



12-Nov-2012

Jacob Hook
Environmental Resources Management
15810 Park Ten Place
Suite 300
Houston, TX 77084

Tel: (281) 600-1000
Fax: (281) 600-1001

Re: ASARCO - Smelter DDD Project

Work Order: **1211194**

Dear Jacob,

ALS Environmental received 1 sample on 07-Nov-2012 09:25 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 22.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

A handwritten signature in cursive script that reads "Patricia L. Lynch".

Electronically approved by: Jumoke M. Lawal

Patricia L. Lynch
Project Manager



Certificate No: TX: T104704231-12-10

Client: Environmental Resources Management
Project: ASARCO - Smelter DDD Project
Work Order: 1211194

**TRRP Laboratory Data
Package Cover Page**

This data package consists of all or some of the following as applicable:

This signature page, the laboratory review checklist, and the following reportable data:

- R1 Field chain-of-custody documentation;
- R2 Sample identification cross-reference;
- R3 Test reports (analytical data sheets) for each environmental sample that includes:
 - a) Items consistent with NELAC Chapter 5,
 - b) dilution factors,
 - c) preparation methods,
 - d) cleanup methods, and
 - e) if required for the project, tentatively identified compounds (TICs).
- R4 Surrogate recovery data including:
 - a) Calculated recovery (%R), and
 - b) The laboratory's surrogate QC limits.
- R5 Test reports/summary forms for blank samples;
- R6 Test reports/summary forms for laboratory control samples (LCSs) including:
 - a) LCS spiking amounts,
 - b) Calculated %R for each analyte, and
 - c) The laboratory's LCS QC limits.
- R7 Test reports for project matrix spike/matrix spike duplicates (MS/MSDs) including:
 - a) Samples associated with the MS/MSD clearly identified,
 - b) MS/MSD spiking amounts,
 - c) Concentration of each MS/MSD analyte measured in the parent and spiked samples,
 - d) Calculated %Rs and relative percent differences (RPDs), and
 - e) The laboratory's MS/MSD QC limits.
- R8 Laboratory analytical duplicate (if applicable) recovery and precision:
 - a) the amount of analyte measured in the duplicate,
 - b) the calculated RPD, and
 - c) the laboratory's QC limits for analytical duplicates.
- R9 List of method quantitation limits (MQLs) and detectability check sample results for each analyte for each method and matrix.

R10 Other problems or anomalies.

The Exception Report for each "No" or "Not Reviewed (NR)" item in Laboratory Review Checklist and for each analyte, matrix, and method for which the laboratory does not hold NELAC accreditation under the Texas Laboratory Accreditation Program.

Client: Environmental Resources Management
Project: ASARCO - Smelter DDD Project
Work Order: 1211194

**TRRP Laboratory Data
Package Cover Page**

Release Statement: I am responsible for the release of this laboratory data package. This laboratory is NELAC accredited under the Texas Laboratory Accreditation Program for all the methods, analytes and matrices reported in this data package except as noted in the Exception Reports. The data have been reviewed and are technically compliant with the requirements of the methods used, except where noted by the laboratory in the attached exception reports. By my signature below, I affirm to the best of my knowledge, all problems/anomalies, observed by the laboratory have been identified by the laboratory in the Laboratory Review Checklist, and no information affecting the quality of the data has been knowingly withheld.

Check, if applicable: [NA] This laboratory meets an exception under 30 TAC §25.6 and was last inspected by TCEQ or _____ on (enter date of last inspection). Any findings affecting the data in this laboratory data package are noted in the Exception Reports herein. The official signing the cover page of the report in which these data are used is responsible for releasing this data package and is by signature affirming the above release statement is true.

Patricia L. Lynch

Patricia L. Lynch
Project Manager

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group		LRC Date: 11/12/2012					
Project Name: ASARCO - Smelter DDD Project		Laboratory Job Number: 1211194					
Reviewer Name: Pat Lynch		Prep Batch Number(s): 65607, 65611					
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
R1	OI	Chain-of-custody (C-O-C)					
		Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	X				
		Were all departures from standard conditions described in an exception report?	X				
R2	OI	Sample and quality control (QC) identification					
		Are all field sample ID numbers cross-referenced to the laboratory ID numbers?	X				
		Are all laboratory ID numbers cross-referenced to the corresponding QC data?	X				
R3	OI	Test reports					
		Were all samples prepared and analyzed within holding times?	X				
		Other than those results < MQL, were all other raw values bracketed by calibration standards?	X				
		Were calculations checked by a peer or supervisor?	X				
		Were all analyte identifications checked by a peer or supervisor?	X				
		Were sample detection limits reported for all analytes not detected?	X				
		Were all results for soil and sediment samples reported on a dry weight basis?	X				
		Were % moisture (or solids) reported for all soil and sediment samples?	X				
		Were bulk soils/solids samples for volatile analysis extracted with methanol per SW-846 Method 5035?			X		
		If required for the project, TICs reported?			X		
R4	O	Surrogate recovery data					
		Were surrogates added prior to extraction?	X				
		Were surrogate percent recoveries in all samples within the laboratory QC limits?	X				
R5	OI	Test reports/summary forms for blank samples					
		Were appropriate type(s) of blanks analyzed?	X				
		Were blanks analyzed at the appropriate frequency?	X				
		Were method blanks taken through the entire analytical process, including preparation and, if applicable, cleanup procedures?	X				
		Were blank concentrations < MQL?	X				
R6	OI	Laboratory control samples (LCS):					
		Were all COCs included in the LCS?	X				
		Was each LCS taken through the entire analytical procedure, including prep and cleanup steps?	X				
		Were LCSs analyzed at the required frequency?	X				
		Were LCS (and LCSD, if applicable) %Rs within the laboratory QC limits?	X				
		Does the detectability data document the laboratory's capability to detect the COCs at the MDL used to calculate the SDLs?	X				
		Was the LCSD RPD within QC limits?	X				
R7	OI	Matrix spike (MS) and matrix spike duplicate (MSD) data					
		Were the project/method specified analytes included in the MS and MSD?	X				
		Were MS/MSD analyzed at the appropriate frequency?	X				
		Were MS (and MSD, if applicable) %Rs within the laboratory QC limits?		X			1
		Were MS/MSD RPDs within laboratory QC limits?	X				
R8	OI	Analytical duplicate data					
		Were appropriate analytical duplicates analyzed for each matrix?	X				
		Were analytical duplicates analyzed at the appropriate frequency?	X				
		Were RPDs or relative standard deviations within the laboratory QC limits?	X				
R9	OI	Method quantitation limits (MQLs):					
		Are the MQLs for each method analyte included in the laboratory data package?	X				
		Do the MQLs correspond to the concentration of the lowest non-zero calibration standard?	X				
		Are unadjusted MQLs and DCSs included in the laboratory data package?	X				
R10	OI	Other problems/anomalies					
		Are all known problems/anomalies/special conditions noted in this LRC and ER?	X				
		Were all necessary corrective actions performed for the reported data?	X				
		Was applicable and available technology used to lower the SDL and minimize the matrix interference affects on the sample results?	X				
		Is the laboratory NELAC-accredited under the Texas Laboratory Program for the analytes, matrices and methods associated with this laboratory data package?	X				

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group			LRC Date: 11/12/2012				
Project Name: ASARCO - Smelter DDD Project			Laboratory Job Number: 1211194				
Reviewer Name: Pat Lynch			Prep Batch Number(s): 65607, 65611				
# ¹	A ²	Description	Yes	No	NA ³	NR ⁴	ER# ⁵
S1	OI	Initial calibration (ICAL)					
		Were response factors and/or relative response factors for each analyte within QC limits?	X				
		Were percent RSDs or correlation coefficient criteria met?	X				
		Was the number of standards recommended in the method used for all analytes?	X				
		Were all points generated between the lowest and highest standard used to calculate the curve?	X				
		Are ICAL data available for all instruments used?	X				
		Has the initial calibration curve been verified using an appropriate second source standard?	X				
S2	OI	Initial and continuing calibration verification (ICCV and CCV) and continuing calibration blank (CCB)					
		Was the CCV analyzed at the method-required frequency?	X				
		Were percent differences for each analyte within the method-required QC limits?	X				
		Was the ICAL curve verified for each analyte?	X				
		Was the absolute value of the analyte concentration in the inorganic CCB < MDL?	X				
S3	O	Mass spectral tuning:					
		Was the appropriate compound for the method used for tuning?	X				
		Were ion abundance data within the method-required QC limits?	X				
S4	O	Internal standards (IS):					
		Were IS area counts and retention times within the method-required QC limits?	X				
S5	OI	Raw data (NELAC section 1 appendix A glossary, and section 5.12 or ISO/IEC 17025 section)					
		Were the raw data (for example, chromatograms, spectral data) reviewed by an analyst?	X				
		Were data associated with manual integrations flagged on the raw data?	X				
S6	O	Dual column confirmation					
		Did dual column confirmation results meet the method-required QC?			X		
S7	O	Tentatively identified compounds (TICs):					
		If TICs were requested, were the mass spectra and TIC data subject to appropriate checks?			X		
S8	I	Interference Check Sample (ICS) results:					
		Were percent recoveries within method QC limits?	X				
S9	I	Serial dilutions, post digestion spikes, and method of standard additions					
		Were percent differences, recoveries, and the linearity within the QC limits specified in the method?		X			2
S10	OI	Method detection limit (MDL) studies					
		Was a MDL study performed for each reported analyte?	X				
		Is the MDL either adjusted or supported by the analysis of DCSs?	X				
S11	OI	Proficiency test reports:					
		Was the laboratory's performance acceptable on the applicable proficiency tests or evaluation studies?	X				
S12	OI	Standards documentation					
		Are all standards used in the analyses NIST-traceable or obtained from other appropriate sources?	X				
S13	OI	Compound/analyte identification procedures					
		Are the procedures for compound/analyte identification documented?	X				
S14	OI	Demonstration of analyst competency (DOC)					
		Was DOC conducted consistent with NELAC Chapter 5C or ISO/IEC 4?	X				
		Is documentation of the analyst's competency up-to-date and on file?	X				
S15	OI	Verification/validation documentation for methods (NELAC Chap 5 or ISO/IEC 17025 Section 5)					
		Are all the methods used to generate the data documented, verified, and validated, where applicable?	X				
S16	OI	Laboratory standard operating procedures (SOPs):					
		Are laboratory SOPs current and on file for each method performed?	X				
Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period. O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable); NA = Not Applicable; NR = Not Reviewed; R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).							

Laboratory Review Checklist: Reportable Data

Laboratory Name: ALS Laboratory Group		LRC Date: 11/12/2012
Project Name: ASARCO - Smelter DDD Project		Laboratory Job Number: 1211194
Reviewer Name: Pat Lynch		Prep Batch Number(s): 65607, 65611
ER#⁵	Description	
1	Batch 65607, Metals, Sample 1211157-01: MS/MSD is for an unrelated sample.	
2	Batch 65607, Metals, Sample 1211157-01: PDS recovery is for unrelated sample.	
<p>Items identified by the letter "R" must be included in the laboratory data package submitted in the TRRP-required report(s). Items identified by the letter "S" should be retained and made available upon request for the appropriate retention period. O = Organic Analyses; I = Inorganic Analyses (and general chemistry, when applicable); NA = Not Applicable; NR = Not Reviewed; R# = Exception Report identification number (an Exception Report should be completed for an item if "NR" or "No" is checked).</p>		

Client: Environmental Resources Management
Project: ASARCO - Smelter DDD Project
Work Order: 1211194

Work Order Sample Summary

<u>Lab Samp ID</u>	<u>Client Sample ID</u>	<u>Matrix</u>	<u>Tag Number</u>	<u>Collection Date</u>	<u>Date Received</u>	<u>Hold</u>
1211194-01	600' stack dust	Soil		11/6/2012 09:15	11/7/2012 09:25	<input type="checkbox"/>

Client: Environmental Resources Management
Project: ASARCO - Smelter DDD Project
Sample ID: 600' stack dust
Collection Date: 11/6/2012 09:15 AM

Work Order: 1211194
Lab ID: 1211194-01
Matrix: SOIL

Analyses	Result	Qual	SDL	ML	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			Method: SW7471A		Prep: SW7471A / 11/9/12		Analyst: JCJ
Mercury	4,380,000		2,800	33,900	µg/Kg	10000	11/12/2012 11:16
METALS			Method: SW6020		Prep: SW3050A / 11/7/12		Analyst: SKS
Aluminum	2,840		18	90.7	mg/Kg	100	11/9/2012 13:14
Antimony	1,030		18	45.4	mg/Kg	100	11/9/2012 13:14
Arsenic	25,200		91	454	mg/Kg	1000	11/9/2012 13:17
Barium	45.6		7.3	45.4	mg/Kg	100	11/9/2012 13:14
Beryllium	U		0.45	4.54	mg/Kg	10	11/9/2012 13:00
Cadmium	11,800		45	454	mg/Kg	1000	11/9/2012 13:17
Calcium	17,400		910	4,540	mg/Kg	100	11/9/2012 13:14
Chromium	3.27		0.082	0.454	mg/Kg	1	11/8/2012 16:07
Cobalt	5.09		0.064	0.454	mg/Kg	1	11/8/2012 16:07
Copper	2,160		9.1	45.4	mg/Kg	100	11/9/2012 13:14
Iron	5,190		910	4,540	mg/Kg	100	11/9/2012 13:14
Lead	73,000		450	4,540	mg/Kg	10000	11/9/2012 13:26
Magnesium	1,370		9.1	45.4	mg/Kg	1	11/8/2012 16:07
Manganese	197		9.1	45.4	mg/Kg	100	11/9/2012 13:14
Nickel	6.71		0.082	0.454	mg/Kg	1	11/8/2012 16:07
Potassium	2,520		12	45.4	mg/Kg	1	11/8/2012 16:07
Selenium	2,940		16	45.4	mg/Kg	100	11/9/2012 13:14
Silver	156		7.3	45.4	mg/Kg	100	11/9/2012 13:14
Sodium	767		10	45.4	mg/Kg	1	11/8/2012 16:07
Thallium	471		6.4	45.4	mg/Kg	100	11/9/2012 13:14
Vanadium	2.02		0.21	0.454	mg/Kg	1	11/8/2012 16:07
Zinc	10,100		230	454	mg/Kg	1000	11/9/2012 13:17

Note: See Qualifiers Page for a list of qualifiers and their explanation.

WorkOrder: 1211194
InstrumentID: HG02
Test Code: HG_S_LOW
Test Number: SW7471A
Test Name: Mercury - SW7471B

**METHOD DETECTION /
REPORTING LIMITS**

Matrix: Solid **Units:** µg/Kg

Type	Analyte	CAS	DCS	MDL	Unadjusted MQL
A	Mercury	7439-97-6	2.3	0.27	3.3

WorkOrder: 1211194
InstrumentID: ICPMS05
Test Code: ICP_S_Low
Test Number: SW6020
Test Name: Metals

**METHOD DETECTION /
 REPORTING LIMITS**

Matrix: Solid **Units:** mg/Kg

Type	Analyte	CAS	DCS	MDL	Unadjusted MQL
A	Aluminum	7429-90-5	0.50	0.20	1.0
A	Antimony	7440-36-0	0.22	0.20	0.50
A	Arsenic	7440-38-2	0.21	0.10	0.50
A	Barium	7440-39-3	0.20	0.080	0.50
A	Beryllium	7440-41-7	0.084	0.050	0.50
A	Cadmium	7440-43-9	0.081	0.050	0.50
A	Calcium	7440-70-2	24	10	50
A	Chromium	7440-47-3	0.24	0.090	0.50
A	Cobalt	7440-48-4	0.22	0.070	0.50
A	Copper	7440-50-8	0.21	0.10	0.50
A	Iron	7439-89-6	21	10	50
A	Lead	7439-92-1	0.21	0.050	0.50
A	Magnesium	7439-95-4	23	10	50
A	Manganese	7439-96-5	0.27	0.10	0.50
A	Nickel	7440-02-0	0.25	0.090	0.50
A	Potassium	7440-09-7	27	13	50
A	Selenium	7782-49-2	0.23	0.18	0.50
A	Silver	7440-22-4	0.21	0.080	0.50
A	Sodium	7440-23-5	23	11	50
A	Thallium	7440-28-0	0.20	0.070	0.50
A	Vanadium	7440-62-2	0.25	0.23	0.50
A	Zinc	7440-66-6	0.45	0.25	0.50

Client: Environmental Resources Management

QC BATCH REPORT

Work Order: 1211194

Project: ASARCO - Smelter DDD Project

Batch ID: **65607**

Instrument ID **ICPMS05**

Method: **SW6020**

MBLK Sample ID: **MBLKS2-110712-65607**

Units: **mg/Kg**

Analysis Date: **11/8/2012 02:50 PM**

Client ID:

Run ID: **ICPMS05_121108A**

SeqNo: **3010247**

Prep Date: **11/7/2012**

DF: **1**

Analyte	Result	MLQ	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	0.3881	1.0								J
Antimony	U	0.50								
Arsenic	U	0.50								
Barium	U	0.50								
Beryllium	U	0.50								
Cadmium	U	0.50								
Calcium	U	50								
Chromium	U	0.50								
Cobalt	U	0.50								
Copper	U	0.50								
Iron	U	50								
Lead	U	0.50								
Magnesium	U	50								
Manganese	U	0.50								
Nickel	U	0.50								
Potassium	U	50								
Selenium	U	0.50								
Silver	U	0.50								
Sodium	U	50								
Thallium	U	0.50								
Vanadium	U	0.50								
Zinc	U	0.50								

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
Work Order: 1211194
Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

LCS Sample ID: **MLCSS2-110712-65607** Units: **mg/Kg** Analysis Date: **11/8/2012 02:53 PM**

Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010248** Prep Date: **11/7/2012** DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	10.18	1.0	10	0	102	80-120	0			
Antimony	9.95	0.50	10	0	99.5	80-120	0			
Arsenic	9.754	0.50	10	0	97.5	80-120	0			
Barium	10.3	0.50	10	0	103	80-120	0			
Beryllium	9.855	0.50	10	0	98.6	80-120	0			
Cadmium	9.884	0.50	10	0	98.8	80-120	0			
Calcium	935	50	1000	0	93.5	80-120	0			
Chromium	10.09	0.50	10	0	101	80-120	0			
Cobalt	10.27	0.50	10	0	103	80-120	0			
Copper	10.24	0.50	10	0	102	80-120	0			
Iron	997.6	50	1000	0	99.8	80-120	0			
Lead	10.02	0.50	10	0	100	80-120	0			
Magnesium	1004	50	1000	0	100	80-120	0			
Manganese	9.891	0.50	10	0	98.9	80-120	0			
Nickel	10.28	0.50	10	0	103	80-120	0			
Potassium	947.7	50	1000	0	94.8	80-120	0			
Selenium	9.845	0.50	10	0	98.5	80-120	0			
Silver	10	0.50	10	0	100	80-120	0			
Sodium	972.9	50	1000	0	97.3	80-120	0			
Thallium	9.901	0.50	10	0	99	80-120	0			
Vanadium	9.93	0.50	10	0	99.3	80-120	0			
Zinc	9.944	0.50	10	0	99.4	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
Work Order: 1211194
Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

MS Sample ID: **1211157-01CMS** Units: **mg/Kg** Analysis Date: **11/8/2012 03:05 PM**
 Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010253** Prep Date: **11/7/2012** DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	12420	0.83	8.341	11680	8880	75-125	0			SEO
Antimony	2.95	0.42	8.341	0.1002	34.2	75-125	0			S
Arsenic	11.19	0.42	8.341	3.52	91.9	75-125	0			
Barium	211.6	0.42	8.341	168.3	519	75-125	0			SEO
Beryllium	8.169	0.42	8.341	0.5658	91.1	75-125	0			
Cadmium	7.68	0.42	8.341	0.183	89.9	75-125	0			
Calcium	31350	42	834.1	28750	312	75-125	0			SEO
Chromium	58.35	0.42	8.341	47.31	132	75-125	0			SO
Cobalt	14.67	0.42	8.341	7.179	89.8	75-125	0			
Copper	25.12	0.42	8.341	16.52	103	75-125	0			
Iron	17490	42	834.1	16590	107	75-125	0			EO
Lead	36.08	0.42	8.341	22.51	163	75-125	0			S
Magnesium	4246	42	834.1	3488	90.9	75-125	0			O
Manganese	278.9	0.42	8.341	241.7	445	75-125	0			SEO
Nickel	25.68	0.42	8.341	18	92.1	75-125	0			
Potassium	1469	42	834.1	823.8	77.4	75-125	0			
Selenium	7.786	0.42	8.341	0.8477	83.2	75-125	0			
Silver	7.737	0.42	8.341	0.07998	91.8	75-125	0			
Sodium	1023	42	834.1	355.8	80	75-125	0			
Thallium	7.449	0.42	8.341	0.1476	87.5	75-125	0			
Vanadium	34.89	0.42	8.341	24.84	121	75-125	0			
Zinc	78.04	0.42	8.341	70.62	88.9	75-125	0			O

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
 Work Order: 1211194
 Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

MSD Sample ID: **1211157-01CMSD** Units: **mg/Kg** Analysis Date: **11/8/2012 03:07 PM**

Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010254** Prep Date: **11/7/2012** DF: **1**

Analyte	Result	ML	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	11470	0.87	8.684	11680	-2420	75-125	12420	7.96	25	SEO
Antimony	3.705	0.43	8.684	0.1002	41.5	75-125	2.95	22.7	25	S
Arsenic	10.79	0.43	8.684	3.52	83.8	75-125	11.19	3.57	25	
Barium	177.7	0.43	8.684	168.3	109	75-125	211.6	17.4	25	EO
Cadmium	7.878	0.43	8.684	0.183	88.6	75-125	7.68	2.55	25	
Calcium	26110	43	868.4	28750	-305	75-125	31350	18.3	25	SEO
Chromium	54.83	0.43	8.684	47.31	86.6	75-125	58.35	6.22	25	O
Cobalt	14.91	0.43	8.684	7.179	89	75-125	14.67	1.63	25	
Copper	24.37	0.43	8.684	16.52	90.4	75-125	25.12	3	25	
Iron	16560	43	868.4	16590	-4.22	75-125	17490	5.47	25	SEO
Lead	34.88	0.43	8.684	22.51	142	75-125	36.08	3.41	25	S
Magnesium	3933	43	868.4	3488	51.2	75-125	4246	7.66	25	SO
Manganese	238.8	0.43	8.684	241.7	-33.2	75-125	278.9	15.5	25	SEO
Nickel	25.17	0.43	8.684	18	82.7	75-125	25.68	1.99	25	
Potassium	1441	43	868.4	823.8	71.1	75-125	1469	1.92	25	S
Selenium	8.192	0.43	8.684	0.8477	84.6	75-125	7.786	5.07	25	
Silver	8.063	0.43	8.684	0.07998	91.9	75-125	7.737	4.12	25	
Sodium	1046	43	868.4	355.8	79.5	75-125	1023	2.21	25	
Thallium	7.965	0.43	8.684	0.1476	90	75-125	7.449	6.69	25	
Vanadium	31.73	0.43	8.684	24.84	79.3	75-125	34.89	9.51	25	
Zinc	75.73	0.43	8.684	70.62	58.8	75-125	78.04	3	25	SO

MSD Sample ID: **1211157-01CMSD** Units: **mg/Kg** Analysis Date: **11/9/2012 12:39 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011533** Prep Date: **11/7/2012** DF: **1**

Analyte	Result	ML	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Beryllium	7.819	0.43	8.684	0.5658	83.5	75-125	8.169	4.38	25	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
 Work Order: 1211194
 Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

DUP Sample ID: **1211157-01CDUP** Units: **mg/Kg** Analysis Date: **11/8/2012 03:02 PM**

Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010252** Prep Date: **11/7/2012** DF: **1**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	U	0.44	0	0	0	0-0	0.1002	0	25	
Arsenic	3.123	0.44	0	0	0	0-0	3.52	11.9	25	
Beryllium	0.5307	0.44	0	0	0	0-0	0.5658	6.4	25	
Cadmium	0.1412	0.44	0	0	0	0-0	0.183	0	25	J
Chromium	40.2	0.44	0	0	0	0-0	47.31	16.2	25	
Cobalt	6.035	0.44	0	0	0	0-0	7.179	17.3	25	
Copper	15.13	0.44	0	0	0	0-0	16.52	8.79	25	
Iron	14470	44	0	0	0	0-0	16590	13.7	25	
Lead	20.03	0.44	0	0	0	0-0	22.51	11.7	25	
Magnesium	2980	44	0	0	0	0-0	3488	15.7	25	
Nickel	15.56	0.44	0	0	0	0-0	18	14.5	25	
Potassium	702.9	44	0	0	0	0-0	823.8	15.8	25	
Selenium	0.704	0.44	0	0	0	0-0	0.8477	18.5	25	
Silver	U	0.44	0	0	0	0-0	0.07998	0	25	
Sodium	308.3	44	0	0	0	0-0	355.8	14.3	25	
Thallium	0.129	0.44	0	0	0	0-0	0.1476	0	25	J
Vanadium	22.46	0.44	0	0	0	0-0	24.84	10.1	25	
Zinc	60.72	0.44	0	0	0	0-0	70.62	15.1	25	

DUP Sample ID: **1211157-01CDUP** Units: **mg/Kg** Analysis Date: **11/9/2012 12:22 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011526** Prep Date: **11/7/2012** DF: **100**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	12290	87	0	0	0	0-0	13450	9	25	
Barium	154.3	44	0	0	0	0-0	161.2	4.38	25	
Calcium	26580	4,400	0	0	0	0-0	31120	15.7	25	
Manganese	209.4	44	0	0	0	0-0	246	16.1	25	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
Work Order: 1211194
Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

PDS Sample ID: **1211157-01CBS** Units: **mg/Kg** Analysis Date: **11/8/2012 03:10 PM**

Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010255** Prep Date: DF: **1**

Analyte	Result	ML	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Antimony	9.089	0.43	8.656	0.1002	104	75-125	0			
Arsenic	12.24	0.43	8.656	3.52	101	75-125	0			
Cadmium	9.485	0.43	8.656	0.183	107	75-125	0			
Chromium	54.59	0.43	8.656	47.31	84.1	75-125	0			O
Cobalt	15.7	0.43	8.656	7.179	98.5	75-125	0			
Copper	24.71	0.43	8.656	16.52	94.6	75-125	0			
Iron	16300	43	865.6	16590	-33.9	75-125	0			SEO
Lead	31.46	0.43	8.656	22.51	103	75-125	0			
Magnesium	3977	43	865.6	3488	56.5	75-125	0			SO
Nickel	25.75	0.43	8.656	18	89.5	75-125	0			
Potassium	1550	43	865.6	823.8	83.9	75-125	0			
Selenium	9.374	0.43	8.656	0.8477	98.5	75-125	0			
Silver	10.56	0.43	8.656	0.07998	121	75-125	0			
Sodium	1078	43	865.6	355.8	83.4	75-125	0			
Thallium	9.243	0.43	8.656	0.1476	105	75-125	0			
Vanadium	32.66	0.43	8.656	24.84	90.3	75-125	0			
Zinc	76.75	0.43	8.656	70.62	70.8	75-125	0			SO

PDS Sample ID: **1211157-01CBS** Units: **mg/Kg** Analysis Date: **11/9/2012 12:29 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011529** Prep Date: DF: **100**

Analyte	Result	ML	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Aluminum	14570	87	865.6	13450	129	75-125	0			SO
Barium	1113	43	865.6	161.2	110	75-125	0			
Calcium	125500	4,300	86560	31120	109	75-125	0			
Manganese	1202	43	865.6	246	110	75-125	0			

PDS Sample ID: **1211157-01CBS** Units: **mg/Kg** Analysis Date: **11/9/2012 12:41 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011534** Prep Date: DF: **1**

Analyte	Result	ML	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Beryllium	9.153	0.43	8.656	0.5658	99.2	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
 Work Order: 1211194
 Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65607** Instrument ID **ICPMS05** Method: **SW6020**

SD Sample ID: **1211157-01C DIL SX** Units: **mg/Kg** Analysis Date: **11/8/2012 03:12 PM**

Client ID: Run ID: **ICPMS05_121108A** SeqNo: **3010257** Prep Date: DF: **5**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Antimony	U	2.2	0	0	0	0-0	0.1002	0	10	
Arsenic	3.538	2.2	0	0	0	0-0	3.52	0.507	10	
Cadmium	0.302	2.2	0	0	0	0-0	0.183	0	10	J
Chromium	46.51	2.2	0	0	0	0-0	47.31	1.69	10	
Cobalt	7.062	2.2	0	0	0	0-0	7.179	1.63	10	
Copper	16.02	2.2	0	0	0	0-0	16.52	3.03	10	
Iron	16360	220	0	0	0	0-0	16590	1.41	10	
Lead	22.76	2.2	0	0	0	0-0	22.51	1.09	10	
Magnesium	3396	220	0	0	0	0-0	3488	2.64	10	
Nickel	17.51	2.2	0	0	0	0-0	18	2.67	10	
Potassium	777.8	220	0	0	0	0-0	823.8	5.59	10	
Selenium	U	2.2	0	0	0	0-0	0.8477	0	10	
Silver	U	2.2	0	0	0	0-0	0.07998	0	10	
Sodium	338.8	220	0	0	0	0-0	355.8	4.77	10	
Thallium	0.3082	2.2	0	0	0	0-0	0.1476	0	10	J
Vanadium	24.55	2.2	0	0	0	0-0	24.84	1.15	10	
Zinc	70.82	2.2	0	0	0	0-0	70.62	0.289	10	

SD Sample ID: **1211157-01C DIL SX** Units: **mg/Kg** Analysis Date: **11/9/2012 12:32 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011530** Prep Date: DF: **500**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Aluminum	14080	430	0	0	0	0-0	13450	4.62	10	
Barium	180.9	220	0	0	0	0-0	161.2	0	10	J
Calcium	33720	22,000	0	0	0	0-0	31120	8.35	10	
Manganese	241.1	220	0	0	0	0-0	246	2	10	

SD Sample ID: **1211157-01C DIL SX** Units: **mg/Kg** Analysis Date: **11/9/2012 12:44 PM**

Client ID: Run ID: **ICPMS05_121109A** SeqNo: **3011535** Prep Date: DF: **5**

Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%D	%D Limit	Qual
Beryllium	0.7129	2.2	0	0	0	0-0	0.5658	0	10	J

The following samples were analyzed in this batch: 1211194-01A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
 Work Order: 1211194
 Project: ASARCO - Smelter DDD Project

QC BATCH REPORT

Batch ID: **65611** Instrument ID **HG02** Method: **SW7471A**

MBLK	Sample ID: GBLKS2-110912-65611	Units: µg/Kg					Analysis Date: 11/9/2012 10:50 AM				
Client ID:	Run ID: HG02_121109A	SeqNo: 3012903		Prep Date: 11/9/2012		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	U	3.3									

LCS	Sample ID: GLCSS2-110912-65611	Units: µg/Kg					Analysis Date: 11/9/2012 10:52 AM				
Client ID:	Run ID: HG02_121109A	SeqNo: 3012904		Prep Date: 11/9/2012		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	342	3.3	333.3	0	103	85-115	0				

MS	Sample ID: 1211157-02CMS	Units: µg/Kg					Analysis Date: 11/9/2012 10:58 AM				
Client ID:	Run ID: HG02_121109A	SeqNo: 3012907		Prep Date: 11/9/2012		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	401.3	3.4	338.9	104.7	87.5	85-115	0				

MSD	Sample ID: 1211157-02CMSD	Units: µg/Kg					Analysis Date: 11/9/2012 11:00 AM				
Client ID:	Run ID: HG02_121109A	SeqNo: 3012908		Prep Date: 11/9/2012		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	423.7	3.4	337.9	104.7	94.4	85-115	401.3	5.44	20		

DUP	Sample ID: 1211157-02CDUP	Units: µg/Kg					Analysis Date: 11/9/2012 10:56 AM				
Client ID:	Run ID: HG02_121109A	SeqNo: 3012906		Prep Date: 11/9/2012		DF: 1					
Analyte	Result	MQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual	
Mercury	103.9	3.4	0	0	0		104.7	0.787	20		

The following samples were analyzed in this batch:

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Environmental Resources Management
Project: ASARCO - Smelter DDD Project
WorkOrder: 1211194

**QUALIFIERS,
ACRONYMS, UNITS**

<u>Qualifier</u>	<u>Description</u>
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

<u>Acronym</u>	<u>Description</u>
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

<u>Units Reported</u>	<u>Description</u>
µg/Kg	Micrograms per Kilogram
mg/Kg	Milligrams per Kilogram

Sample Receipt Checklist

Client Name: **ERMSW-HOU**

Date/Time Received: **07-Nov-12 09:25**

Work Order: **1211194**

Received by: **PMG**

Checklist completed by Parash M. Ciga 07-Nov-12
eSignature Date

Reviewed by: Patricia L. Lynch 08-Nov-12
eSignature Date

Matrices: Soil
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	Not Present <input type="checkbox"/>
Custody seals intact on shipping container/cooler?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Container/Temp Blank temperature in compliance?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	
Temperature(s)/Thermometer(s):	<u>22.2c C/U</u>		<u>005</u>
Cooler(s)/Kit(s):	<u>Box</u>		
Date/Time sample(s) sent to storage:	<u>11/7/12 12:30</u>		
Water - VOA vials have zero headspace?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>
pH adjusted by:	<u>-</u>		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:
Contacted By: Regarding:

Comments:

CorrectiveAction:



Chain of Custody Form

1211194

- Gnd +1 5'
- Evert +1 4'
- Fort +1 9'

ERMSW-HOU: Environmental Resources Management

Project: ASARCO - Smelter DDD Project

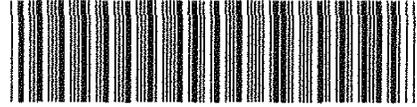
Page 1 of 1

COC ID: 123456

Environmental

Customer Information		ALS Project Manager:	
Purchase Order	Project Name	Project Information	Parameter/Method Request for Analysis
Work Order	Asarco Smelter DDD Project	A	Regra *8 with T.A.L. analysis.
Company Name	ERM	B	
Send Report To	Mike Casbon	C	
Address	15810 Park Ten Place, Suite 300	D	
City/State/Zip	Houston, TX, 77084	E	
Phone	1-224-542-0954	F	
Fax		G	
e-Mail Address	mike.casbon@erm.com	H	
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Total Packages Total Weight Total Declared Value
Our liability is limited to \$100 unless you declare a higher value. See the current FedEx Service Guide for details.

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Sender's Name, Address, City, State, ZIP, Country, and other contact information fields.

City: Houston, TX, ZIP: 77099

Address: 10450 S. Fairview Rd, Houston, TX 77099

Company: NLS Environmental

Recipients Name: NLS Environmental, Phone: 541 580 5256

2 Your Internal Billing Reference: 01/8198

City: Milwaukee, WI, ZIP: 53009

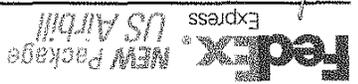
Address: 900 N. Virginia St, Suite 101

Company: FPM, Inc

Sender's Name: Mike Gibson, Phone: 384 398-0959

1 From: 11/12

Tracking Number: 8993 6900 6820



7 Payment Bill to:

Payment options: No (checked), Yes, As per shipper's declaration, Shipper's declaration not required.

Does this shipment contain dangerous goods? No Signature Required (checked), Direct Signature, Indirect Signature.

6 Special Handling and Delivery Signature Options

Special handling options: FedEx Envelope, FedEx Pak, Box, Tube, Other (checked).

5 Packaging

Delivery options: FedEx First Overnight, FedEx Priority Overnight, FedEx Standard Overnight, FedEx 2Day, FedEx Express Saver.

4 Express Package Service

Express Package Service details and tracking information.

FedEx.COM 1.800.GoFedEx 1.800.463.3339