water samples and nine soil samples were collected from the Indian Lakes area near Fallon, Nevada, and were submitted to CH2M Hill Laboratory in Redding, California, for analysis. The soil samples were digested following EPA Method 3050, and included a field duplicate and two reference soils. A rinseate blank from the soil sampling equipment was submitted with the water samples, as well as a duplicate and spiked duplicate water samples. The laboratory analyzed and reported the sample results with a Level 2 QC packet of laboratory QC results, which were reviewed and found to be acceptable.

Soils

The external quality assurance samples submitted with the soil samples showed mostly acceptable results. The rinseate blank from sampling equipment showed insignificant levels of a few metals and was below detection for all others. The Relative Percent Differences (RPD's) between regular and duplicate results were all within acceptance limits, and recoveries of the reference materials were acceptable with the exception of one slightly low aluminum recovery (64%) and one high mercury recovery (150%). Upon reanalysis, aluminum showed a recovery of 99%, but mercury dropped to only 135% recovery. Therefore data must be reviewed keeping in mind that a possible low bias exists for aluminum results while a high bias may exist in mercury results.

Waters

The results of external quality assurance samples submitted with the water samples indicated a few problems. The duplicate RPD's were unacceptable for aluminum, chromium, and zinc results. The spike recoveries were unacceptably low for five metals and high for arsenic. Reanalyses were requested and results indicated that sample matrix may have caused variability and interference. The RPD's improved for aluminum from 86% to 27%, for chromium from >1xDL to 34%, and for zinc from 61% to 30%. While these results are better, the RPD's still do not meet acceptance criteria, and may indicate that matrix effects are influencing precision.

The spike recoveries upon reanalysis improved for arsenic, cadmium, chromium, copper, selenium, and silver. However, criteria was still not met for selenium (61% and 71% recovery) and silver (<47% and 167% recovery). Given the variability of results (changes were both positive and negative in concentration) for the regular, duplicate, and spiked samples, reanalysis of other samples in the batch was determined to be unnecessary. The results reported for the regular sample were either the original or reanalysis result based upon evaluation of that parameter in the regular, duplicate and spiked samples and their reanalyses as well. The original results for all other water samples are reported with the following qualifications.

Silver may have a low bias, with recoveries possibly as low as 50%. Selenium, chromium, and copper may have a low bias of close to 70% recovery. Arsenic may be biased as high as 140% recovery. Aluminum demonstrated both a possible low bias and a wide variability upon reanalysis. Zinc and chromium also demonstrated variability with zinc results of 23.5 ug/l initially and 59.0 ug/l in the reanalysis of the duplicate sample, and chromium resulting in <3.0 ug/l initially and 9.7 ug/l upon reanalysis of the duplicate. Yet the regular sample showed changes of only 43.9 ug/l to 43.7 ug/l for zinc, and 7.5 ug/l to 6.9 ug/l for chromium.

Qualifications in summary

The notable quality assurance results for samples collected from the Indian Lakes area near Fallon, Nevada on May 18, 1993, indicate that results for soils may have a low bias for aluminum and a high bias for mercury. Results for waters demonstrated a wide variability for aluminum, zinc, and chromium, and possible low bias of recoveries for silver, copper, chromium, selenium and aluminum. Arsenic may be demonstrating a high bias in water samples.

Bureau of Reclamation, Mid-Pacific Region

Acceptance Criteria for Inorganics in Soils

Duplicates:	For values > 5X Detection Limit, Relative Percent Difference (RPD) ≤ 35%
	For values ≤ 5X Detection Limit, difference must be within ± 2X detection limit
Spikes:	Recovery should be 65% - 135%
	Limit does not apply when sample value exceeds spike concentration by 5X or more
Reference soils:	Recovery should be 65% - 135% for values ≥ 20X Detection Limit for soils digested by similar method to that used to obtain certified values
	For values < 20X Detection Limit, recovery should be ± 4X Detection Limit from the certified value
Blanks:	Blank concentrations should be less than 10% of lowest sample concentration

Acceptance Criteria for Inorganics in Water

Duplicates:	For values ≥ 20X Detection Limit, RPD ≤ 20%
	For values < 20X Detection Limit, difference must be within ± 1X Detection Limit
Spikes:	Recovery should be 80% - 120%
	Limit does not apply when sample value exceeds spike concentration by 5X or more
Reference materials:	Recovery should be 80% - 120% of the certified value for values ≥ 20X Detection Limit
	For values < 20X Detection Limit, recovery should be ± 4X Detection Limit from the certified value
Blanks:	Blank concentrations should be less than 10% of lowest sample concentration

5/20/93

Lahonton Reservoir Soils--ICAP Metals, Hg
Quality Assurance Review Summary

Thirty-three soil samples were collected from the Lahonton Reservoir beach areas *March 30 and March 31, 1993. Bureau of Reclamation's (Reclamation)* Missouri-Souris Office Soil and Water Laboratory in Bismarck, North Dakota, conducted analyses for mercury by EPA Method 7471, and digested samples for analysis by ICP following EPA Method 3050. The ICP analyses were performed by Reclamation's Mid-Pacific Region Water Quality Laboratory in Sacramento, California. Samples were submitted along with several external quality assurance samples including five duplicates, two collocated samples taken approximately five feet away from regular sample, and eight reference soils. Extraction quality assurance samples were prepared during the digest and were analyzed along with the sample extracts including seven duplicates, two spiked duplicates, three blanks, and a reference material.

Results of the external and extraction quality assurance samples were generally very good, with any notable exceptions addressed in this review. Reanalyses were requested when results exceeded Mid-Pacific Region's acceptance criteria, and significant changes were recorded. In one case, review of sample results and reanalyses for a sample extracted in triplicate caused the values of one extraction duplicate to replace those of the regular sample. Samples and elements not specifically addressed here did not have any notable problems.

Silver had one notable problem with a low recovery (44%) that was confirmed upon reanalysis of a reference soil extract. This same reference soil also resulted in acceptable recoveries of 65% and 97%, and extraction spikes showed acceptable recoveries for silver. All Lahonton Reservoir soils had silver concentrations below the detection level of 0.20 mg/kg, and while some of these samples could possibly have results as high as 0.4 mg/kg based on this low recovery, it is unlikely based on the four acceptable recoveries.

Relative Percent Difference (RPD) between arsenic values for one pair of duplicate samples was unacceptable, and these samples were reanalyzed, confirming the differences. The reanalyses did change, however, by as much as 0.08 mg/l, or 4 mg/kg. This may indicate that precision for arsenic values is possibly as high as 4 mg/kg.

Another element with an unacceptable RPD between the regular and extraction duplicate was chromium. The same pair of duplicates had large RPD's for copper as well, and while copper was updated, RPD's were still unacceptable. Chromium did not change upon reanalysis. This sample was extracted in triplicate, and one duplicate had values close to a median value for most elements in all three extracts. Therefore the results for that extraction duplicate replaced the results for the regular for Site LR-10A.

Copper also had a notable low recovery for one extraction spike. That sample was extracted in triplicate and precision results were acceptable. The two duplicate extracts had acceptable recoveries for the same spike, so no reanalysis was requested. Copper appears in two blanks at levels of 0.002 and 0.004 mg/l, or 0.1 and 0.2 mg/kg. This is much less than 10% of all but one sample concentration, and is not determined to be have a significant effect.

The notable quality assurance results from Lahonton Reservoir soils indicate that arsenic may have an uncertainty level as high as 4 mg/kg, and that silver may have a possible low bias in a portion of samples. Values reported for elements other than those addressed above are determined to be valid and supportable.

Lahonton Reservoir Soils
Field Duplicates and Collocated (*) Samples

Field ID Labid Element	LR-04A / LR07A 16271 / 16275 RPD	LR-13A / LR-18A / *LR-16A 15283 / 16289 / *16287 RPD RPD	LR-21A / LR-24A 16292 / 16296 RPD
Ag	<0.20 / <0.20 <2XDL	<0.20 / <0.20 / <0.20 <2XDL <2XDL	<0.20 / <0.20 <2XDL
As	2.50 / 3.00 <2XDL	3.50 / 3.00 / <2.50 <2XDL <2XDL	5.50 / 7.00 24 %
Cd	0.25 / 0.25 0 %	0.40 / 0.40 / 0.30 <2XDL <2XDL	0.35 / 0.25 <2XDL
Cr	3.45 / 3.30 4.4 %	3.00 / 2.90 / 2.70 3.4 % 11 %	3.70 / 3.25 13 %
Cu	3.60 / 3.60 0 %	4.70 / 4.85 / 4.10 3.1 % 14 %	9.80 / 7.45 27 %
Ni	2.50 / 3.00 <2XDL	3.50 / 3.00 / 2.00 <2XDL <2XDL	5.50 / 4.00 32 %
Pb	3.50 / 3.00 <2XDL	3.00 / 3.00 / 2.50 <2XDL <2XDL	4.00 / 3.00 29 %
Hg	<0.1 / <0.1 <2XDL	0.2 / 0.3 / <0.1 <2XDL <2XDL	<0.1 / <0.1 <2XDL

*Collocated samples taken approximately five feet from regular sample to test variability of soil in the study area.

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Lahonton Reservoir Soils
Field Duplicates and Collocated (*) Samples

Field ID Labid Element	LR-28A / LR-30A 16300 / 16303 RPD	LR-36A / LR-39A 16309 / 16313 RPD	LR-37A / *LR-40A 16310 / 16314 RPD
Ag	<0.20 / <0.20 <2XDL	<0.20 / <0.20 <2XDL	<0.20 / <0.20 <2XDL
As	10.0 / 7.50 <2XDL	78.0 / 79.0 1.3 %	10.0 / 11.0 9.5 %
Cd	0.20 / <0.15 <2XDL	0.70 / 0.70 <2XDL	0.20 / 0.25 <2XDL
Cr	2.15 / 1.80 18 %	5.30 / 6.60 22 %	2.70 / 2.70 0 %
Cu	5.35 / 3.75 35 %	19.3 / 20.8 7.5 %	5.40 / 5.60 3.6 %
Ni	3.50 / 3.00 <2XDL	8.50 / 8.50 0 %	3.50 / 3.00 <2XDL
Pb	2.00 / <1.50 <2XDL	9.00 / 9.00 0 %	4.00 / 3.50 <2XDL
Hg	<0.1 / <0.1 <2XDL	0.3 / 0.2 <2XDL	0.2 / 0.2 <2XDL

*Collocated samples taken approximately five feet from regular sample to test variability of soil in the study area.

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Lahonton Reservoir Soils
Reference Sample Results

Reference Field ID Labid Element	ERA PPS-46 LR-05A 16273 Act/Exp % Rec	ERA BMD-57 LR-11A 16281 Act/Exp % Rec	*NIST Buf.R. LR-15A 16286 Act/Exp % Rec	ERA PPS-46 LR-22A 16294 Act/Exp % Rec
Ag	59.5 / 92.1 65 %	<0.20 / <2.0 -	<0.20 / - -	89.5 / 92.1 97 %
As	129 / 144 90 %	<2.50 / <2.0 -	18.5 / 23.4 79 %	141 / 144 98 %
Cd	119 / 129 92 %	0.55 / <1.0 -	4.50 / 3.45 130 %	138 / 129 107 %
Cr	87.5 / 100 88 %	5.10 / <20 -	73.5 / 135 54 %	96.5 / 100 97 %
Cu	88.0 / 101 87 %	4.70 / <20 -	87.0 / 98.6 88 %	94.0 / 101 93 %
Ni	127 / 136 93 %	4.00 / <10 -	33.5 / 44.1 76 %	139 / 136 102 %
Pb	118 / 118 100 %	8.50 / <30 -	146 / 161 91 %	131 / 118 111 %
Hg	4.9 / 4.88 100 %	<0.1 / <0.10 -	1.7 / 1.47 116 %	3.6 / 4.88 74 %

*Certified values are by Total digestion, not 3050, so low recoveries are acceptable.

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Lahonton Reservoir Soils
Reference Sample Results

Reference Field ID Labid Element	ERA BMD-57 LR-23A 16295 Act/Exp % Rec	ERA PPS-46 LR-31A 16304 Act/Exp % Rec	ERA BMD-57 LR-35A 16308 Act/Exp % Rec	*BSK-1 LR-38A 16312 Act/Exp % Rec
Ag	<0.20 / <2.0 -	40.1 / 92.1 44 %	<0.20 / <2.0 -	<0.20 / - -
As	2.50 / <2.0 <4XDL	129 / 144 90 %	4.50 / <2.0 <4XDL	<2.50 / 2.50 <4XDL
Cd	0.35 / <1.0 -	118 / 129 91 %	0.35 / <1.0 -	0.55 / <2 -
Cr	5.05 / <20 -	86.0 / 100 86 %	4.65 / <20 -	18.1 / 40 45 %
Cu	4.60 / <20 -	88.0 / 101 87 %	5.25 / <20 -	10.7 / 14 76 %
Ni	4.00 / <10 -	123 / 136 90 %	4.00 / <10 -	24.5 / 32 77 %
Pb	9.00 / <30 -	116 / 118 98 %	9.50 / <30 -	11.0 / 23 48 %
Hg	<0.2 / <0.10 -	3.9 / 4.88 80 %	<0.2 / <0.10 -	<0.2 / 0.5 <4XDL

*Certified values are by USGS Total digestion, not 3050, so low recoveries are acceptable.

Lahonton Reservoir Soils
Extraction Duplicates

Bismarck ID	933394		931446	933408		931447	933408		931448
Field ID	LR-10A			LR-21B			LR-21B		
Labid	16279		16207	16293		16208	16293		16209
Element	mg/kg	RPD	mg/kg	mg/kg	RPD	mg/kg	mg/kg	RPD	mg/kg
Ag	<0.20	<2XDL	<0.20	<0.20	<2XDL	<0.20	<0.20	<2XDL	<0.20
As	5.00	<2XDL	4.00	18.0	15 %	15.5	18.0	15 %	15.5
Cd	0.55	<2XDL	0.35	0.95	5.4 %	0.90	0.95	17 %	0.80
Cr	5.85	35 %	4.10	8.00	15 %	6.90	8.00	12 %	7.10
Cu	9.90	53 %	5.75	24.1	11 %	21.5	24.1	19 %	19.9
Ni	5.00	<2XDL	3.00	10.5	15 %	9.00	10.5	15 %	9.00
Pb	4.00	<2XDL	3.00	8.50	6.1 %	8.00	8.50	13 %	7.50

Lahonton Reservoir Soils
Extraction Duplicates

Bismarck ID	933394		931449	933387		931450	933420		931452
Field ID	LR-10A			LR-04B			LR-32A		
Labid	16279		16210	16272		16211	16305		16213
Element		RPD			RPD			RPD	
Ag	<0.20	<2XDL	<0.20	<0.20	<2XDL	<0.20	<0.20	<2XDL	<0.20
As	5.00	<2XDL	3.50	2.50	<2XDL	3.50	7.50	<2XDL	4.50
Cd	0.55	<2XDL	0.30	0.20	<2XDL	0.25	0.15	<2XDL	0.25
Cr	5.85	56 %	3.30	3.15	8.3 %	2.90	2.00	16 %	2.35
Cu	9.90	41 %	6.50	3.75	0.3 %	3.65	4.85	16 %	4.15
Ni	5.00	<2XDL	3.00	2.50	<2XDL	2.50	3.00	<2XDL	2.50
Pb	4.00	<2XDL	3.00	3.00	<2XDL	3.50	2.50	<2XDL	3.00

Lahonton Reservoir Soils
Extraction Duplicates

Bismarck ID	933421		931454
Field ID	LR-33A		
Labid	16306		16215
Element		RPD	
Ag	<0.20	<2XDL	<0.20
As	22.5	38 %	32.0
Cd	0.80	22 %	1.00
Cr	7.25	15 %	8.40
Cu	27.4	12 %	30.9
Ni	10.0	14 %	11.5
Pb	9.50	27 %	12.5

Lahonton Reservoir Soils
Extraction Spiked Duplicates

	Regular	Spike	Regular	Spike
Bismarck ID	933408	931445	933420	931453
Field ID	LR-21B		LR-32	
Labid	16293	16206	16305	16214
	% Rec		% Rec	
Element	mg/l	mg/l	mg/l	mg/l
Ag	<0.004	0.153	<0.004	0.166
	77 %		83 %	
As	0.36	0.49	0.15	0.30
	65 %		75 %	
Cd	0.019	0.200	0.003	0.184
	91 %		91 %	
Cr	0.160	0.316	0.040	0.234
	78 %		97 %	
Cu	0.481	0.607	0.097	0.309
	63 %		106 %	
Ni	0.21	0.37	0.06	0.25
	80 %		95 %	
Pb	0.17	0.37	0.05	0.26
	100 %		105 %	

Lahonton Reservoir Soils
Extraction Blanks

Blank ID	Blank F	Blank G	Ultra DI
Bismarck ID	931451	931455	931457
Labid	16212	16216	16218
Element	mg/l	mg/l	mg/l
Ag	<0.004	<0.004	<0.004
As	<0.05	<0.05	<0.05
Cd	<0.003	<0.003	<0.003
Cr	<0.005	<0.005	<0.005
Cu	0.002	0.004	<0.002
Ni	<0.02	<0.02	<0.02
Pb	<0.03	<0.03	<0.03

Acceptance Criteria for Soils used by Bureau of Reclamation, Mid-Pacific Region

Duplicates:	For values > 5X Detection Limit, Relative Percent Difference (RPD) ± 35%
	For values < 5X Detection Limit, RPD ± 2X detection limit
Spikes:	Recovery should be 65% - 135%
	Limit does not apply when sample value exceeds spike concentration by 5X or more.
Reference soils:	Recovery should be 65% - 135% for values ≥ 20X Detection Limit for soils digested by similar method to that used to obtain certified values.
	For values < 20X Detection Limit, recovery should be ± 4X Detection Limit from the certified value.
Blanks:	Blank concentrations should be less than 10% of lowest sample concentration.

LAHONTAN RESERVIOR
AIR MONITORING PROGRAM

Department of the Interior
Bureau of Reclamation
Mid-Pacific Region
Sacramento, California

December 9, 1993

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12/9/93

Lahontan Reservoir Air Monitoring Program
Data Validation and Health Assessment

High-volume PM10 and TSP ambient air samplers were run every sixth day coinciding with the national air monitoring schedule. Every twelve days the batch of filters were sent to CH2M Hill Laboratory in Redding, California for weighing as well as analysis of the filters for eight metals, while the interim batches were archived for possible future analysis. In early October, the decision was made to begin sending the worse-case batch of two to the laboratory for analysis; the selection determined by visually examining the amount of particulates on the filters and wind conditions on run days.

Analyses were reported in mg/filter by the laboratory, and the data report packages included duplicate relative percent differences, spike recoveries (pre and post digestion spikes), control sample recoveries, method blanks, initial and continuing calibration information, and sample preparation and analysis logs. The laboratory also recorded the total weight of each filter. This information was reviewed and summarized, and any results which did not meet Mid-Pacific Region's QA criteria for soils were evaluated as to their significance. The summary was included with the results for each batch in which the individual metal concentrations were calculated. The difference or relative percent difference was calculated for each primary and collocated PM10 sample and all met the following precision criteria in accordance with 40 CFR Part 50, Appendix J: Within 5 ug/m^3 for concentrations below 80 ug/m^3, and within 7 percent for concentrations above 80 ug/m^3. This criteria applies only to PM10 stations; there are no precision criteria for TSP samplers.

After the sample batches were reviewed, data under the windiest conditions, believed to be worst-case scenarios, were calculated. Both the filters' total weight as well as each metal having a result greater than the method detection limit were calculated to determine metal concentrations in the ambient air for these days. All metal results were recorded in a table, and the greatest concentration of each metal was used to show that levels around Lahontan Reservoir were well below the 8 hour criteria recommended by the American Conference of Government Industrial Hygienists. The worst case scenarios are based on 24 hour sampling periods, and are therefore potentially three times greater than they need be for comparison to the 8 hour criteria. Despite this conservative approach, the closest metal concentration to a criterion, chromium, is more 700 times below the action level, and greater than 3000 times below the criteria for any other metal.

National Ambient Air Quality Standards (NAAQS) criteria for Particulate Matter less than 10 micrometers in diameter in ambient air (PM10) as stated in Title 40 CFR Part 50.6 is 150 ug/m^3 for a 24 hour average, and 50 ug/m^3 as an annual arithmetic mean. In accordance with 40 CFR Part 58, at least 75% of filters collected must be weighed and calculated. Therefore, to maintain the validity of Reclamation's air monitoring program, half of the archived filters will be weighed and calculated accordingly. The highest PM10 concentration to date (data received for sampling dates through November 3, 1993) was 36.18 ug/m^3, well below the stated criteria. There are currently no NAAQS criteria for Total Suspended Particulates (TSP).

Lahonton Air Monitoring
July 18, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM001 Dam #1 PM10 #2	M = 0.0099 min = 1440 cfm = 35	<0.06	<0.42	0.10	1.3	14.2	<0.12	2.5	<6.0

Results (ug/cu.m): Filter 6.95 Cd 0.00007 Cr 0.0009 Cu 0.01 Pb 0.002

LAM002 Void: Sampler did not run
Dam #1
TSP #3

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM003 N Shore Marina PM10 #1	M = 0.0109 min = 1440 cfm = 37	<0.06	0.42	0.06	6.2	9.4	<0.12	1.7	<6.0

Results (ug/cu.m): Filter 7.24 As 0.0003 Cd 0.00004 Cr 0.004 Cu 0.006
Pb 0.001

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM004 N Shore Marina TSP #5	M = 0.0305 min = 1440 cfm = 38	0.11	0.42	0.08	1.3	162	<0.12	3.9	<6.0

Results (ug/cu.m): Filter 19.73 Ag 0.00007 As 0.0003 Cd 0.00005
Cr 0.0008 Cu 0.10 Pb 0.003

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM005 Beach #3 PM10 #3	M = 0.0248 min = 1440 cfm = 37	<0.06	0.42	0.23	1.1	6.9	<0.12	4.9	<6.0

Results (ug/cu.m): Filter 16.47 As 0.0003 Cd 0.0002 Cr 0.0007
Cu 0.005 Pb 0.003

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM006 Beach #3 TSP #4	M = 0.0766 min = 1440 cfm = 40	0.10	0.72	0.22	1.3	114	<0.12	6.3	<6.0

Results (ug/cu.m): Filter 47.06 Ag 0.00006 As 0.0004 Cd 0.0001
Cr 0.0008 Cu 0.07 Pb 0.004

LAM007 Void: Sampler did not run
Beach #7 Primary
PM10 #5

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM008 Beach #7 Coll. TSP #1	M = 0.0985 min = 1440 cfm = 36	<0.06	0.96	0.16	1.7	74.5	<0.12	9.8	<6.0

Results (ug/cu.m): Filter 67.24 As 0.0007 Cd 0.0001 Cr 0.001 Cu 0.05

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM009 Beach #7 Coll. 2PM10#4	M = 0.0344 min = 1440 cfm = 34	<0.06	0.54	0.14	1.0	11.9	<0.12	7.9	<6.0

Results (ug/cu.m): Filter 24.87 As 0.0004 Cd 0.0001 Cr 0.0007 Cu 0.009
Pb 0.006

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM010 Beach #7 Prim. TSP #2	M = 0.0907 min = 1440 cfm = 32	0.08	0.90	0.10	18.4	111	<0.12	9.1	10.1

Results (ug/cu.m): Filter 69.66 Ag 0.00006 As 0.0007 Cd 0.00008
Cr 0.01 Cu 0.09 Pb 0.007 Ni 0.008

LAM011
Blank control filter M = 0.0041

Collocated Samples-Difference: PM10 Void, 24.87

Lahonton Air Monitoring

July 30, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM023	M = 0.0303								
Dam #1	min = 1440								
TSP #1	cfm = 38								

Results (ug/cu.m): Filter 19.59

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM024	M = 0.0112								
Dam #1	min = 1440								
PM10 #2	cfm = 35								

Results (ug/cu.m): Filter 7.86

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM025	M = 0.0100								
N Shore Marina	min = 1440								
PM10 #1	cfm = 38								

Results (ug/cu.m): Filter 6.79

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM026	M = 0.0251								
N Shore Marina	min = 1440								
TSP #5	cfm = 38								

Results (ug/cu.m): Filter 16.23

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM027 Beach #3 PM10 #3	M = 0.0317 min = 1440 cfm = 37								

Results (ug/cu.m): Filter 21.05

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM028 Beach #3 TSP #4	M = 0.0750 min = 1440 cfm = 36								

Results (ug/cu.m): Filter 51.20

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM029 Beach #7 Primary PM10 #5	M = 0.026 min = 1440 cfm = 36								

Results (ug/1cu.m): Filter 18.09

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM030 Beach #7 Coll. TSP #1	M = 0.0732 min = 1440 cfm = 36								

Results (ug/cu.m): Filter 49.97

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM031 Beach #7 Coll. 2PM10#4	M = 0.0270 min = 1440 cfm = 35								

Results (ug/cu.m): Filter 18.95

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM032 Beach #7 Prim. TSP #2	M = 0.0593 min = 1440 cfm = 32								

Results (ug/cu.m): Filter 45.54

LAM033
Blank control filter M = 0.0007

Collocated Samples-Difference: PM10 18.09, 18.95 Diff = 0.86

Lahonton Air Monitoring
August 11, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM045 M = 0.0080
Dam #1 min = 1440
PM10 #2 cfm = 34

Results (ug/cu.m): Filter 5.78

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM046 M = 0.0230
Dam #1 min = 1440
TSP #3 cfm = 38

Results (ug/cu.m): Filter 15.00

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM047 M = 0.0080
N Shore Marina min = 1440
PM10 #1 cfm = 35

Results (ug/cu.m): Filter 5.89

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM048 M = 0.0241
N Shore Marina min = 1440
TSP #5 cfm = 38

Results (ug/cu.m): Filter 15.58

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM049 M = 0.0117
Beach #3 min = 1440
PM10 #3 cfm = 35

Results (ug/cu.m): Filter 8.21

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM050 M = 0.0306
Beach #3 min = 1440
TSP #4 cfm = 36

Results (ug/cu.m): Filter 21.48

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM051 M = 0.0181
Beach #7 min = 1440
PM10 #5 Prim. cfm = 36

Results (ug/cu.m): Filter 12.35

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM052 M = 0.0391
Beach #7 min = 1440
TSP #1 Coll. cfm = 36

Results (ug/cu.m): Filter 26.69

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM053 M = 0.0172
Beach #7 min = 1440
PM10 #4 Coll. cfm = 35

Results (ug/cu.m): Filter 12.07

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM054 M = 0.0382
Beach #7 min = 1440
TSP #2 Prim. cfm = 34

Results (ug/cu.m): Filter 27.61

LAM055 PM10 12.35, 12.07
Blank control filter M = - 0.0031

Collocated samples-Difference: PM10 12.35, 12.07 Diff = 0.28

Lahonton Air Monitoring
August 23, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM067	M = 0.0061								
Dam #1	min = 1440								
PM10 #2	cfm = 34								

Results (ug/cu.m): Filter 4.41

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM068	M = 0.0191								
Dam #1	min = 1440								
TSP #3	cfm = 38								

Results (ug/cu.m): Filter 12.35

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM069	M = 0.0055								
N Shore Marina	min = 1440								
PM10 #1	cfm = 36								

Results (ug/cu.m): Filter 3.75

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM070	M = 0.0180								
N Shore Marina	min = 1440								
TSP #5	cfm = 37								

Results (ug/cu.m): Filter 11.95

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM071 M = 0.0165
Beach #3 min = 1440
PM10 #3 cfm = 36

Results (ug/cu.m): Filter 11.26

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM072 M = 0.0360
Beach #3 min = 1440
TSP #4 cfm = 35

Results (ug/cu.m): Filter 25.27

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM073 M = 0.0168
Beach #7 min = 1440
PM10 #5 Prim. cfm = 37

Results (ug/cu.m): Filter 11.15

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM074 M = 0.0400
Beach #7 min = 1440
TSP #1 Coll. cfm = 36

Results (ug/cu.m): Filter 27.71

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM075 M = 0.0160
Beach #7 min = 1440
PM10 #4 Coll. cfm = 35

Results (ug/cu.m): Filter 11.23

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM076 M = 0.0377
Beach #7 min = 1440
TSP #2 Prim. cfm = 32

Results (ug/cu.m): Filter 28.95

LAM077
Blank control filter M = 0.0015

Collocated samples-Difference: PM10 11.15, 11.23 Diff = 0.08

Lahonton Air Monitoring
September 4, 1993

Using $M \times 10^6 \times 35.39$ / min x cfm where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM089 Dam #1 PM10 #2	M = 0.0241 min = 1440 cfm = 34	0.07	2.3	0.08	1.5	15.1	<0.12	3.3	<6.0

Results (ug/cu.m): Filter 17.42 Ag 0.00005 As 0.002 Cd 0.00006 Cr 0.001 Cu 0.01 Pb 0.002

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM090 Dam #1 TSP #3	M = 0.0489 min = 1440 cfm = 39	0.13	3.2	0.23	1.8	118	<0.12	4.6	<6.0

Results (ug/cu.m): Filter 30.82 Ag 0.00009 As 0.002 Cd 0.0002 Cr 0.001 Cu 0.09 Pb 0.003

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM091 N Shore Marina PM10 #1	M = 0.0235 min = 1440 cfm = 35	<0.06	1.1	0.07	1.3	9.8	<0.12	2.9	<6.0

Results (ug/cu.m): Filter 16.50 As 0.0008 Cd 0.00005 Cr 0.0009 Cu 0.007 Pb 0.002

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM092 N Shore Marina TSP #5	M = 0.0415 min = 1440 cfm = 37	0.15	1.6	0.07	1.9	184	<0.12	3.8	<6.0

Results (ug/cu.m): Filter 27.57 Ag 0.0001 As 0.001 Cd 0.00005
Cr 0.001 Cu 0.1 Pb 0.003

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM093 Beach #3 PM10 #3	M = 0.0321 min = 1440 cfm = 37	<0.06	1.1	0.08	1.7	11.4	<0.12	4.4	<6.0

Results (ug/cu.m): Filter 21.32 As 0.0007 Cd 0.00005 Cr 0.001
Cu 0.008 Pb 0.003

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM094 Beach #3 TSP #4	M = 0.0737 min = 1440 cfm = 37	0.22	1.7	0.11	2.7	229	0.12	5.4	<6.0

Results (ug/cu.m): Filter 48.95 Ag 0.0001 As 0.001 Cd 0.00007 Cr 0.002
Cu 0.2 Hg 0.00008 Pb 0.004

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM095 Beach #7 PM10 #5 Prim.	M = 0.0530 min = 1440 cfm = 36	<0.06	1.4	0.11	2.0	11.1	<0.12	7.3	<6.0

Results (ug/cu.m): Filter 36.18 As 0.001 Cd 0.00008 Cr 0.001
Cu 0.008 Pb 0.005

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM097 Beach #7 PM10 #4 Coll.	M = 0.0500 min = 1440 cfm = 36	<0.06	1.1	0.10	1.9	14.7	0.12	7.3	<6.0

Results (ug/cu.m): Filter 34.13 As 0.0008 Cd 0.00007 Cr 0.001
Cu 0.01 Hg 0.00008 Pb 0.005

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM098 Beach #7 TSP #2 Prim.	M = 0.1145 min = 1440 cfm = 31	0.10	2.3	0.10	2.4	72.1	<0.12	8.8	<6.0

Results (ug/cu.m): Filter 90.77 Ag 0.00008 As 0.002 Cd 0.00008
Cr 0.002 Cu 0.06 Pb 0.007

LAM099
Blank control filter M = -0.0027

Collocated samples-Difference: PM10 36.18, 34.13 Diff = 2.05

Lahonton Air Monitoring
September 16, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM0110 Dam #1 PM10 #2	M = 0.0161 min = 1440 cfm = 36								

Results (ug/cu.m): Filter 10.99

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM111 Dam #1 TSP #3	M = 0.0200 min = 1440 cfm = 32*								

Results (ug/cu.m): Filter 15.36

* Pen not operational, assumed worse case of 32 cfm.

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM112 N Shore Marina PM10 #1	M = 0.0158 min = 1440 cfm = 36								

Results (ug/cu.m): Filter 10.78

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM113 N Shore Marina TSP #5	M = 0.0323 min = 1440 cfm = 38								

Results (ug/cu.m): Filter 20.88

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM114 M = 0.0181
Beach #3 min = 1440
PM10 #3 cfm = 36

Results (ug/cu.m): Filter 12.35

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM115 M = 0.0347
Beach #3 min = 1440
TSP #4 cfm = 36

Results (ug/cu.m): Filter 23.68

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM116 M = 0.0215
Beach #7 min = 1440
PM10 #5 Prim. cfm = 36

Results (ug/cu.m): Filter 14.67

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM096 M = 0.0296
Beach #7 min = 780
TSP #1 Coll. cfm = 37

Results (ug/cu.m): Filter 36.29

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM117 M = 0.0211
Beach #7 min = 1440
PM10 #4 Coll. cfm = 35

Results (ug/cu.m): Filter 14.81

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM118 M = 0.0482
Beach #7 min = 1440
TSP #2 Prim. cfm = 32

Results (ug/cu.m): Filter 37.01

LAM119
Blank control filter M = 0.0028

Collocated samples-Difference: PM10 14.67, 14.81 Diff = 0.14

Lahonton Air Monitoring
September 28, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM0131	M = 0.0137								
Dam #1	min = 1440								
PM10 #2	cfm = 34								

Results (ug/cu.m): Filter 9.90

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM133	M = 0.0126								
N Shore Marina	min = 1440								
PM10 #1	cfm = 37								

Results (ug/cu.m): Filter 8.36

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM134	M = 0.0285								
N Shore Marina	min = 1440								
TSP #5	cfm = 37								

Results (ug/cu.m): Filter 18.93

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM135	M = 0.0276								
Beach #3	min = 1440								
PM10 #3	cfm = 35								

Results (ug/cu.m): Filter 19.38

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM136 M = 0.0465
Beach #3 min = 1440
TSP #4 cfm = 37

Results (ug/cu.m): Filter 30.88

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM137 M = 0.0268
Beach #7 min = 1440
PM10 #5 Prim. cfm = 36

Results (ug/cu.m): Filter 18.29

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM139 M = 0.0280
Beach #7 min = 1440
PM10 #4 Coll. cfm = 35

Results (ug/cu.m): Filter 19.66

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM138 M = 0.0369
Beach #7 min = 1440
TSP #2 Prim. cfm = 32

Results (ug/cu.m): Filter 32.38

LAM140
Blank control filter M = 0.0011

Collocated samples-Difference: PM10 18.29, 19.66 Diff = 1.37

Lahonton Air Monitoring
October 4, 1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM141	M = 0.0355	<.06	2.0	.17	1.1	11.5	<.12	2.9	<6.0
DAM #1	min = 1440								
PM10 #2	cfm = 35								

Results (ug/cu.m): Filter 24.93 As 0.0014 Cd 0.0001 Cr 0.0007
Pb 0.002 Cu 0.008

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM132	M = 0.0886	.11	2.6	.29	1.8	113	<0.12	4.0	<6.0
DAM #1	min = 1440								
TSP #3	cfm = 37								

Results (ug/cu.m): Filter 58.85 As 0.001 Cd 0.0001 Cr 0.001
Cu 0.07 Pb 0.002 Ag 0.00007

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM142	M = 0.0246	<.06	1.7	.16	.72	9.5	<.12	2.7	<6.0
N Shore Marina	min = 1440								
PM10 #1	cfm = 37								

Results (ug/cu.m): Filter 16.34 As 0.001 Cd 0.0001 Cr 0.00004
Cu 0.006 Pb 0.001

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM143	M = 0.0527	.13	2.2	.19	1.3	194	.12	3.5	<6.0
N Shore Marina	min = 1440								
TSP #5	cfm = 37								

Results (ug/cu.m): Filter 35.00 As 0.001 Cd 0.0001 Cr 0.0008
Cu 0.12 Pb 0.002 Hg 0.00007
Ni 0.003 Ag 0.00008

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM144 Beach #3 PM10 #3	M = 0.0390 min = 1440 cfm = 36	<.06	1.9	.15	.90	7.7	<.12	2.6	<6.0

Results (ug/cu.m): Filter 26.62 As 0.001 Cd 0.0001 Cr 0.0006
Cu 0.005 Pb 0.001

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM145 Beach #3 TSP #4	M = 0.0703 min = 1440 cfm = 37	.10	2.5	.17	1.3	118	<.12	3.6	<6.0

Results (ug/cu.m): Filter 46.70 As 0.001 Cd 0.0001 Cr 0.00086
Cu 0.07 Pb 0.002 Ag 0.00006

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM146 Beach #7 PM10 #5 Prim.	M = 0.0415 min = 1440 cfm = 36	<0.06	2.2	.16	.96	9.7	<.12	3.1	<6.0

Results (ug/cu.m): Filter 28.33 As 0.001 Cd 0.0001 Cr 0.0006
Cu 0.006 Pb 0.002

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM147 Beach #7 TSP #2 Prim.	M = 0.0953 min = 1440 cfm = 33	<0.06	3.0	.56	1.5	89.9	<.12	3.8	<6.0

Results (ug/cu.m): Filter 70.97 As 0.002 Cd 0.00041 Cr 0.001
Cu 0.066 Pb 0.002

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM148 Beach #7 PM10 #4 Coll.	M = 0.0432 min = 1440 cfm = 35	<0.06	2.0	.14	1.2	10.9	<.12	2.6	<6.0

Results (ug/cu.m): Filter 30.33 As 0.001 Cd 0.00009 Cr 0.0008
Cu 0.007 Pb 0.001

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM149 Beach #7 TSP #1 Coll.	M = 0.0916 min = 1440 cfm = 36	.08	3.2	.22	2.0	93.5	<.12	3.8	<6.0

Results (ug/cu.m): Filter 62.53 As 0.002 Cu 0.063 Pb 0.002
Ag 0.00005

LAM150
Blank control filter M = 0.0008

Collocated samples-Difference: PM10 28.33, 30.33 Diff = 2.0

Lahonton Air Monitoring
October 22,1993

Using $M \times 10^6 \times 35.39$ / min x cfm where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM0173	M = 0.0080								
Dam #1	min = 1440								
PM10 #2	cfm = 35								

Results (ug/cu.m): Filter 5.61

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM174	M = 0.0190								
Dam #1	min = 1440								
TSP #3	cfm = 39								

Results (ug/cu.m): Filter 11.97

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM175	M = 0.0097								
N Shore Marina	min = 1440								
PM10 #1	cfm = 37								

Results (ug/cu.m): Filter 6.44

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM176	M = 0.0189								
N Shore Marina	min = 1440								
TSP #5	cfm = 39								

Results (ug/cu.m): Filter 11.91

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM177 M = 0.0132
Beach #3 min = 1440
PM10 #3 cfm = 40

Results (ug/cu.m): Filter 8.11

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM178 M = 0.0253
Beach #3 min = 1440
TSP #4 cfm = 37

Results (ug/cu.m): Filter 16.80

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM179 M = 0.0127
Beach #7 min = 1440
PM10 #5 Prim. cfm = 36

Results (ug/cu.m): Filter 8.67

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM182 M = 0.0269
Beach #7 min = 1440
TSP #1 Coll. cfm = 38

Results (ug/cu.m): Filter 17.39

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM181 M = 0.0129
Beach #7 min = 1440
PM10 #4 Coll. cfm = 36

Results (ug/cu.m): Filter 8.80

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM180	M = 0.0301								
Beach #7	min = 1440								
TSP #2 Prim.	cfm = 36								

Results (ug/cu.m): Filter 20.54

Blank filter was not received with this batch at the laboratory - was sent with later a batch

Collocated samples-Difference: PM10 8.67, 8.80 Diff = 0.13

Lahonton Air Monitoring
November 3,1993

Using $M \times 10^6 \times 35.39 / min \times cfm$ where:
M = mass of particulates in grams
min = duration of sampling in minutes
*cfm = rate of flow in cu. feet/minute

*rate of flow from Dixon chart using the period's lowest average flow from that site for worst case

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM0195 Dam #1 PM10 #2	M = 0.0119 min = 1440 cfm = 35								

Results (ug/cu.m): Filter 8.35

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM196 Dam #1 TSP #3	M = 0.0251 min = 1440 cfm = 39								

Results (ug/cu.m): Filter 15.81

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM197 N Shore Marina PM10 #1	M = 0.0111 min = 1440 cfm = 37								

Results (ug/cu.m): Filter 7.37

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug
LAM198 N Shore Marina TSP #5	M = 0.0270 min = 1440 cfm = 39								

Results (ug/cu.m): Filter 17.01

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM199 M = 0.0188
Beach #3 min = 1440
PM10 #3 cfm = 40

Results (ug/cu.m): Filter 11.55

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM200 M = 0.0280
Beach #3 min = 1440
TSP #4 cfm = 36

Results (ug/cu.m): Filter 19.11

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM201 M = 0.0160
Beach #7 min = 1440
PM10 #5 Prim. cfm = 37

Results (ug/cu.m): Filter 10.62

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM204 M = 0.0342
Beach #7 min = 1440
TSP #1 Coll. cfm = 39

Results (ug/cu.m): Filter 21.55

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM203 M = 0.0186
Beach #7 min = 1440
PM10 #4 Coll. cfm = 37

Results (ug/cu.m): Filter 12.35

Site/Sampler ID	Filter mass(g)	Ag ug	As ug	Cd ug	Cr ug	Cu ug	Hg ug	Pb ug	Ni ug

LAM202 M = 0.0300
Beach #7 min = 1440
TSP #2 Prim. cfm = 34

Results (ug/cu.m): Filter 21.68

LAM205
Blank control filter M = -0.0035

Collocated samples-Difference: PM10 10.62, 12.35 Diff = 1.73

Lahonton Reservoir Air Monitoring Program
Filter Results (ug/filter)

Field ID	Date	Ag	As	Cd	Cr	Cu	Hg	Pb	Ni
LAM001	7/18	<0.06	<0.42	0.10	1.3	14.2	<0.12	2.5	<6.0
LAM003	7/18	<0.06	0.42	0.06	6.2	9.4	<0.12	1.7	<6.0
LAM004	7/18	0.11	0.42	0.08	1.3	162	<0.12	3.9	<6.0
LAM005	7/18	<0.06	0.42	0.23	1.1	6.9	<0.12	4.9	<6.0
LAM006	7/18	0.10	0.72	0.22	1.3	114	<0.12	6.3	<6.0
LAM008	7/18	<0.06	0.96	0.16	1.7	74.5	<0.12	**9.8**	<6.0
LAM009	7/18	<0.06	0.54	0.14	1.0	11.9	<0.12	7.9	<6.0
LAM010	7/18	0.08	0.90	0.10	**18.4**	111	<0.12	9.1	**10.1**
LAM023	7/30	0.07	0.54	0.09	1.6	116	* 2.1	1.9	<6.0
LAM024	7/30	<0.06	0.48	0.06	1.4	17.8	0.58	1.4	<6.0
LAM025	7/30	<0.06	0.42	0.07	0.42	10.6	**4.9**	1.4	<6.0
LAM026	7/30	0.14	<0.42	0.06	1.3	238	1.2	1.7	<6.0
LAM027	7/30	<0.06	0.48	0.08	1.2	11.5	0.89	1.7	<6.0
LAM028	7/30	0.11	1.1	0.07	1.8	199	1.3	2.6	<6.0
LAM029	7/30	<0.06	0.54	0.08	1.1	13.6	3.0	2.1	<6.0
LAM030	7/30	0.08	0.90	0.08	1.7	120	1.2	2.1	<6.0
LAM031	7/30	<0.06	0.42	0.07	1.4	11.7	0.97	1.3	<6.0
LAM032	7/30	0.06	0.90	0.10	1.6	71.0	0.50	1.7	<6.0

*Hg contamination of this batch was indicated by a value of 0.32 mg Hg for the blank control filter.

LAM045	8/11	<0.06	0.66	<0.06	<0.60	14.6	<0.12	1.7	<6.0
LAM046	8/11	0.10	0.72	0.15	1.1	155	<0.12	2.1	<6.0
LAM047	8/11	<0.06	0.42	0.06	0.60	7.6	<0.12	1.5	<6.0
LAM048	8/11	0.11	0.66	<0.06	0.84	180	0.34	2.2	<6.0
LAM049	8/11	<0.06	<0.42	<0.06	<0.60	7.4	<0.12	2.0	<6.0
LAM050	8/11	**0.23**	0.78	0.08	2.8	156	<0.12	2.8	<6.0
LAM051	8/11	0.08	<0.42	0.07	1.0	51.6	<0.12	4.4	<6.0
LAM052	8/11	0.17	1.0	0.08	1.0	118	<0.12	3.0	<6.0
LAM053	8/11	0.08	0.84	0.08	2.1	10.3	0.20	2.3	<6.0
LAM054	8/11	0.19	0.90	0.08	0.72	70.0	<0.12	3.1	<6.0

Field ID	Date	Ag	As	Cd	Cr	Cu	Hg	Pb	Ni
LAM067	8/23	<0.06	0.60	0.07	1.0	12.1	<0.12	1.3	<6.0
LAM068	8/23	0.08	0.72	0.07	1.6	95.7	<0.12	1.6	<6.0
LAM069	8/23	<0.06	0.42	0.07	2.5	8.3	<0.12	1.0	<6.0
LAM070	8/23	0.17	<0.42	<0.06	1.4	228	<0.12	3.2	<6.0
LAM071	8/23	0.07	0.66	<0.06	1.2	4.1	<0.12	1.5	<6.0
LAM072	8/23	0.11	0.96	0.07	1.2	198	<0.12	2.6	<6.0
LAM073	8/23	<0.06	0.72	0.06	0.78	8.8	<0.12	6.8	<6.0
LAM074	8/23	0.21	1.1	0.09	1.0	145	<0.12	8.8	<6.0
LAM075	8/23	<0.06	0.60	0.08	1.0	12.7	<0.12	7.1	<6.0
LAM076	8/23	0.10	0.90	0.08	1.7	63.0	0.13	8.0	<6.0
LAM089	9/4	0.07	2.3	0.08	1.5	15.1	<0.12	3.3	<6.0
LAM090	9/4	0.13	3.2	0.23	1.8	118	<0.12	4.6	<6.0
LAM091	9/4	<0.06	1.1	0.07	1.3	9.8	<0.12	2.9	<6.0
LAM092	9/4	0.15	1.6	0.07	1.9	184	<0.12	3.8	<6.0
LAM093	9/4	<0.06	1.1	0.08	1.7	11.4	<0.12	4.4	<6.0
LAM094	9/4	0.22	1.7	0.11	2.7	229	0.12	5.4	<6.0
LAM095	9/4	<0.06	1.4	0.11	2.0	11.1	<0.12	7.3	<6.0
LAM096	Did not run								
LAM097	9/4	<0.06	1.1	0.10	1.9	14.7	0.12	7.3	<6.0
LAM098	9/4	0.10	2.3	0.10	2.4	72.1	<0.12	8.8	<6.0
LAM096	9/16	0.12	<0.42	0.07	4.1	51.8	<0.12	1.9	<6.0
LAM110	9/16	0.07	<0.42	0.08	1.7	19.2	<0.12	2.0	<6.0
LAM111	9/16	0.06	<0.42	0.06	1.7	46.3	<0.12	1.6	<6.0
LAM112	9/16	<0.06	<0.42	0.06	1.5	6.4	<0.12	1.7	<6.0
LAM113	9/16	0.11	<0.42	0.09	1.7	129	<0.12	2.6	<6.0
LAM114	9/16	<0.06	<0.42	0.09	1.5	5.2	<0.12	1.7	<6.0
LAM115	9/16	0.11	<0.42	0.08	1.6	81.1	<0.12	4.7	<6.0
LAM116	9/16	0.08	<0.42	0.11	2.1	7.0	<0.12	2.3	<6.0
LAM117	9/16	0.06	<0.42	0.11	1.6	9.1	<0.12	1.9	<6.0

Field ID	Date	Ag	As	Cd	Cr	Cu	Hg	Pb	Ni
LAM118	9/16	0.16	0.60	0.12	1.7	59.7	<0.12	2.5	<6.0
LAM131	9/28	<0.06	1.1	0.10	1.3	12.1	<0.12	1.6	<6.0
LAM132	Did not run								
LAM133	9/28	0.07	0.42	0.13	1.2	14.2	<0.12	1.7	<6.0
LAM134	9/28	0.22	0.42	0.11	1.2	**302**	<0.12	2.3	<6.0
LAM135	9/28	0.10	1.0	0.13	1.6	14.2	<0.12	1.9	<6.0
LAM136	9/28	0.22	2.2	0.14	2.8	178	<0.12	2.8	<6.0
LAM137	9/28	0.09	0.48	0.12	1.3	12.2	<0.12	1.6	<6.0
LAM138	9/28	0.11	0.42	0.11	1.2	67.6	<0.12	2.0	6.6
LAM139	9/28	0.08	0.96	0.14	1.0	11.3	<0.12	1.8	<6.0
LAM141	10/4	<0.06	2.0	0.17	1.1	11.5	<0.12	2.9	<6.0
LAM132	10/4	0.11	2.6	0.29	1.8	113	<0.12	4.0	<6.0
LAM142	10/4	<0.06	1.7	0.16	0.72	9.5	<0.12	2.7	<6.0
LAM143	10/4	0.13	2.2	0.19	1.3	194	0.12	3.5	<6.0
LAM144	10/4	<0.06	1.9	0.15	0.90	7.7	<0.12	2.6	<6.0
LAM145	10/4	0.10	2.5	0.17	1.3	118	<0.12	3.6	<6.0
LAM146	10/4	<0.06	2.2	0.16	0.96	9.7	<0.12	3.1	<6.0
LAM147	10/4	<0.06	3.0	**0.56**	1.5	89.9	<0.12	3.8	<6.0
LAM148	10/4	<0.06	2.0	0.14	1.2	10.9	<0.12	2.6	<6.0
LAM149	10/4	0.08	**3.2**	0.22	2.0	93.5	<0.12	3.8	<6.0

Worst case sample concentrations versus criteria:

		Lowest Criteria
Ag:	**0.23 ug x 35.39 / 1440 min x 36 cfm = 0.0002 ug/m³**	**10 ug/m³**
As:	**3.2 ug x 35.39 / 1440 min x 36 cfm = 0.002 ug/m³**	**10 ug/m³**
Cd:	**0.56 x 35.39 / 1440 min x 33 cfm = 0.0004 ug/m³**	**2 ug/m³**
Cr:	**18.4 x 35.39 / 1440 min x 32 cfm = 0.014 ug/m³**	**10 ug/m³**
Cu:	**302 x 35.39 / 1440 min x 37 cfm = 0.20 ug/m³**	**1000 ug/m³**
Hg:	**4.9 x 35.39 / 1440 min x 38 cfm = 0.003 ug/m³**	**10 ug/m³**
Pb:	**9.8 x 35.39 / 1440 min x 36 cfm = 0.007 ug/m³**	**50 ug/m³**
Ni:	**10.1 x 35.39 / 1440 min x 32 cfm = 0.008 ug/m³**	**50 ug/m³**

Lahonton Air Monitoring Program Quality Assurance Report
Air Samples from 7/18/93

This report is based on data reported only from the laboratory directly, with results in ug/filter, not upon results corrected to include flow data. Eleven filters were sent to CH2M Hill Laboratory in Redding, California, and received on July 21, 1993. These filters included one blank filter, and filters from one collocated station at Beach #7 for PM10 and TSP samplers. The laboratory digested the filters according to EPA methods for soil digestion found in the manual "Test Methods for Evaluating Solid Waste," SW-846. Metals analyzed by graphite furnace were arsenic, cadmium, chromium, lead, and silver. Mercury was analyzed by cold vapor, and nickel was analyzed by ICP. Copper was analyzed first by graphite furnace, then by ICP if results were greater than 5 times the ICP detection limit, or 15 ug/filter.

The laboratory reported results of internal quality control samples along with the filter data, and the unacceptable results are reviewed as follows. Spike results for copper and silver were poor (62.5% and 15.0% respectively); however, post digestion spikes were acceptable for both copper and silver (96.7% and 104.5% respectively). Levels of silver were very low in a few filters and below detection in most. The possibility exists that unrecoverable silver was present on the filters. Copper levels were much greater on the filters, but a low bias may still be present.

The duplicate relative percent differences (RPDs) were poor for chromium and silver (113.7 RPD and 200.0 RPD respectively). These differences (0.43 ug/filter and <0.06 ug/filter, or less than 7 times the detection limit) occurred near the detection limit for silver where higher variance is expected, and difficulties in recovery of silver may be influencing precision. The difference in chromium results (1.32 ug/filter and 4.80 ug/filter) is almost 20 times the detection limit and indicates that variability does exist at that level. These levels are representative of chromium on most of the filters, but they are relatively low.

One monitoring site contains a second, collocated sampler to test field variability. The PM10 samples both had very low levels and very little variability. The TSP samples on the other hand had very little variability for most metals with low levels, but copper, which had levels of 111 ug/filter on the primary and 74.5 ug/filter on the collocated filter, resulted in 39% RPD. Chromium had much lower levels and resulted in 166% RPD between the primary sample at 18.4 ug/filter and the collocated sample at 1.7 ug/filter. The difference in variability between the two types presumably is inherent in the type of sample, as the TSP sampler is collecting all suspended particles and not filtering out the larger, less homogeneous particles as the PM10 sampler does.

In general, notable quality control results indicate problems both with low recovery and variability of silver. Some variability is seen in chromium results as well, and copper is also showing a possible low bias, though not as low as silver.

Lahonton Air Monitoring Program Quality Assurance Report
Samples From 7/30/93

This report is based on data reported only from the laboratory directly, with results in ug/filter, not upon results corrected to include flow data. Eleven filters were sent to CH2M Hill Laboratory in Redding, California, and received on August 5, 1993. These filters included one blank filter, and filters from one collocated station at Beach #7 for PM10 and TSP samplers. The laboratory digested the filters according to EPA methods for soil digestion found in the manual "Test Methods for Evaluating Solid Waste," SW-846. Metals analyzed by graphite furnace were arsenic, cadmium, chromium, lead, and silver. Mercury was analyzed by cold vapor, and nickel was analyzed by ICP. Copper was analyzed first by graphite furnace, then by ICP if results were greater than 5 times the ICP detection limit, or 15 ug/filter.

The laboratory reported results of internal quality control samples along with the filter data, and the unacceptable results are reviewed as follows. Chromium appeared in the laboratory preparation blank at a level of 0.420 ug/filter, and also was present in the blank control filter at a level of 0.78 ug/filter. Contamination could be a significant contributor to the levels reported from the samples, which ranged from 0.42 to 1.8 ug filter. Copper did not appear in the preparation blank when analyzed by ICP, but was detected in the furnace analysis at a level of 0.78 ug/filter; however, this is less than 10% of the lowest concentration detected on the filters, which ranged from 10.6 to 238 ug/filter, and should not be significant.

Mercury did not appear in the laboratory preparation blank, but was present on the blank control filter at a level of 0.32 ug/filter. The levels of mercury present on the sample filters ranged from 0.50 to 4.9 ug/filter, and 0.32 ug/filter is greater than 10% of all but the highest concentration. An unknown portion of these sample results may be due to contamination, although some mercury is apparently being captured through sampling.

The spike recovery for silver was extremely low (16.1%), and although a post digestion spike came in at 104.5% recovery, the first result indicates a problem in recovering silver from the samples. Silver only appears in a few samples, with the highest level being only 0.14 ug/filter. It is possible that more silver was present and could not be recovered for detection.

One site contains a second, collocated station with both TSP and PM10 samplers to test field variability. Concentrations of the metals on the PM10 samples were low, but variability was seen in mercury (102% RPD) and in lead (47% RPD). Concentrations of metals on the TSP samples were also low except for copper (120 and 71 ug/filter). Copper also had the greatest variability with 51% RPD, lead had an RPD of 21%, and mercury, which had low levels, varied by more than twice the detection limit at 0.70 ug/filter difference between the primary and collocated station.

In general, notable quality control results indicate problems with the recovery of silver. Some low level contamination of chromium is possible, as is contamination of mercury.

Lahonton Air Monitoring Program Quality Assurance Report
Air Samples from 9/4/93

This report is based on data reported only from the laboratory directly, with results in ug/filter, not upon results corrected to include flow data. Ten filters were sent to CH2M Hill Laboratory in Redding, California, and received on September 16, 1993. These filters included one blank filter, and filters from one collocated station at Beach #7 for PM10 and TSP samplers. The primary TSP sampler did not produce a valid sample, was not included in the sample batch, and is therefore unavailable for comparison. The laboratory digested the filters according to EPA methods for soil digestion found in the manual "Test Methods for Evaluating Solid Waste," SW-846. Metals analyzed by graphite furnace were arsenic, cadmium, chromium, lead, and silver. Mercury was analyzed by cold vapor, and nickel was analyzed by ICP. Copper was analyzed first by graphite furnace, then by ICP if results were greater than five times the ICP detection limit, or 15 ug/filter.

The laboratory reported results of internal quality control samples along with the filter data, and the unacceptable results are reviewed as follows. The spike recovery for mercury was slightly low (63%); however, the post digestion spike was acceptable (104%). Silver recovery was low in the CRDL standard, but was acceptable in the LCS and spiked samples. All duplicates had acceptable relative percent differences.

The filters from the collocated PM10 samplers had very low concentrations and very little variability. The relative percent differences between results were below acceptance criteria for duplicates for all metals. The control filter showed trace levels of chromium and lead, and while the level of lead is insignificant, the chromium concentration on the blank filter was 0.9 ug. This is a significant level as the highest chromium concentration was 2.7 ug and 1.3 ug the lowest.

In general, the only significant quality control problem appears to be poossible low level chromium contamination as seen in the control blank at a level of 0.9 ug/filter.

Threshold Limit Values
as recommended by the
American Conference of Government Industrial Hygenists

TWA: Threshold Limit Value--Time-Weighted Average (TLV-TWA) is the time-weighted average concentration for a normal 8-hour workday and a 40-hour workweek, to which nearly all workers may be repeatedly exposed, day after day, without adverse effect.

STEL: Threshold Limit Value--Short-Term Exposure Limit (TLV-STEL) is defined as a 15-minute TWA exposure which should not be exceeded at any time during a workday even if the 8-hour TWA is within the TLV-TWA.

The limits listed below are taken from the "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices" handbook of the ACGIH. Metals on the "Notice of Intended Changes" for 1993-1994 are listed here with the proposed, and in each case, lower limits.

Metal	TWA ug/m^3	STEL ug/m^3
Arsenic	10	-
Cadmium	2.0	-
Chromium		
Metal, elemental, inorganic compounds	500	-
Cr III compounds	500	-
Cr VI compounds, water soluble	50	
Cr VI compounds, insoluble	10	-
Copper	1000	-
Mercury		
Alkyl compounds	10	30
Aryl compounds	100	-
Elemental and inorganic	25	-
Lead	50	-
Nickel	50	-
Silver		
Metal	100	-
Soluble compounds	10	-