SWR 31235

ASARCO EL PASO COPPER SMELTER
PHASE III REMEDIAL INVESTIGATION REPORT
EL PASO, TEXAS

Prepared For:

ASARCO
2301 West Paisano Drive
El Paso, Texas 79922

Prepared By:

Hydrometrics, Inc.®
consulting scientists, engineers and contractors

VOLUME
II of V

November 2001

SWR # 31235

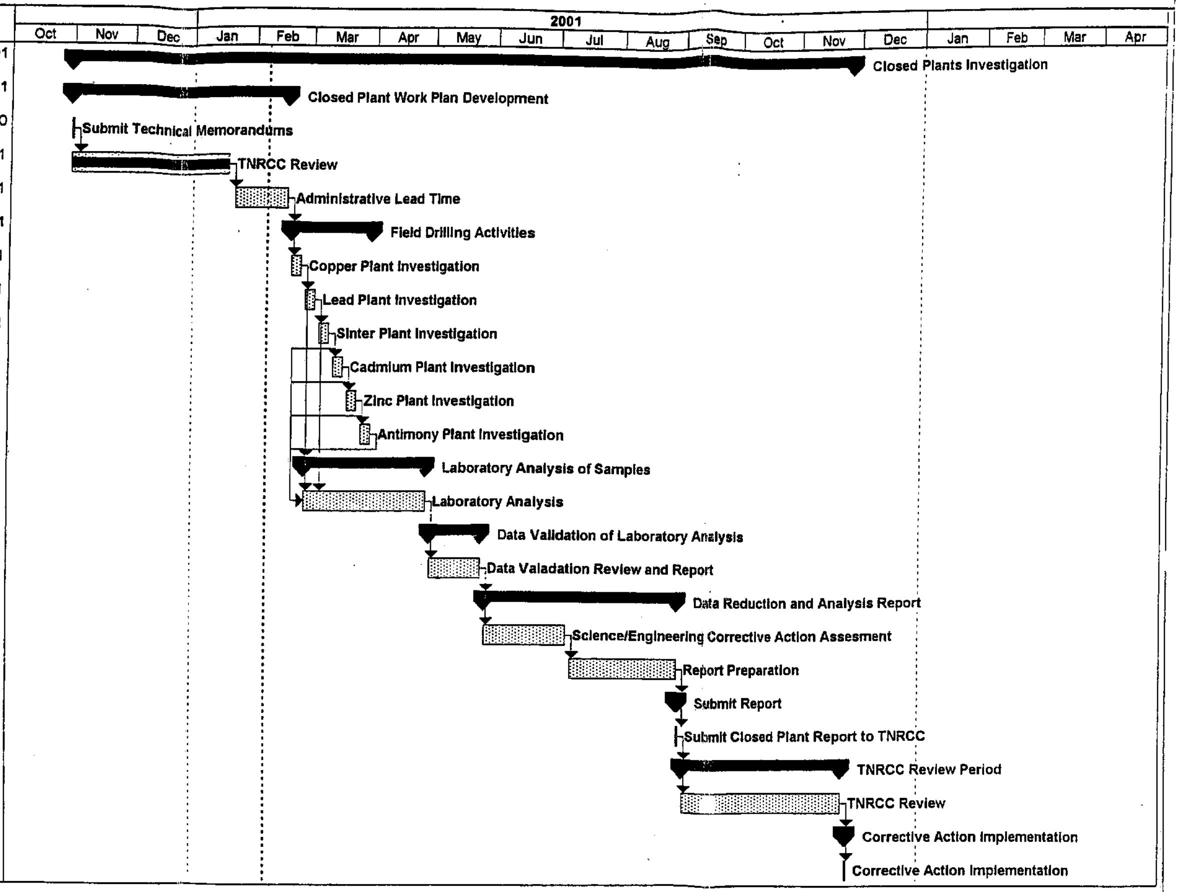
CAS DOC # 14721
PROJ. MGR Brad N.

APPENDIX A

CORRESPONDENCE RELEVANT TO THE ASARCO EL PASO COPPER SMELTER REMEDIAL INVESTIGATION

CLOSED PLANT INVESTIGATION SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**Closed Plants Investigation**	**280 days**	**Tue 10/31/00**	**Mon 11/26/01**
2	**Closed Plant Work Plan Development**	**79 days**	**Tue 10/31/00**	**Fri 2/16/01**
3	Submit Technical Memorandums	1 day	Tue 10/31/00	Tue 10/31/00
4	TNRCC Review	58 days	Tue 10/31/00	Thu 1/18/01
5	Administrative Lead Time	20 days	Mon 1/22/01	Fri 2/16/01
6	**Field Drilling Activities**	**30 days**	**Mon 2/19/01**	**Fri 3/30/01**
7	Copper Plant Investigation	5 days	Mon 2/19/01	Fri 2/23/01
8	Lead Plant Investigation	5 days	Mon 2/26/01	Fri 3/2/01
9	Sinter Plant Investigation	5 days	Mon 3/5/01	Fri 3/9/01
10	Cadmium Plant Investigation	5 days	Mon 3/12/01	Fri 3/16/01
11	Zinc Plant Investigation	5 days	Mon 3/19/01	Fri 3/23/01
12	Antimony Plant Investigation	5 days	Mon 3/26/01	Fri 3/30/01
13	**Laboratory Analysis of Samples**	**45 days**	**Mon 2/26/01**	**Fri 4/27/01**
14	Laboratory Analysis	45 days	Mon 2/26/01	Fri 4/27/01
15	**Data Validation of Laboratory Analysis**	**20 days**	**Mon 4/30/01**	**Fri 5/25/01**
16	Data Valadation Review and Report	20 days	Mon 4/30/01	Fri 5/25/01
17	**Data Reduction and Analysis Report**	**69 days**	**Mon 5/28/01**	**Thu 8/30/01**
18	Science/Engineering Corrective Action Assesment	30 days	Mon 5/28/01	Fri 7/6/01
19	Report Preparation	39 days	Mon 7/9/01	Thu 8/30/01
20	**Submit Report**	**1 day**	**Fri 8/31/01**	**Fri 8/31/01**
21	Submit Closed Plant Report to TNRCC	1 day	Fri 8/31/01	Fri 8/31/01
22	**TNRCC Review Period**	**60 days**	**Mon 9/3/01**	**Fri 11/23/01**
23	TNRCC Review	12 wks	Mon 9/3/01	Fri 11/23/01
24	**Corrective Action Implementation**	**1 day**	**Mon 11/26/01**	**Mon 11/26/01**
25	Corrective Action Implementation	1 day	Mon 11/26/01	Mon 11/26/01

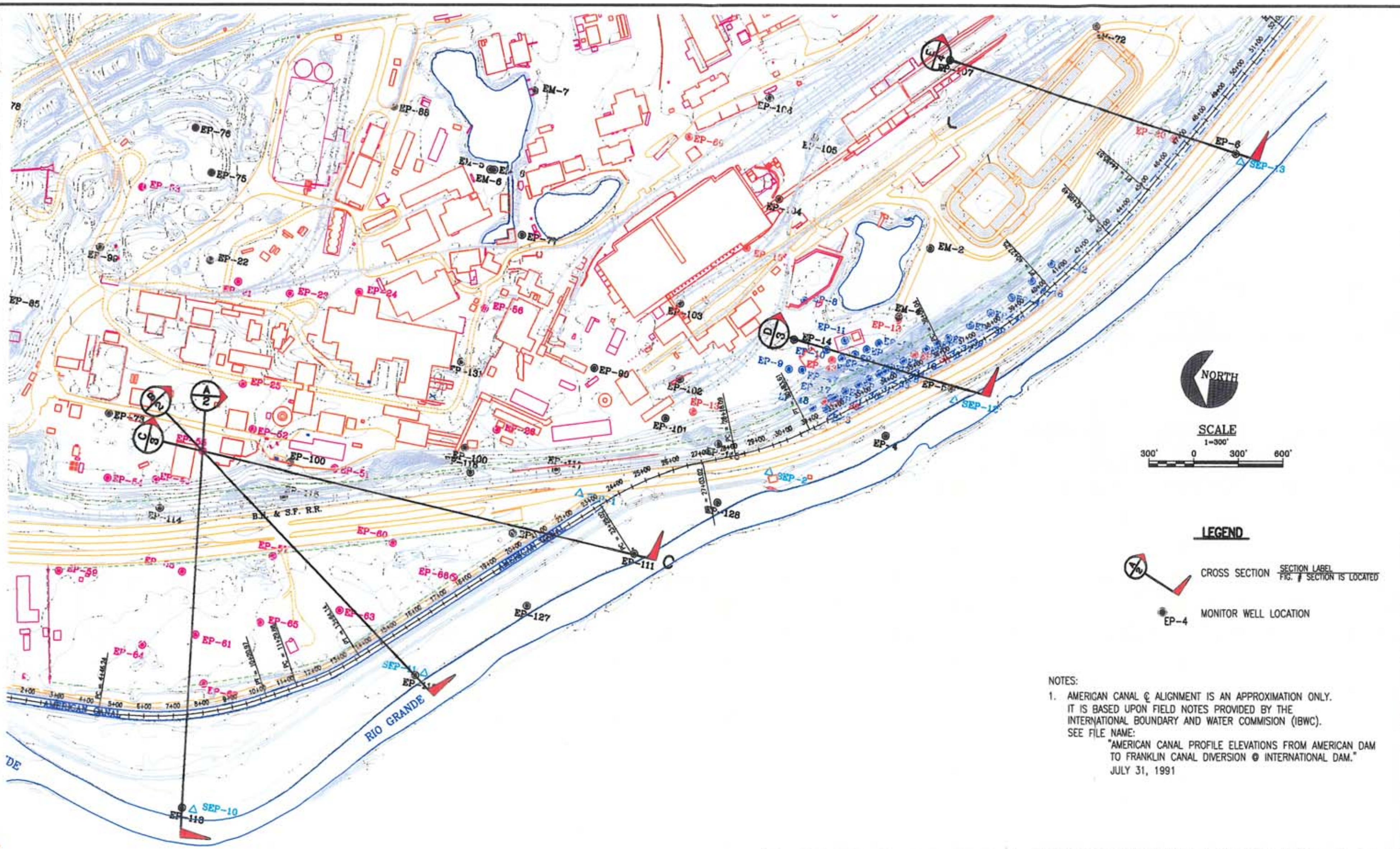


Date: Wed 2/7/01

Task | Progress | Milestone | Summary | Rolled Up Task | Rolled Up Milestone | Rolled Up Progress | External Tasks | Project Summary | Split | Rolled Up Split

CLOSED PLANT INVESTIGATION SCHEDULE

EXHIBIT 1



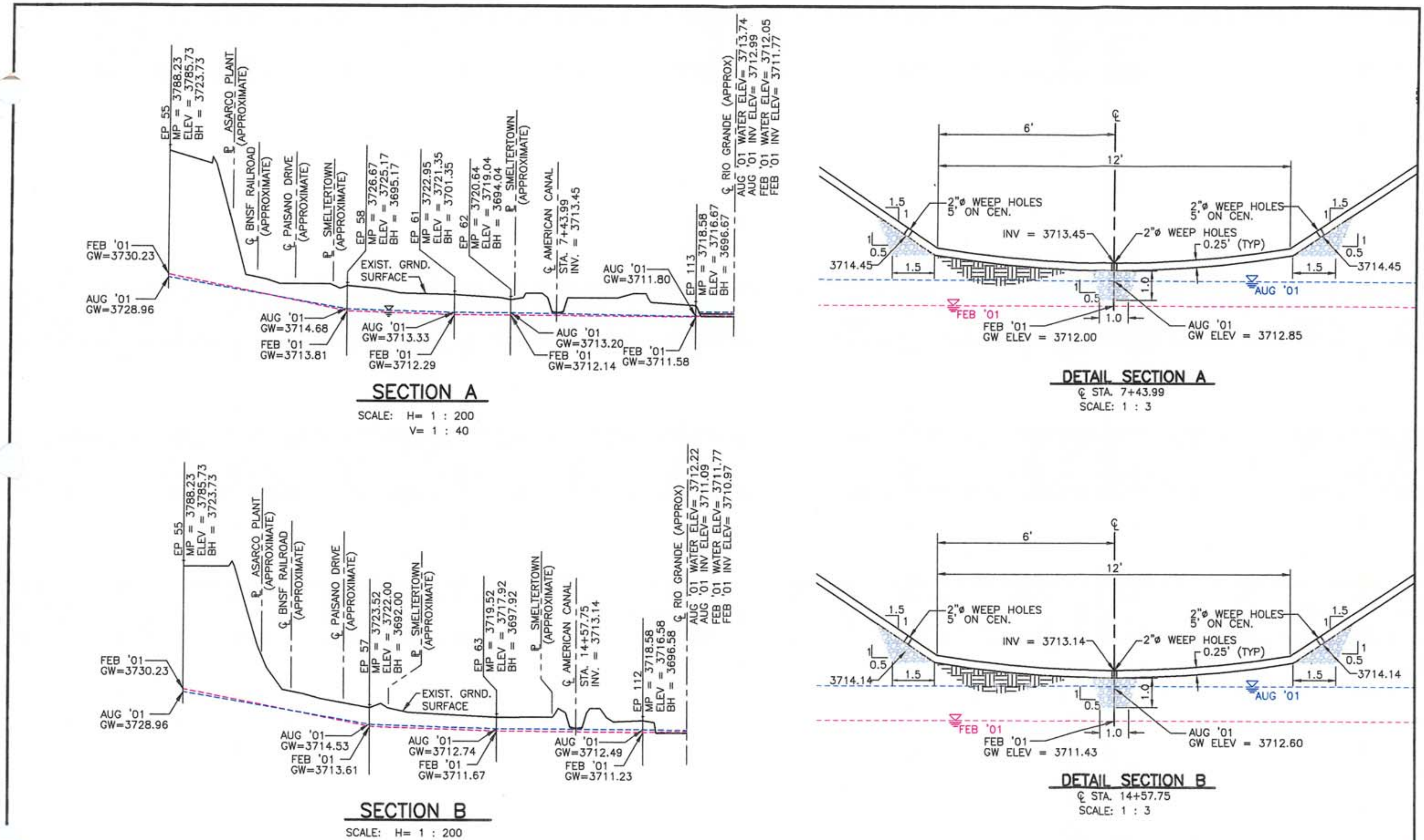
NOTES:

1. AMERICAN CANAL ℄ ALIGNMENT IS AN APPROXIMATION ONLY. IT IS BASED UPON FIELD NOTES PROVIDED BY THE INTERNATIONAL BOUNDARY AND WATER COMMISION (IBWC). SEE FILE NAME: "AMERICAN CANAL PROFILE ELEVATIONS FROM AMERICAN DAM TO FRANKLIN CANAL DIVERSION @ INTERNATIONAL DAM." JULY 31, 1991

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION EL PASO, TEXAS	ASARCO RESPONSE TO A TNRCC LETTER DATED OCTOBER 2, 2001 AMERICAN CANAL \ GW RELATIONSHIP AMERICAN CANAL ALIGNMENT	FIGURE 1

Hydrometrics, Inc.

UPDATE TIME: 16:30
0300\ELP\101301\I:\Land Projects R2\1247\ 1247v201v052



ASARCO INCORPORATED
EL PASO COPPER SMELTER
REMEDIAL INVESTIGATION
EL PASO, TEXAS

ASARCO RESPONSE TO A TNRCC LETTER
DATED OCTOBER2, 2001
AMERICAN CANAL \ GW RELATIONSHIP
CROSS SECTIONS AND DETAILS

FIGURE 2

Hydrometrics, Inc.

UPDATE TIME: 16:00
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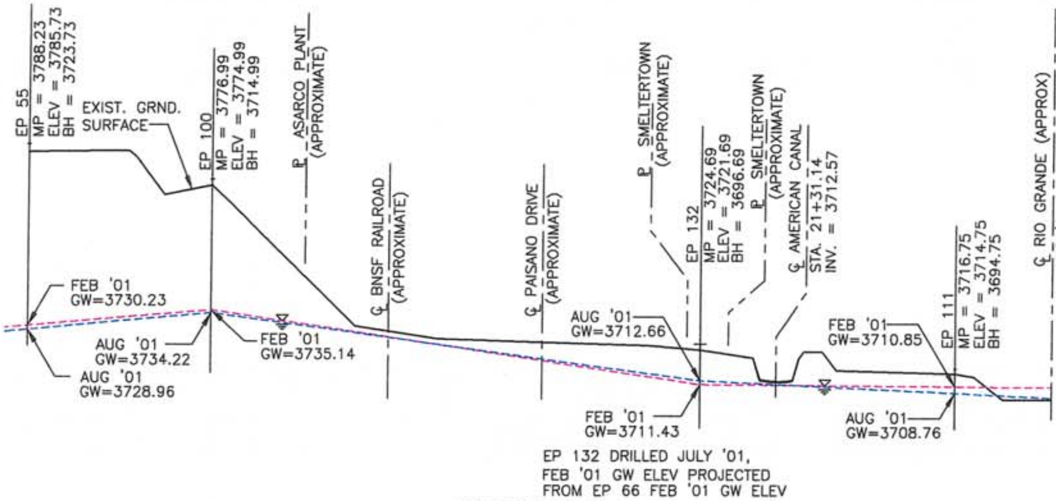

SECTION C

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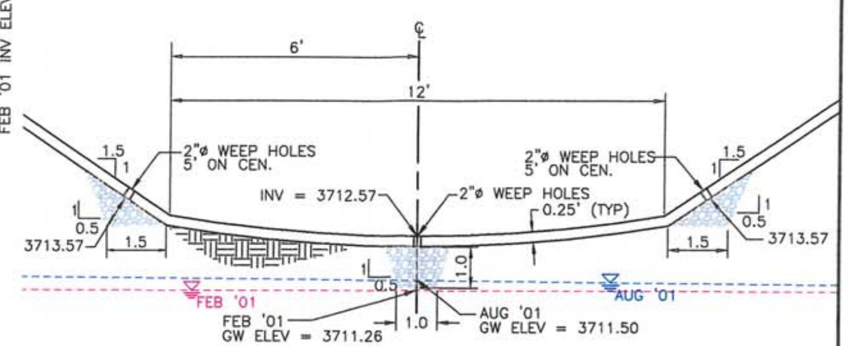

DETAIL SECTION C

℄ STA. 21+31.14
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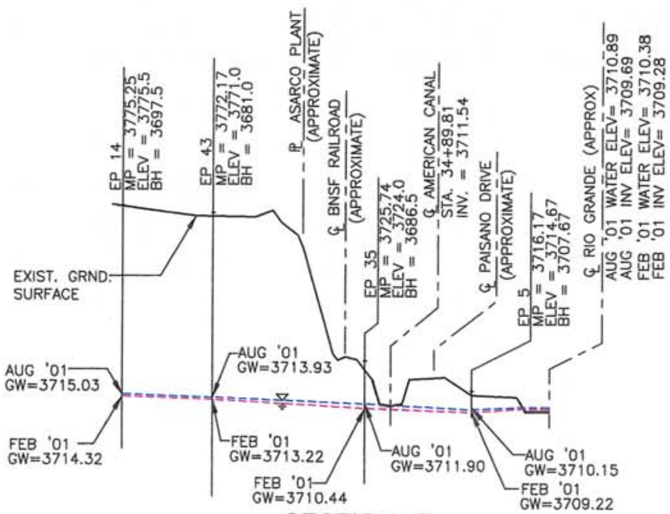

SECTION D

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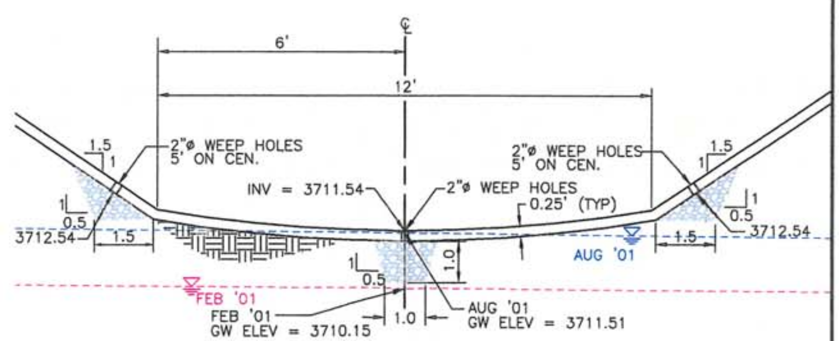

DETAIL SECTION D

℄ STA. 34+89.81
SCALE: 1 : 3

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION EL PASO, TEXAS	ASARCO RESPONSE TO A TNRCC LETTER DATED OCTOBER 2, 2001 AMERICAN CANAL \ GW RELATIONSHIP CROSS SECTIONS AND DETAILS	FIGURE 3

Hydrometrics, Inc.

UPDATE TIME: 16:00
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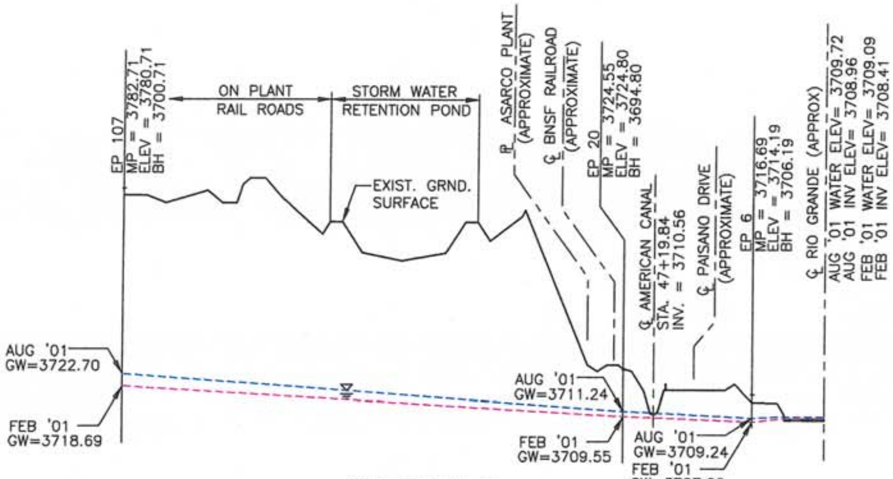

SECTION E

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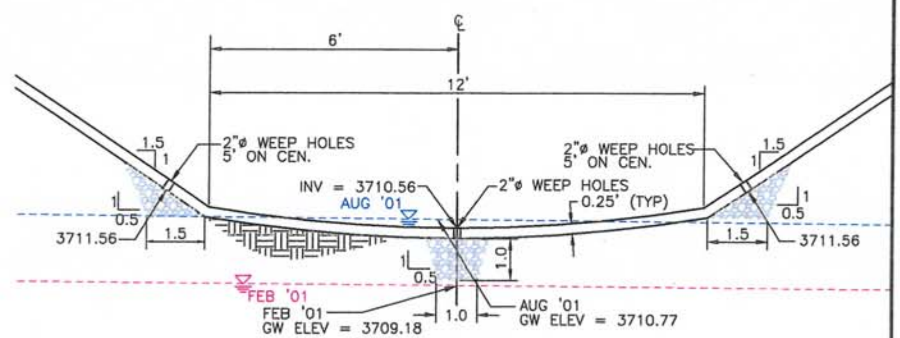

DETAIL SECTION E

℄ STA. 47+19.84
SCALE: 1 : 3

ASARCO INCORPORATED EL PASO COPPER SMELTER REMEDIAL INVESTIGATION EL PASO, TEXAS	ASARCO RESPONSE TO A TNRCC LETTER DATED OCTOBER 2, 2001 AMERICAN CANAL \ GW RELATIONSHIP CROSS SECTIONS AND DETAILS	FIGURE 4

Hydrometrics, Inc.

UPDATE TIME: 16:00
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APPENDIX A

CORRESPONDENCE RELEVANT TO THE ASARCO EL PASO COPPER SMELTER REMEDIAL INVESTIGATION

APPENDIX A

CORRESPONDENCE RELEVANT TO THE ASARCO EL PASO COPPER SMELTER REMEDIAL INVESTIGATION

DATE	LETTER SUBJECT
Aug. 29, 1996	**TNRCC:** Agreed Order Assessing Administrative Penalties and Requiring Certain Actions
Nov. 8, 1996	**ASARCO:** Remedial Investigation Work Plan Submittal
Feb. 24, 1997	**TNRCC:** Approval of Remedial Investigation Work Plan
Mar. 4, 1997	**TNRCC:** Approval of the Closed Plant Evaluation Plan
Mar. 27, 1997	**ASARCO:** Response to Comments and Submittal of Work Plan Addendum
Jun. 24, 1997	**TNRCC:** Response to Remedial Investigation Work Plan Addendum
Mar. 23, 1998	**ASARCO:** Revision of Remedial Investigation Schedule for Ponds 1, 5 and 6
May 20, 1998	**ASARCO:** Revision of Remedial Investigation Schedule for Report Submittal
Jun. 25, 1999	**TNRCC:** Response to Remedial Investigation Phase I Report
Aug. 6, 1999	**ASARCO:** Completion Schedule for the Remedial Investigation Phase II
Oct. 15, 1999	**ASARCO:** El Paso Smelter Remedial Investigation
Dec. 9, 1999	**TNRCC:** Remedial Investigation Report Approval
May 5, 2000	**ASARCO:** Area of Contamination Matter
May 2000	**ASARCO:** Area of Contamination Document
May 2000	**ASARCO:** Responses to TNRCC Comments on Phase I Remedial Investigation Report

Jul. 13, 2000	**TNRCC:** Area of Contamination at the Asarco El Paso Copper Smelter Interim Corrective Action
Aug. 11, 2000	**ASARCO:** Response to the TNRCC Letter of July 13, 2000 Regarding Asarco El Paso Copper Smelter
Oct. 23, 2000	**ASARCO:** Technical Memorandums / Closed Plant Evaluation Plans
Dec. 5, 2000	**ASARCO:** Response to TNRCC Record of September 14, 2000 Received November 21, 2000 for Asarco
Dec. 22, 2000	**TNRCC:** Response to Asarco's Area of Contamination Proposal
Jan. 18, 2001	**TNRCC:** Asarco Closed Plant Evaluation Plans
Feb. 7, 2001	**ASARCO:** Response to TNRCC Letter of January 18, 2001
Feb. 13, 2001	**ASARCO:** El Paso Corrective Action Implementation Schedule
Feb. 14, 2001	**TNRCC:** Comments to Asarco El Paso Copper Smelter Phase II Remedial Investigation Report
Mar. 13, 2001	**TNRCC:** Asarco Closed Plant Evaluations Extension Request
Apr. 27, 2001	**ASARCO:** Response to Comments in TNRCC Letter Dated February 14, 2001
Jun. 14, 2001	**ASARCO:** New Deliverable Dates for Closed Plant Evaluation Report and Phase III Remedial Investigation Report
Jul. 10, 2001	**TNRCC:** Closed Plant Evaluation Report – Extension Approval
Oct. 2, 2001	**TNRCC:** Comments to Asarco document received April 27, 2001

THE STATE OF TEXAS

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

August 29, 1996

CERTIFIED MAIL

Tom Martin, Environmental Manager
ASARCO, Inc.
2301 Paisano
El Paso, TX 79901

RE: ASARCO, INCORPORATED
Docket No. 96-0212-MLM-E; SWR No. 31235; Permit No. WQ 02321
Agreed Order assessing administrative penalties and requiring certain actions

Enclosed is a certified copy of an enforcement order issued by the Commission.

Questions regarding the order should be directed to the Enforcement Coordinator or the Staff Attorney. If there are questions pertaining to the mailing of the order, then please contact Deanna Avalos in the Office of the Chief Clerk at (512) 239-3327.

Sincerely,

Gloria A. Vasquez

Gloria A. Vasquez
Chief Clerk

GAV:da

Enclosure

cc w/ enclosure:
TNRCC Region 6
Vic McWherter, TNRCC Staff Attorney
John Sadlier, TNRCC Enforcement Coordinator
Keith Hopson; Brown McCarroll & Oaks Hartline; 1400 Franklin Plaza; 111 Congress Avenue; Austin, TX 78701-4043

RECEIVED
SEP 3 1996
T.E. MARTIN

THE STATE OF TEXAS
COUNTY OF TRAVIS
I hereby certify that this is a true and correct copy of a Texas Natural Resource Conservation Commission document, which is filed in the permanent records of the Commission.
Given under my hand and the seal of office on

Gloria A. Vasquez, Chief Clerk
Texas Natural Resource Conservation Commission AUG 29 1996

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

IN THE MATTER OF	§	**BEFORE THE**
	§	
ASARCO INCORPORATED	§	**TEXAS NATURAL RESOURCE**
	§	
SWR NO. 31235, WQ 02321	§	**CONSERVATION COMMISSION**

AGREED ORDER
DOCKET NO. 96-0212-MLM-E

Assessing Administrative Penalties and Requiring Corrective Actions of ASARCO Incorporated under the Authority of the Solid Waste Disposal Act, TEX. HEALTH AND SAFETY CODE ANN. Chapter 361 (Vernon 1992 and Supp. 1994) and the Texas Water Code, Chapter 5 and 26 (Vernon 1988 and Supp. 1994).

At its AUG 28 1996 agenda, the Texas Natural Resource Conservation Commission (the "Commission" or "TNRCC") considered the oral report to the Commission alleging violations of the Solid Waste Disposal Act, TEX. HEALTH AND SAFETY ANN. Chapter 361 (Vernon 1992 and Supp. 1994) (the "Act"), the Texas Water Code, Chapter 5 and 26 (Vernon 1988 and Supp. 1994) (the"Code") and the rules of the Texas Natural Resource Conservation Commission pertaining to solid waste management and requesting appropriate relief, including the imposition of administrative penalties. The facility made the subject of this Agreed Order is ASARCO Incorporated (ASARCO), located at 2301 West Paisano Drive, City of El Paso, El Paso County, Texas.

After proper notice, the parties appeared and announced before the Commission that they had reached a settlement and requested the Commission to enter this Agreed Order.

ASARCO understands that it has certain procedural rights, including but not limited to, the right to formal notice of violations, notice of an evidentiary hearing, the right to an evidentiary hearing, and a right to appeal. By entering into this Agreed Order, ASARCO agrees to waive all notice and procedural rights.

It is further understood and agreed that this Agreed Order represents the complete and fully-integrated agreement of the parties. The provisions of this Agreed Order are deemed severable and, if a court of competent jurisdiction or other appropriate authority deems any provision of this Agreed Order unenforceable, the remaining provisions shall be valid and enforceable. The duties and responsibilities imposed by this Agreed Order are binding upon ASARCO and upon its successors and assigns.

The Commission makes the following Findings of Fact and Conclusions of Law:

FINDINGS OF FACT

(1) ASARCO owns and operates a copper smelter (facility operations previously included lead and zinc smelting) located at 2301 West Paisano Drive, City of El Paso, El Paso County, Texas (the "Facility").

(2) Activities conducted at the Facility include the storage and management of industrial and hazardous wastes generated at the site.

(3) During a Compliance Evaluation Inspection conducted on May 31 through June 13, 1994 (the 1994 inspection), and a follow-up sampling event conducted on January 12-13, 1995, TNRCC Region 6 field investigators documented the following unauthorized discharges of industrial solid waste, wastewater and storm water:

(a) Investigators noted that water from Pond Nos. 1 and 6 was being utilized for dust suppression. Sediment and surface water samples were obtained from Pond Nos. 1 and 6 during the 1994 inspection and the January 1995 sampling event. Analytical results confirmed the presence of elevated levels of metals evidencing the presence of industrial solid waste in the ponds;

(b) During the 1994 inspection, investigators noted that an asphalt-lined surface impoundment located west of the Converter Building Ventilation Baghouse was being used as a spill containment area. Water samples were collected and analytical results confirmed the presence of elevated levels of metals evidencing the presence of industrial solid waste in the impoundment. Investigators also noted cracks in the impoundment's asphalt surface and noted evidence of leakage through the expansion joints in the impoundment's concrete containment wall. Analytical results of soil samples taken from an area located adjacent to the containment wall confirmed the presence of elevated levels of metals in the soil. During the January 1995 sampling event, investigators noted the presence of approximately eight inches of sludge and sediment in part of the impoundment;

(c) During the 1994 inspection, effluent samples were collected from the 90,000 gallon tank which serves the Unloading Building's wastewater treatment plant. Analytical results confirmed the presence of elevated levels of metals evidencing the presence of contaminants in the tank. Investigators documented that effluent from the 90,000 gallon tank was being used for wash down in the bedding building and, unloading building, and for dust suppression on miscellaneous piles of material stored around the Facility;

(d) During the 1994 inspection and the January 1995 sampling event, investigators noted that spent scrubber saddles, discarded brick, wood, plastic, flues and flue residue had been deposited in the area referred to as the boneyard on top of the slag pile (the "boneyard"). Soil samples were obtained from the boneyard during the 1994 inspection. Analytical results confirmed the presence of elevated levels of metals in the soil;

(e) During the 1994 inspection, ASARCO representatives informed investigators of a sulfuric acid spill at Acid Plant No. 2. During the January 1995 sampling event, investigators observed an additional discharge of sulfuric acid on the ground at Acid Plant No. 2;

(f) During the 1995 sampling event, soil samples were obtained from the base of a slope located outside ASARCO's perimeter fence just west of Acid Plant No. 2. Analytical results confirmed the presence of elevated levels of metals in the soil;

(g) During the 1994 inspection, soil samples were obtained from an area of stained soil adjacent to a roll-off container located just west of Acid Plant No. 2. Analytical results confirmed the presence of elevated levels of metals in the soil;

(h) During the 1994 inspection, investigators observed soil displacement and erosion of a berm located west of the Lead Plant and south of the closed Copper Roaster indicating that the berm had been breached. Soil samples were collected adjacent to the breach point by ASARCO. Analytical results confirmed the presence of elevated levels of metals in the soil;

(i) During the 1994 inspection, investigators observed soil displacement and erosion of the berm located south of the lined storm water pond indicating that the berm had been breached. Soil samples were collected adjacent to the breach point by ASARCO. Analytical results confirmed the presence of elevated levels of metals in the soil; and

(j) During the 1994 inspection, investigators noted that storm water was bypassing a sump located adjacent to the Facility's entry gate and discharging off-site. Samples of the discharge were obtained and analytical results confirmed the presence of elevated levels of metals in the storm water run-off. Investigators also noted that ASARCO had failed to monitor the unauthorized discharge for pH, Chemical Oxygen Demand (COD), oil and grease and metals as required by ASARCO's water quality permit.

(4) During the 1994 inspection, investigators documented that ASARCO failed to perform a waste determination and failed to amend its Notice of Registration concerning the generation of the following solid wastes:

(a) Air conditioning filters in a dumpster south of Acid Plant No. 2;
(b) Spent catalyst in a poly-bag found west of Acid Plant No. 2;
(c) Lathe cleaning solvent found in the machine shop;
(d) Anti-freeze and freon recycling machine filters in the auto shop;
(e) Waste oils from the auto shop;
(f) Scrubber saddles in the boneyard;
(g) Brick material in the boneyard:
(h) Residues in flues located in the bone yard;
(i) Waste oil, grease, and other liquids and solids in drums stored in the Zig Zag building;
(j) Bags from the Spray Dryer Baghouse; and
(k) Drums containing spent solvents and waste oil located, (1) adjacent to the compressor station north of the unloading building, (2) north of the bedding plant, and (3) west of Acid Plant No. 2.

(5) During the 1994 inspection, investigators documented that ASARCO failed to amend its Notice of Registration concerning the following waste management units:

(a) The 90,000 gallon wastewater treatment plant which consists of a drum filter, a thickener and the 90,000 gallon tank used for storing the wastewater (this tank was subsequently replaced with a 60,000 gallon tank);
(b) The 1,000 gallon laboratory wastewater holding tank which is used to hold wastewater and chemicals used in the laboratory;
(c) The RCC pre-treatment wastewater treatment plant; and
(d) The RCC wastewater treatment plant.

(6) During the 1994 inspection, investigators documented that ASARCO failed to properly label the following hazardous waste containers with correct accumulation start dates or the words "Hazardous Waste":

(a) The bulk hauler trailer located at the RCC wastewater treatment plant; and
(b) A roll-off container located west of Acid Plant No. 2.

(7) During the 1994 inspection, investigators documented that the following hazardous waste containers were uncovered when waste was not being added or removed:

(a) The bulk hauler trailer located at the RCC wastewater treatment plant; and
(b) Drums containing grease, waste oil or spent solvent located, (1) adjacent to the compressor station north of the unloading building, (2) north of the bedding plant, and (3) west of Acid Plant No. 2.

(8) On-site and off-site groundwater monitoring wells were sampled during a sampling event undertaken during May 1995. Analytical results confirm the presence of elevated levels of arsenic and other metals in some on-site and off-site groundwater monitoring wells.

(9) During a Compliance Evaluation Inspection conducted on April 28 through May 8, 1995 (the 1995 inspection), investigators documented the following unauthorized discharges of industrial solid waste:

(a) A dark colored sludge was observed flowing from a storage bin located at the Acid Plant wastewater treatment plant;
(b) A pile of sediment containing broken pieces of spent scrubber saddles was observed adjacent to a containment wall west of the Converter Building Ventilation Baghouse;
(c) Broken pieces of spent scrubber saddles were observed on the ground adjacent to roll-off containers located in the southwest yard;
(d) Waste materials, similar in nature to those observed during the 1994 inspection, were observed in the boneyard; and
(e) A leaking 35 gallon drum containing lubricating oil was observed adjacent to the Zig Zag building.

(10) During the 1995 inspection, investigators documented that ASARCO failed to amend its Notice of Registration concerning the generation of the following solid wastes:

(a) Air conditioning filters in a dumpster south of Acid Plant No. 2;

(b) Anti-freeze and freon recycling machine filters in the auto shop;
(c) Scrubber saddles in the boneyard;
(d) Brick material in the boneyard;
(e) Residues in flues located in the boneyard; and
(f) Bags from the Spray Dryer Baghouse.

(11) During the 1995 inspection, investigators documented that ASARCO failed to amend its Notice of Registration concerning the following waste management units:

(a) The 90,000 gallon wastewater treatment plant which consists of a drum filter, a thickener and the 90,000 gallon tank used for storing the wastewater (this tank was subsequently replaced with a 60,000 gallon tank);
(b) The 1,000 gallon laboratory wastewater holding tank which is used to hold wastewater and chemicals used in the laboratory;
(c) The Zig Zag building; and
(d) The RCC wastewater treatment plant.

(12) During the 1995 inspection, investigators documented that ASARCO had failed to perform a waste determination on the following wastes:

(a) A 55 gallon drum containing contaminated grease; and
(b) A 55 gallon drum containing an unidentified grey sludge. Both drums were located in the Zig Zag building.

CONCLUSIONS OF LAW

(1) ASARCO has managed industrial and hazardous solid waste at its copper smelting facility located in El Paso County, Texas and is therefore subject to the jurisdiction of the Texas Natural Resource Conservation Commission pursuant to the Solid Waste Disposal Act (the "Act"), TEX. HEALTH AND SAFETY ANN. Chapter 361 (Vernon 1994), the Texas Water Code (the "Code"), Chapter 5 and 26 (Vernon 1988 and Supp. 1994) and the rules of the Texas Natural Resource Conservation Commission pertaining to solid waste management.

(2) As evidenced by Finding of Fact Nos. 3(a)-(j), 8 and 9, ASARCO has caused, suffered, allowed, or permitted the disposal of industrial solid waste in such a manner so as to cause the discharge or imminent threat of discharge of such waste into or adjacent to waters in the state without obtaining specific authorization for such a discharge in violation of 30 TAC §335.4 and the Texas Water Codc §26.121.

(3) As evidenced by Finding of Fact Nos. 4, 5, 10 and 11, ASARCO has violated 30 TAC §335.6(c) by failing to notify the Commission of all generated wastes and associated waste management units.

(4) As evidenced by Finding of Fact No. 6. ASARCO has violated 30 TAC §335.69(a)(2) and 40 CFR §262.34(a)(2) by failing to label containers of hazardous waste with a correct accumulation start date.

(5) As evidenced by Finding of Fact No. 6, ASARCO has violated 30 TAC §335.69(a)(3) and 40 CFR §262.34(a)(3) by failing to label containers of hazardous waste with the words "Hazardous Waste".

(6) As evidenced by Finding of Fact No. 7, ASARCO has violated 30 TAC §335.112(a)(8) and 40 CFR §265.173 by storing hazardous waste in open containers when waste was not being added or removed.

(7) As evidenced by Finding of Fact Nos. 4 and 12, ASARCO has violated 30 TAC §335.62 and 40 CFR §262.11 by failing to make a waste determination on all wastes generated at the Facility.

(8) The Commission has the authority to assess administrative penalties for violations of the Act and the Code pursuant to §361.252 of the Act and §26.136 of the Code.

(9) The Commission has the authority to issue enforcement orders directing compliance with the Act, the Code, and Commission rules pursuant to §26.019 of the Code, §361.302 of the Act and 30 TAC §70.5.

(10) An administrative penalty of One Hundred Sixty-Eight Thousand Four Hundred Dollars ($168,400.00) is justified by the facts recited herein, considered in light of the factors set forth in §361.252 of the Act and §26.136 of the Code.

ORDERING PROVISIONS

NOW, THEREFORE, THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION ORDERS that ASARCO shall be assessed an administrative penalty of One Hundred Sixty-Eight Thousand Four Hundred Dollars ($168,400.00) for violations of the Solid Waste Disposal Act, the Texas Water Code, and the rules of the Texas Natural Resource Conservation Commission. ASARCO has paid Eighty-Four Thousand Two Hundred Dollars

($84,200.00) of the assessed penalty. The remaining Eighty-Four Thousand Two Hundred Dollars ($84,200.00) of the assessed administrative penalty shall be remitted with the condition that the Company shall implement the Supplemental Environmental Project (SEP) defined in Attachment A, in accordance with §361.252(o) of the Act and §26.136(n) of the Code. ASARCO is hereby ordered to comply with all provisions in Attachment A which is attached hereto and incorporated herein by reference. If ASARCO complies with all provisions of the SEP set out in Attachment A, ASARCO's obligation to pay the conditionally remitted portion of the administrative penalty assessed shall be discharged. If ASARCO fails to comply with all provisions of the SEP agreement, including the deadlines associated with it, the Executive Director may require ASARCO to immediately pay all or part of the conditionally remitted portion of the administrative penalty. The imposition of this administrative penalty resolves only those alleged violations of the Act , the Code and the rules of the TNRCC pertaining to solid waste management arising from the TNRCC inspections of May 31 through June 13, 1994 and January 12-13, 1995 and sampling events conducted in May and December 1995 and January 1996. The Commission shall not be constrained in any manner from considering administrative penalties for violations of the Act, the Code or the regulations occurring after this Agreed Order is signed or which are not raised in this Agreed Order.

IT IS FURTHER ORDERED BY THE TEXAS NATURAL RESOURCE CONSERVATION COMMISSION that:

(1) Within 30 days of the effective date of this Order, ASARCO shall certify that ASARCO is then in compliance with the requirements of 30 TAC §335.6(c). Certification shall be provided in writing.

(2) Within 30 days of the effective date of this Order, ASARCO shall certify that ASARCO is then in compliance with the requirements of 30 TAC §335.69 and 40 CFR §262.34. Certification shall be provided in writing.

(3) Within 30 days of the effective date of this Order, ASARCO shall certify that ASARCO is then in compliance with the requirements of 30 TAC §335.112(a)(8) and 40 CFR §265.171. Certification shall be provided in writing.

(4) Within 60 days of the effective date of this Order, ASARCO shall certify that ASARCO is then in compliance with the requirements of 30 TAC §335.62 and 40 CFR §262.11. Certification shall be provided in writing.

(5) Within 75 days of the effective date of this Order, ASARCO shall submit to the TNRCC a plan for the remedial investigation to determine the vertical and horizontal extent of the

contamination identified as a result of the 1994 and 1995 inspections and the January 1995 sampling event (the "Remedial Investigation"). The Remedial Investigation must also include an assessment of contamination identified during the May and December 1995 and January 1996 sampling events where off-site groundwater contamination was documented and/or confirmed. The objectives of the Remedial Investigation are to determine the source(s) and to characterize the nature, extent, direction, rate of movement, volume, composition, and concentration of contaminants in environmental media in Texas in accordance with 30 TAC Chapter 335 Subchapter S Risk Reduction Standards, or later-adopted Texas Risk Reduction Rules, whichever are in effect at the time the plan for the Remedial Investigation is due. The Remedial Investigation shall include, but is not limited to the following elements:

(a) A detailed site history including previous site owners, previous known site activities, previous known waste management, and current waste management practices.

(b) A site characterization of the local soil, geology, groundwater, and surface water conditions based upon a literature review.

(c) A sufficient number of samples of environmental media to define background conditions, hydraulic gradient(s), source(s) of contamination, and the vertical and horizontal extent of contamination. ASARCO shall pursue contamination across property boundaries in the State of Texas as necessary to determine the extent of contamination. If ASARCO is unable to obtain off-site access, they shall document their efforts and notify the TNRCC Enforcement Division's Multi-Media Section within 5 days of a determination by ASARCO that their efforts to obtain access have failed.

(d) Samples of environmental media shall be analyzed using appropriate EPA-approved analytical methods to detect site contaminants as delineated in Appendix A.

Use of non compound-specific analysis (e.g., total petroleum hydrocarbons, total organic carbon, etc.) may, where appropriate for the site contaminants, be used to aid in the determination of the horizontal and vertical extent of contamination, but must be appropriately supported by compound-specific analysis to assess the risk to human health and the environment, and to demonstrate the attainment of cleanup levels in accordance with 30 TAC §335.553 (d) (Required Information), or subsequently applicable regulations. Contaminants related to two ongoing diesel remediations need not be addressed under this Order. Any action under this Order which impacts those remediation efforts will be coordinated with the Petroleum Storage Tank Division of the TNRCC.

Sampling quality assurance/quality control (QA/QC) procedures shall include the use of field duplicates, equipment blanks, and trip blanks to measure any problems which may result from incomplete decontamination, atmospheric conditions, variability in samples, incomplete homogenization, or lab error.

(e) Assessment of Texas sensitive receptors within an area one-half mile hydraulically downgradient of the property owned by ASARCO between Interstate Highway 10 and West Paisano Drive in El Paso, Texas. The term "sensitive receptor" includes, but is not limited to, water wells, basements, subsurface utilities, manholes, or any other known below ground structures located hydraulically downgradient of the operating plant site. In addition to any surveys of registered water wells, ASARCO shall also interview any potentially affected property owners or occupants to determine if any groundwater user in the receptor zone utilizes unregistered water wells.

Information on all water wells, both registered and unregistered, to the extent available, shall include: current owner; date of construction, well completion logs; current water depth; screened interval; producing geologic unit(s); total well depth; water quality data; and current and historical uses(s). All wells potentially impacted by the facility shall be sampled and the analytical results included in the Remedial Investigation Report required by Ordering Provision No. 6.

Assessment of subsurface utilities shall include a determination of the location and integrity of all on-site wastewater and storm water drains, sumps and ancillary piping in order to determine if they are sources of releases to soil or groundwater.

(f) Determination of the hydraulic parameters porosity, transmissivity, hydraulic conductivity and storativity of saturated zones found to contain free-phase or dissolved-phase contamination.

(g) All generated wastes shall be managed as an industrial solid waste in accordance with 30 TAC Chapter §335, Subchapter A - Industrial Solid Waste and Municipal Hazardous Waste Management in General; Subchapter C - Standards Applicable to Generators of Hazardous Waste; and Subchapter R - Waste Classification.

(h) A schedule to implement the Remedial Investigation upon TNRCC approval.

(6) Within 120 days of the completion of the Remedial Investigation, ASARCO shall submit a Remedial Investigation Report which summarizes the findings of the investigation for written approval, or approval with modifications, from the Executive Director. The report shall contain at a minimum:

(a) A site map(s) drawn to a scale capable of showing the locations for all current and known historical facility structures, operations, and storage areas; all areas of visible and suspected contamination; sampling locations, including locations of soil borings and monitor wells; adjacent properties; all significant topographic features in the vicinity of the site; and locations of both on-site and adjacent utilities, structures, roads, surface drainage, and surface waters located in the State of Texas. All components and symbols (i.e., legend, scale, and north arrow) for each map shall be legible and clearly identified.

(b) Copies of field logs and lithologic logs, construction details, and description of drilling and construction procedures for all wells used during the assessment. Top of casing, screened interval, and groundwater elevations for all wells shall be shown on the logs.

(c) Geologic cross sections of the area covered by this investigation showing each hydrogeologic unit and screened intervals of all monitoring wells and sampling depths within all soil borings.

(d) The results of the Sensitive Receptor Survey and map(s) drawn to scale showing any Texas water-sensitive receptors and all Texas water wells within an area one-half mile hydraulically downgradient of the property owned by ASARCO between Interstate Highway 10 and West Paisano Drive.

(e) Descriptions of sampling and analysis protocols, including: sampling equipment and techniques; procedures for taking measurements of water level elevations in the monitor wells; procedures for detecting any phase-separated liquids and their thickness, if present; well evacuation procedures including purged water or water quality prior to sampling and handling; sampling and analysis protocol for field measurements; procedures for decontaminating sampling equipment between sampling events; disposal of field-generated waste; sample handling and preservation techniques, including chain of custody documentation; and sampling quality assurance/quality control (QA/QC) procedures.

(f) Tabulations of all analytical results including a separate tabulation of results which exceed background conditions. Soil sample results shall be reported in units of mg/kg, and groundwater sample results shall be reported in units of mg/l or μg/l.

(g) Copies of the original laboratory data and results of data evaluation regarding: analytical methods, quantitation limits, qualifiers and codes, blanks, and tentatively identified compounds.

(h) Contaminant isopleth maps and cross sections for each Appendix A contaminant discovered showing the lateral and vertical extent of constituents in the soil and all saturated zone(s) in which groundwater samples were taken.

(i) Potentiometric surface maps showing hydraulic gradient, static water elevations, groundwater flow paths, and the thickness of any phase-separated liquids determined during the investigation.

(j) Saturated zone characteristics, i.e., hydraulic conductivity, porosity, storativity, transmissivity, etc. of all zone(s) found to contain free-phase or dissolved-phase contamination.

(k) Identification of areas identified as sources of releases to soil or groundwater.

(l) A general proposal for corrective action stating the Risk Reduction Standard to be achieved and a detailed schedule for remediation of any contaminated media identified during the assessment necessary to meet the selected Risk Reduction Standard. The purpose of this proposal and schedule is to assure appropriate remediation in compliance with 30 TAC Chapter 335, Subchapter S, Risk Reduction Standards, or later-adopted Texas Risk Reduction Rules, whichever are in effect at the time the Remedial Investigation Report is due.

(7) Within 90 days after receiving written approval, or approval with modifications from the Executive Director of the Remedial Investigation Report (including the corrective action proposal), ASARCO shall begin implementation of the approved proposal for corrective actions required by Ordering Provision No. 6(l) in accordance with the approved schedule.

(8) Within 90 days of the effective date of this Agreed Order, ASARCO shall submit for approval or approval with modifications a Closed Plant Evaluation Plan. The plan shall include a proposal to evaluate the closed plant areas in order to determine if the closed areas are responsible for any releases of contaminants to the environment.

(9) Within 30 days of receiving written approval, or approval with modification from the Executive Director of the Closed Plant Evaluation Plan. ASARCO shall implement the plan in accordance with the approved schedule.

(10) All plans, reports, submittals, specifications, and other documents which relate to this enforcement action shall be submitted in duplicate to:

Executive Director
c/o John L. Sadlier
Enforcement Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
MC 128
Austin, Texas 78711-3087

and a copy of the materials shall be submitted to:

Region 6 Manager
Texas Natural Resource Conservation Commission
7500 Viscount Blvd., Suite 147
El Paso, TX 79925

(11) If ASARCO fails to comply with any of the technical ordering provisions in this Agreed Order within the prescribed schedules, and that failure is caused by an act of God, war, riot, or other catastrophe beyond the control of ASARCO, that failure shall not be construed as a violation of this Agreed Order. ASARCO has the burden of establishing to the Executive Director's satisfaction that such an event has occurred. ASARCO shall notify the Executive Director within seven (7) days after ASARCO becomes aware of a delaying event and shall take all reasonable measures to mitigate and minimize the delay.

(12) The Executive Director may grant an extension of any deadline in this Agreed Order or in any plan, report or other document submitted pursuant to this Agreed Order, upon written and substantial showing of good cause. All requests for extensions by ASARCO shall not extend any deadlines contained in this Agreed Order until it has received written approval for extension from the Executive Director. The determination of what constitutes good cause rests solely with the Executive Director.

(13) The Executive Director may refer this matter to the Office of the Attorney General for further enforcement proceedings without notice to ASARCO if the Executive Director

determines that ASARCO is noncompliant with the requirements set forth in this Agreed Order.

(14) This Agreed Order shall terminate 5 years from its effective date or upon compliance with all terms and conditions set forth in the order, whichever is later.

The Chief Clerk shall provide a copy of this Order to each of the parties. By law, the effective date of this Order is the mailing date, as provided by 30 TAC §70.10(b).

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Barry R. McBee, Chairman

ATTEST:

Gloria A. Vasquez

Gloria A. Vasquez, Chief Clerk

I, the undersigned, have read and understand the attached Agreed Order in the matter of ASARCO Incorporated.

I am authorized to agree to the attached Agreed Order on behalf of ASARCO Incorporated, and do agree to the specified terms and conditions.

I understand that by entering into this Agreed Order, ASARCO Incorporated waives certain procedural rights, including but not limited to, the right to formal notice of violations addressed by this Agreed Order, notice of an evidentiary hearing, the right to an evidentiary hearing, and the right to appeal.

I agree to the terms of this Agreed Order in lieu of an evidentiary hearing. This Agreed Order constitutes full and final adjudication by the Commission of the violations set forth in this Agreed Order.

Authorized Representative
ASARCO Incorporated

Date: August 9, 1996

ACCEPTED:

Jim Phillips
Deputy Director
Office of Legal Services
Texas Natural Resource Conservation Commission

Date: 8/12/96

Attachment A
SUPPLEMENTAL ENVIRONMENTAL PROJECT

The Texas Natural Resource Conservation Commission ("TNRCC") agrees to remit a portion of the administrative penalty assessed in this Agreed Order with the condition that ASARCO, Incorporated ("the Company") shall perform and comply with the following Supplemental Environmental Project ("SEP") provisions. The total amount of the conditional remittance for this SEP, upon completion according to the terms and schedule listed below, shall be Eighty-Four Thousand Two Hundred Dollars ($84,200.00) of the assessed penalty of One Hundred Sixty-Eight Thousand Four Hundred Dollars ($168,400.00).

1. Project Description

The Company agrees to demolish the following facilities located at the El Paso Plant site:

A. Copper Wedge Roaster Building and the brick flue that served the reverberatory furnace.

B. Blast furnaces, dross reverberatory furnace, flues and baghouse.

C. Zinc plant area which includes that cooling tubes, flues, rotary kilns and baghouse.

The above facilities will be demolished down to the concrete foundations with all demolition rumble being properly managed. The Company shall comply with all applicable state and federal laws and regulations when implementing this SEP.

The Company has estimated that it will incur capital costs of One Million One Hundred Thirty-Six Thousand Dollars ($1,136,000.00) to complete the demolition as described above. The Company agrees that it will incur capital costs of at least One Million One Hundred Thirty-Six Thousand Dollars ($1,136,000.00) to implement this SEP.

2. Performance Schedule

The Company shall begin implementation of the project described in Section 1 within 30 days of the effective date of this Agreed Order.

The Company shall submit to the TNRCC SEP Coordinator quarterly reports. The first quarterly report shall be submitted within 90 days of effective date of this Agreed Order. Subsequent quarterly reports shall be submitted within 90 days of the submittal date of the previous report.

The Company shall complete this SEP within 50 months of the effective date of this Agreed Order.

The Company shall submit to the TNRCC SEP Coordinator a final report summarizing the project within 30 days of completion of the SEP.

3. **Records and Reporting**

The Company shall document all capital costs incurred under the terms of this SEP.

The quarterly reports and the final report shall include documentation of capital costs incurred, including copies of receipts and invoices for expenditures. The final report shall delineate all costs of each project, describe each project, and summarize the environmental benefits expected.

Reports shall be submitted to the following address:

SEP Coordinator
Litigation Support Division
Texas Natural Resource Conservation Commission
MC-175
P.O. Box 13087
Austin, Texas 78711-3087

4. **Failure to Fully Perform**

In the event that the Company does not satisfy its obligations under this SEP, the Executive Director may require the Company to immediately pay all or part of the Eighty-Four Thousand Two Hundred Dollar ($84,200.00) conditional remittance to the TNRCC for deposit in the General Revenue Fund of the State of Texas.

The check for any amount due shall be made out to the "State of Texas - General Revenue Fund" and mailed to:

Texas Natural Resource Conservation Commission
Financial Administration Division, Revenues
Attention: Cashier, MC 214
Austin, Texas 78711-3088

A copy of the check shall be mailed to the TNRCC SEP Coordinator at the address in Section 3 above.

5. <u>Publicity</u>

Any public statements concerning this SEP made by or on behalf of the Company must include a clear statement that the project was performed as part of the settlement of an enforcement action brought by the TNRCC. Such statements include, but are not limited to, advertising, public relations, and press releases.

6. <u>Clean Texas 2000 Program</u>

The Company shall not include this SEP in any application made to TNRCC under the "Clean Texas 2000" (or any successor) program(s). Similarly, the Company may not seek recognition for this contribution in any other state or federal regulatory program.

7. <u>Other SEPs by TNRCC or Other Agencies</u>

The SEP identified in this Agreed Order has not been, and shall not be, included as an SEP for the Company under any other Agreed Order, negotiated with the TNRCC or any other agency of the state or federal government.

APPENDIX A

arsenic
cadmium
chromium
copper
iron
selenium
zinc
lead
pH
specific conductivity
TDS

ASARCO

El Paso Plant
Amarillo Copper Refinery

Thomas E. Martin
Environmental Manager

November 8, 1996

VIA FEDERAL EXPRESS

Executive Director
c/o John L. Sadlier
Enforcement Division
Texas Natural Resource Conservation Commission
12100 Park 35 Circle
Building F
Austin, TX 78753

Re: Remedial Investigation Work Plan Submittal
ASARCO, Incorporated
El Paso Plant
Docket No. 96-0212-MLM-E; SWR No. 31235; Permit No. WQ 02321
Agreed Order

Dear Mr. Sadlier:

As required by Ordering Provision No. 5 of the above referenced Agreed Order, enclosed are two copies of the Remedial Investigation Work Plan for the El Paso Plant of ASARCO, Incorporated (Asarco). This plan was prepared by Hydrometrics, Incorporated, Asarco's contractor on this project.

Do not hesitate to contact me at the number below if you have any questions regarding this work plan.

Sincerely,

Thomas E. Martin

Thomas E. Martin

cc: Frank Espino, TNRCC Region 6
J. A. Baca, Asarco, El Paso
John B. Richardson, Asarco, Salt Lake City
Gregory A. Knapp, Asarco, Salt Lake City
R. Keith Hopson., Brown McCarroll & Oaks Hartline
Kent Lang, Hydrometrics, Tucson
Lairy Johnson, Hydrometrics, El Paso

PROPOSED CLOSED PLANT
EVALUATION PLAN

DOCKET NO. 96-0212-MLM-E:
SWR NO. 31235: PERMIT NO. WQ 02321
AGREED ORDER

Prepared for:
ASARCO Incorporated
El Paso, Texas

Prepared by:
Hydrometrics, Inc.
El Paso, Texas

November 1996

RECEIVED
NOV 1996
T.E. MARTIN

F:\COPY\734\CPEPWP1.DOC

ASARCO

El Paso Plant
Amarillo Copper Refinery

November 22, 1996

Thomas E. Martin
Environmental Manager

VIA FEDERAL EXPRESS

Executive Director
c/o Mr. John L. Sadlier
Enforcement Division
Texas Natural Resource Conservation Commission
12100 Park 35 Circle, Building F
Austin, TX 78753

Re: Submittal of Proposed Closed Plant Evaluation Plan
ASARCO, Incorporated
El Paso Plant
Docket No. 96-0212-MLM-E: SWR No. 31235: Permit No. WQ 02321
Agreed Order

Dear Mr. Sadlier:

As required by provision No. 8 of the above referenced Agreed Order, this letter provides the proposed Closed Plant Evaluation Plan (CPEP). The CPEP provides for the investigation of areas of the ASARCO, Inc. El Paso Plant which are scheduled for demolition to determine if these areas are responsible for any appreciable releases of contaminants to the environment.

Sections 2.1.3 and 2.4 of the Remedial Investigation Work Plan (submitted previously as required by the Agreed Order) summarize plant demolition actions and present the relationship between the Supplemental Environmental Project (SEP), the Remedial Investigation Work Plan, and the Closed Plant Evaluation Plan. This letter utilizes background information presented in the work plan, and sets forth specific objectives and procedures comprising the Closed Plant Evaluation Plan. An exhibit is provided which identifies each of the planned plant demolition areas.

PLANT DEMOLITION ACTIONS

This subsection summarizes plant demolition actions, and relates these actions to the Supplemental Environmental Project, other closures, and the Remedial Investigation. Table 1 provides a summary of all plant demolition plans.

ASARCO Incorporated • P.O. Box 1111 • El Paso, Texas 79999 • (915) 541-1819 • Fax (915) 521-3651

Table 1. PLANT CLOSURE AND SUPPLEMENTAL ENVIRONMENTAL PROJECT STATUS

FACILITY	INCLUDED WITHIN SEP	SUMMARY
Copper Wedge Roaster	Yes	Will be demolished.*
Copper Reverberatory Furnace	No	Plan to demolish.*
Copper Brick Flues	Yes	Will be demolished.*
Lead Blast Furnace Flues and Baghouse (Lead Plant)	Yes	Will be demolished
Zinc Plant **	Yes	Will be demolished.
Antimony Plant	No	1/2 Converted to use by Auto Shop. 1/2 pilot plant and electric motor storage.
Sinter Plant	No	Plan to demolish.
Cadmium Plant and Baghouse	No	Buildings will remain for use. Plan to demolish the baghouse.

* Utility rerouting underway.

** Partially demolished for ConTop Project.

SEP Closures. Pursuant to Attachment A of the Agreed Order, Asarco intends to demolish select closed plant areas or areas no longer in service as part of a Supplemental Environmental Project (SEP). As stipulated in the SEP, the copper roaster, lead blast furnaces, lead dross reverberatory furnace, flues and baghouses, and zinc plant are scheduled for demolition, which will be completed within 50 months of the effective date of the Agreed Order.

Other Closures. While not included in the SEP, the remaining closed plants and related facilities listed in Table 1 are also being considered for demolition or refurbishment..

Relationship of the RI to Plant Closure Activities. The RI will evaluate potential pathways for contaminant movement from all closed facility components based on characterization of lithology, ground water and surface water in the area. Ground water and surface water monitoring will be performed as discussed in Section 4.0 of the Remedial Investigation Work Plan. Where ground water results indicate potential upgradient source areas of elevated metals at closed facilities, additional investigations into these potential source areas will be initiated as part of the Closed Plant Evaluation Plan. Results of the RI will be utilized, where applicable, to address environmental concerns associated with facilities in the closed category.

CLOSED PLANT EVALUATION PLAN OBJECTIVES

The objective of this Closed Plant Evaluation Plan is to determine if the closed areas are responsible for appreciable significant releases of contaminants to the environment.

Investigations anticipated to be performed specific to the Closed Plant Evaluation Plan include surface and subsurface soil sampling. Specific sampling locations are not being presented at this time due to the need for additional information and to facilitate coordination with other ongoing programs. Comprehensive site-wide monitoring of ground water and surface water under the remedial investigation will provide information concerning any present impacts potentially related to closed plant areas. Information derived from the Remedial Investigation and other ongoing programs will be coordinated with the Closed Plant Evaluation Plan. As appropriate, investigations may need to include monitoring and sampling of ground water and surface water, and multiple investigations (i.e. Phase I, Phase II) may be necessary.

Therefore, this Closed Plant Evaluation Plan will be appended with a series of technical memorandums which will be developed during demolition activities for the facilities identified in Table 1. The objective of each technical memorandum will be to provide a comprehensive, facility-specific plan for investigating the degree and extent of metals contamination associated with a particular post-closure facility. To meet this objective these memorandums will:

- Summarize facility-specific demolition actions taken;
- Present results of any source characterization or remedial efforts (i.e. findings resulting from the remedial investigation which may help focus facility-specific closure investigations); and
- Propose environmental sampling programs to include specific sampling locations, depth, etc.

To facilitate maximum data comparability and to minimize the need for reprinting, review and approval of a large volume of standards procedures, investigations conducted as part of the Closed Plant Evaluation Plan will be consistent with investigations performed for the Remedial Investigation. All standard operation procedures (SOPs), quality control/quality assurance and laboratory objectives, procedures and methods prescribed in the Remedial Investigation Work Plan are incorporated as applicable to this Closed Plant Evaluation Plan.

If you have any questions reqarding this document, please contact me.

Sincerely,

Thomas E. Martin

Thomas E. Martin

Enclosures

cc: Frank Espino, TNRCC, Region 6
J.A. Baca, Asarco, El Paso
John Richardson, Asarco, Salt Lake City
Gregory Knapp, Asarco, Salt Lake City
R. Keith Hopson, Brown McCarroll & Oaks Hartline
Kent Lang, Hydrometrics, Inc., Tucson
Lairy Johnson, Hydrometrics, Inc., El Paso

0734.502.100
TNRCC RESPONSE TO [illegible]

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

February 24, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED Z 707 602 741

Mr. Tom Martin
Environmental Manager
ASARCO, Inc.
P.O. Box 1111
El Paso, Texas 79999

Re: Remedial Investigation Work Plan
ASARCO Inc., El Paso Plant
2401 West Paisano, El Paso, Texas 79901
Solid Waste Registration No. 31235
Water Quality Permit No. WQ 0002321
EPA Identification No. TXD990757668

RECEIVED
FEB 27 1997
ASARCO-EL PASO
ENVIRONMENTAL

Dear Mr. Martin:

The Texas Natural Resource Conservation Commission (TNRCC) has completed its review of the November 1996 report entitled "ASARCO El Paso Copper Smelter - Remedial Investigation Work Plan" ("the Plan") prepared by Hydrometrics, Inc. for the referenced facility. The Report describes the activities proposed to satisfy Ordering Provision No. 5 of the Agreed Order issued on August 29, 1996 ("the Order"). Our review indicates that the Plan fails to satisfy the requirements of Ordering Provision No. 5 as follows:

(a) Section 2.1.6 of the Plan references ASARCO's active Solid Waste Management Units (SWMUs) and states that "these areas are not included as part of this RI". This statement may be contrary to the agreement set forth in Ordering Provision No. 5 of the Order which states that ASARCO shall submit for TNRCC approval "a plan for the remedial investigation to determine the vertical and horizontal extent of contamination identified as a result of the 1994 and 1995 inspections and the January 1995 sampling event." Therefore, pursuant to Provision No. 5, the Plan should include provisions for the assessment of all SWMUs where contamination has been documented in accordance with the Order. Specifically, the Plan fails to provide for the assessment of SWMU No. 15, Acid Plant Accumulation Area[1] and SWMU NO. 16, Unloading/Bedding Wastewater Treatment Plant[2].

[1] Finding of Fact Nos. 3(e), 3(g) and 9(a) of the Order reference three spills which occurred in the vicinity of Acid Plant No. 2. The spills were documented during the 1994 and 1995 inspections.

[2] Finding of Fact No. 3(c) of the Order references samples obtained during the 1994 inspection which indicated that contaminated effluent had been used for dust suppression in Bedding/Unloading Building.

(b) Section 2.4.1 of the Plan states that "as a separate project, Hydrometrics has initiated a preliminary investigation associated with remedial and closure activities of the ponds." Additionally, Section 2.6.3 states that "because the ponds are being closed, evaluation of the ponds are being excluded from this investigation." Pursuant to Provision No. 5, the Plan should, at a minimum, include provisions for the assessment of Pond Nos. 1 and 6[3].

(c) Section 3.1.1 states that "issues related to storm water are being addressed by other programs." Pursuant to Provision No. 5, the Plan should, at a minimum, include provisions for the assessment of the areas adjacent to the sump located near the Facility's entry gate[4].

(d) Exhibit No. 1 of the Plan fails to indicate surface or subsurface sampling of the boneyard[5]. Pursuant to Provision No. 5, the Plan should, at a minimum, include provisions for the assessment of the boneyard's surface and subsurface soils.

Areas of Concern:

Section 3.1.3.1 states that "since in-place soils are not considered to be wastes, TCLP testing of soils will not be necessary." TNRCC agrees that total metal concentration values may be utilized as evidence in the attainment of the Risk Reduction Standards for in-place soils. However, please be advised that for the purpose of hazardous waste determination and waste classification, TCLP values may be required.

Also noted as an area of concern was the quantity of proposed sampling points in some of the areas under investigation. However, as stated in Sections 3.1.3 and 3.1.3.3 of the Plan, ASARCO understands that if the results of the assessment indicate that contamination has migrated beyond the proposed investigation areas, additional soil and/or groundwater assessment will be necessary.

As a result of the deficiencies noted in items (a) through (d) above, an addendum to the Plan is necessary. Please submit an addendum to the Plan within 35 days from the date of this letter.

[3] Finding of Fact No. 3(a) of the Order references samples obtained during the 1994 inspection and the 1995 sampling event which confirmed the presence of elevated levels of metals in Pond Nos. 1 and 6.

[4] Finding of Fact No. 3(j) of the Order references samples obtained during the 1994 inspection which confirmed the presence of elevated levels of metals in storm water run-off observed bypassing the sump adjacent to the Facility's entry gate.

[5] Finding of Fact Nos. 3(d) and 9(d) of the Order reference samples obtained during the 1994 inspection and the 1995 sampling event which confirmed the presence of elevated levels of metals in the boneyard.

All submittals required as a result of this letter must be sent in duplicate to the following address:

John Sadlier, Senior Coordinator
Enforcement Division, Multi-Media Section, MC-219
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

with a copy to:

Terry McMillan, Waste Program Manager
El Paso Regional Office
Texas Natural Resource Conservation Commission
7500 Viscount Blvd., Suite 147
El Paso, Texas 79925

This correspondence constitutes TNRCC approval with modifications of the Plan. All assessment activities described in the Plan must be initiated and completed within the time frames depicted in Figure 3.3 of the Plan. In the event that an assessment of the areas noted in items (a) through (d) of this letter cannot be completed prior to the end of the third quarter of calendar year 1998, then a request for an extended assessment period must be submitted by ASARCO.

Thank you for the attention given to this matter. Should you have any questions concerning this letter, please contact me at (512) 239-6012.

Sincerely,

John L. Sadlier

John L. Sadlier, Senior Coordinator
Multi-Media Section
Enforcement Division

cc: R. Keith Hopson, Brown McCarroll Oaks & Hartline
Vic McWherter, Staff Attorney, TNRCC
Terry McMillan, Waste Program Manager, El Paso Regional Office

cc LWC
GAP
JAB
LJ

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

March 4, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED Z 707 602 752

RECEIVED
MAR 18 1997
HYDROMETRICS, INC.

Mr. Tom Martin
Environmental Manager
ASARCO, Inc.
P.O. Box 1111
El Paso, Texas 79999

RECEIVED
MAR 7 1997
T.E. MARTIN

Re: Closed Plant Evaluation Plan
ASARCO Inc., El Paso Plant
2401 West Paisano, El Paso, Texas 79901
Solid Waste Registration No. 31235
Water Quality Permit No. WQ 0002321
EPA Identification No. TXD990757668

Dear Mr. Martin:

The Texas Natural Resource Conservation Commission has completed its review of the November 22, 1996 plan entitled "Proposed Closed Plant Evaluation Plan" ("the Plan") prepared for the referenced facility. The Plan was submitted to satisfy Ordering Provision No. 8 of the Agreed Order issued on August 29, 1996 ("the Order"). Our review indicates that the Plan will satisfy Ordering Provision No. 8 with the following stipulations:

(a) ASARCO must update its Notice of Registration concerning the generation of all demolition-related wastes. Notification must be accomplished pursuant to 30 TEX. ADMIN. CODE Section 335.6;

(b) Waste determination and waste classification must be completed prior to waste disposal or the shipment of wastes off-site for processing or disposal pursuant to 30 TEX. ADMIN. CODE Sections 335.501 through 335.515; and

(c) The storage, processing and disposal of demolition wastes must be accomplished in accordance with all applicable state and federal regulations. Specifically, ASARCO must not stockpile demolition-related wastes in a manner which would constitute a potential discharge or precipitate an actual discharge of wastes into or adjacent to the waters of the state.

Page number 4 of the Plan states that a series of technical memorandums will be developed during demolition activities to summarize demolition actions taken, present waste characterization results, and to amend the sampling program as necessary. I would suggest that ASARCO address items (a) through (c) above through its proposed memorandum process. Although not specifically required by the Order, written guidance regarding these issues may serve to help ASARCO maintain compliance with state and federal regulations during this period of increased activity at the facility.

Thank you for the attention given to this matter. Should you have any questions concerning this letter, please contact me at (512) 239-6012.

Sincerely,

John L. Sadlier

John L. Sadlier, Senior Coordinator
Multi-Media Section
Enforcement Division

cc: R. Keith Hopson, Brown McCarroll Oaks & Hartline
Vic McWherter, Staff Attorney, TNRCC
Terry McMillan, Waste Program Manager, El Paso Regional Office

ASARCO

El Paso Plant
Amarillo Copper Refinery

Thomas E. Martin
Environmental Manager

March 27, 1997

Via FEDEX Airbill #4403386514

Mr. John Sadlier
Senior Coordinator
Enforcement Division, Multi-Media Section, MC-219
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Response to Comments and Submittal of Work Plan Addendum
ASARCO El Paso Plant
Remedial Investigation Work Plan
El Paso, Texas

Dear Mr. Sadlier,

This letter is in response to your letter dated February 24, 1997, (provided as Attachment 1) which comments on Asarco Incorporated's (ASARCO) Remedial Investigation Work Plan and serves as the Work Plan Addendum. This letter/addendum includes the following work plan revisions, included as Attachment 2, which replace the previous versions of these items in the work plan:

- Exhibit 1 Plant Layout, Investigation Areas and Monitoring Locations
- Table 3-1 Investigation Areas
- Table 4-1 Sample Analysis Matrix

In summary, additional work is proposed to meet each of the comments numbered (a) through (d) in your letter dated February 24, 1997.

ASARCO Incorporated • P.O. Box 1111 • El Paso, Texas 79999 • (915) 541-1819 • Fax (915) 521-3651

RESPONSE TO COMMENTS

TNRCC COMMENT (a): Section 2.1.6 of the Plan references ASARCO's active Solid Waste Management Units (SWMUs) and states that "these areas are not included as part of this RI." This statement may be contrary to the agreement set forth in Ordering Provision No. 5 of the Order which states that ASARCO shall submit for TNRCC approval "a plan for the remedial investigation to determine the vertical and horizontal extent of contamination identified as a result of the 1994 and 1995 inspections and the January 1995 sampling event." Therefore, pursuant to Provision No. 5, the Plan would include provisions for the assessment of all SWMUs where contamination has been documented in accordance with the Order. Specifically, the Plan fails to provide for the assessment of SWMU No. 15, Acid Plant Accumulation Area[1] and SWMU No. 16, Unloading/Bedding Wastewater Treatment Plant[2].

ASARCO RESPONSE: Additional assessment work will be performed in the Unloading/Bedding Wastewater Treatment Plant area. The principal concern is that water used for dust suppression may have contaminated surface soils in the area. Therefore, soil samples will be collected at the surface and at two feet below ground surface. Should elevated metals concentrations be identified at depth, such that there is concern for potential groundwater contamination, additional sampling at greater depths and/or leachability studies may be performed as follow-up.

The Acid Plant Accumulation area is already addressed in the work plan as Investigation Area 3, which includes the Acid Plant #1, Acid Plant #2, and downgradient areas.

TNRCC COMMENT (b): Section 2.4.1 of the Plan states that "as a separate project, Hydrometrics has initiated a preliminary investigation associated with remedial and closure activities of the ponds." Additionally, Section 2.6.3 state that "because the ponds are being closed, evaluation of the ponds are being excluded from this investigation." Pursuant to Provision No. 5, the Plan should, at a minimum, include provisions for the assessment of Pond Nos. 1 and 6[3].

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[1] Finding of Fact Nos. 3(e), 3(g) and 9(a) of the Order reference three spills which occurred in the vicinity of Acid Plant No. 2. The spills were documented during the 1994 and 1995 inspections.

[2] Finding of Fact No. 3(c) of the Order references samples obtained during the 1994 inspection which indicated that contaminated effluent had been used for dust suppression in Bedding/Unloading Building.

[3] Finding of Fact No. 3(a) of the Order references samples obtained during the 1994 inspection and the 1995 sampling event which confirmed the presence of elevated levels of metals in Pond Nos. 1 and 6.

ASARCO RESPONSE: A more detailed investigation to determine the extent of total metals concentrations in sediments, subsurface soils and water quality is being proposed for Ponds 1, 5 and 6. A good estimate of the horizontal and vertical concentration gradients is necessary to determine the volume of material which may require remediation or what level of remediation will be conducted. Therefore, samples will be collected at the following depths:

- Surface sediment (0-2 inches)
- Subsurface sediment (directly above the sediment/soil interface)
- Subsurface soils (6 inches below the sediment/soil interface)
- Deep subsurface soils (18 inches below the sediment/soil interface)

Prior to the collection of the above described samples, the ponds will be evaluated to determine if they had been lined with clay or other material and the estimated thickness of the liner. The issue of the liner's thickness is important with regards to what samples will be collected. The sample plan will be adjusted based on liner thickness so as not to collect samples from depth intervals which may penetrate through the liner and create a conduit for subsurface release of pond water.

Sediment samples will be collected using a sampling device attached to an extension sufficient for the depth of water in the ponds, about 10 feet. If the depth of sediment is greater than 6 inches, such that multiple split spoon retrievals within a borehole are necessary to collect the deeper samples, then a hollow tube will be placed into the sediments and soils to guide the spilt spoon and prevent sediment from falling into the borehole between sample collections. During sample collection, the depth of sediment will be documented to support a determination of the volume of sediment in each of the ponds. In addition, the sample collection procedure may be adjusted to meet the specific needs of each of the ponds.

In addition, samples of the soil immediately below the pond sediment and liner, will have to be sampled. The sampling of the soil will be completed as soon as the ponds are dewatered and the surface soils become rigid to support appropriate sampling equipment. The sampling will be collected from the same locations as the surface sediments, as shown on revised Exhibit 1.

Additionally, surface water samples will be collected quarterly from each pond which can be compared with surrounding groundwater monitor well data to support an evaluation of potential seepage issues. Follow-up work may include sediment leachability studies, pending results of the initial site characterization.

TNRCC COMMENT (c): Section 3.1.1 states that "issues related to storm water are being addressed by other programs." Pursuant to Provisions No. 5 the Plan should, at a minimum, include provisions for the assessment of the areas adjacent to the sump located near the Facility's entry gate[4].

ASARCO RESPONSE: Asarco is presently engaged in a large storm water project which is intended to prevent future runoff and infiltration of storm water from the facility. The proposed investigation of the sump located near the Facility's entry gate will include the collection of eight soil samples from a depth of 0 to 24-inches below ground level. The sample locations will be spotted in the soil adjacent to the road pavement.

TNRCC COMMENT (d): Exhibit No. 1 of the Plan fails to indicate surface or subsurface sampling of the boneyard[5]. Pursuant to Provision No. 5, the Plan should, at a minimum, include provisions for the assessment of the boneyard's surface and subsurface soils.

ASARCO RESPONSE: As indicated in Table 3-1 of the work plan, the boneyard area exists mostly on top of slag (see revised Exhibit 1). The principal concern is the potential leaching of contaminants from material/equipment formally stored on the boneyard to surface soil. Several bore holes were proposed in the work plan in areas of slag to evaluate soils beneath the slag to groundwater elevation. Two additional bore holes will be added in the Boneyard area to evaluate any additional contamination which may have occurred in this area. Two surface samples locations (0 and 2 foot sample depths) are proposed to characterize the soil on the slag. All samples collected will be tested for total metals.

TNRCC AREA OF CONCERN (1): Section 3.1.3.1 states that "since in-place soils are not considered to be wastes, TCLP testing of soils will not be necessary." TNRCC agrees that total metal concentration values may be utilized as evidence in the attainment of the Risk Reduction Standards for in-place soils. However, please be advised that for the purpose of hazardous waste determination and waste classification, TCLP values may be required.

ASARCO RESPONSE: If, and/or when materials requiring excavation and disposal are identified, TCLP testing will be performed as necessary to support proper waste classification and disposal.

---

[4] Finding of Fact No 3(j) of the Order references samples obtained during the 1994 inspection which confirmed the presence of elevated levels of metals in storm water run-off observed bypassing the sump adjacent to the Facility's entry gate.

[5] Finding of Fact Nos. 3 (d) of the Order reference samples obtained during the 1994 inspection and the 1995 sampling event which confirmed the presence of elevated levels of metals in the boneyard.

TNRCC AREA OF CONCERN (2): Also noted as an area of concern was the quantity of proposed sampling points in some of the areas under investigation. However, as stated in Sections 3.1.3 and 3.1.1.1 of the Plan, ASARCO understands that if the results of the assessment indicate that contamination has migrated beyond the proposed investigation areas, additional soil and/or groundwater assessment will be necessary.

ASARCO RESPONSE: Asarco believes the initial work plan provides a sufficient number of soil sampling points initially to characterize areas of potential contamination and support preliminary risk evaluations. Once areas of potential concern are identified, additional work may be necessary to better define boundaries, evaluate the potential mobility of parameters of potential concern, and to support remedial design work.

We understand that the TNRCC letter dated February 24, 1997 regarding the Remedial Investigation Work Plan constitutes approval of the work plan, with the modifications provided by this letter. We will begin the Remedial Investigation in accordance with the schedule provided by Figure 3-3 of the work plan. The work schedule for data collection may be extended to allow for collection of four quarters of water sampling prior to preparation of the remedial investigation report. In addition, the schedule may be lengthened with regards to the pond investigations. This schedule change is dependent upon the construction schedule of the new storm water collection pond. Should you have any questions regarding this letter please contact me at (915)541-1819.

Sincerely,

J.A. Baca for

Thomas E. Martin
Environmental Manager

Attachments

c: Terry McMillan, TNRCC Region 6, El Paso
J.A. Baca, Asarco, El Paso
John B. Richardson, Asarco, Salt Lake City
R. Keith Hopson, Brown McCarroll & Oaks Hartline, Austin
Lairy Johnson, Hydrometrics, El Paso
Kent Lang, Hydrometrics, Tucson
Steve Ackerlund, Hydrometrics, Helena

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

June 24, 1997

CERTIFIED MAIL - RETURN RECEIPT REQUESTED Z 707 602 768

Mr. Tom Martin
Environmental Manager
ASARCO, Incorporated
P.O. Box 1111
El Paso, Texas 79999

RECEIVED
JUN 25 1997
ASARCO-EL PASO
ENVIRONMENTAL

Re: Remedial Investigation Workplan Addendum
ASARCO Inc., El Paso Plant
2401 West Paisano, El Paso, Texas 79901
Solid Waste Registration No. 31235
Water Quality Permit No. WQ 0002321
EPA Identification No. TXD990757668

Dear Mr. Martin:

The Texas Natural Resource Conservation Commission has completed its review of the March 27, 1997 addendum to the Remedial Investigation Workplan prepared for the referenced facility. The addendum was submitted in response to TNRCC's Notice of Deficiency (NOD) dated February 24, 1997. Our review indicates that the addendum resolves all of the issues noted in the NOD, therefore, the Remedial Investigation Workplan and addendum are hereby approved.

Thank you for the attention given to this matter. Should you have any questions concerning this letter, please contact me at (512) 239-6012.

Sincerely,

John L. Sadlier

John L. Sadlier, Senior Coordinator
Multi-Media Section
Enforcement Division

cc: Mr. R. Keith Hopson, Brown McCarroll Oaks & Hartline, 1400 Franklin Plaza, 111 Congress Avenue, Austin, Texas 78701-4043
Mr. Terry McMillan, Waste Program Manager, El Paso Regional Office

ASARCO

El Paso Plant
Amarillo Copper Refinery

Thomas E. Martin
Environmental Manager

March 23, 1998

Via FEDEX Airbill # 803785696929

Mr. John Sadlier
Senior Coordinator
Enforcement Division, Multi-Media Section, MC-219
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: **Revision of Remedial Investigation Schedule for Ponds No. 1, No. 5 and No. 6 - ASARCO El Paso Plant Remedial Investigation Work Plan El Paso, Texas**

Dear Mr. Sadlier,

In accordance with our telephone conversation on March 3, 1998, and pursuant to the Agreed Order (Docket No. 96-02122-MLM-E; SWR No. 31235; Permit No. WQ 02321), we are requesting an extension of time to fully implement the investigation of sediment and subsurface soil described in the Remedial Investigation Work Plan (Work Plan) for Ponds No. 1, No. 5, and No. 6 (the ponds). We are requesting this extension due to the following factors:

- Originally, the ponds were to be drained and sediment and subsurface soil sampled in December 1997.

- Due to design and construction schedule revisions for new storm water collection and reuse system, construction is not scheduled to begin until approximately May 1998. This will necessitate a delay in emptying of the ponds until approximately January 2000.

- Boring the ponds while they contain water to investigate and characterize sediment and subsurface soil increases the chances for cross contamination of soil samples with pond water.

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- Boring the ponds while they contain water also increases the chances for seepage of pond water and migration of metals to underlying subsurface soil and the groundwater system.

The ponds are identified as a separate investigation area in the Agreed Order and the Work Plan. Grab samples of sediment have been collected from the ponds and analyzed for total silver. arsenic. barium. cadmium, chromium. mercury, lead. selenium. copper. We propose these data will be adequate to support an assessment of potential impacts to subsurface soil and groundwater for the purpose of completing the *Remedial Investigation and Corrective Action Report*. The collection of sediment and subsurface soil samples as described in the Work Plan will be delayed until the ponds are drained in 2000. These data. and any specific recommendations regarding the remediation of the ponds that are a result of an interpretation of these data. will be submitted to the TNRCC in the form of a *technical memorandum* as a supplement to the *Remedial Investigation and Corrective Action Report*.

We would appreciate a written confirmation of your acceptance to this proposed revision of the RI schedule regarding Ponds No. 1, No. 5 and No. 6 from you.

If you have any questions regarding this letter, please feel free to contact me at (915) 541-1819.

Sincerely.

Thomas E. Martin

Thomas E. Martin
Environmental Manager

cc: Terry McMillan. TNRCC Region 6, El Paso
R. Keith Hopson. Brown McCarroll & Oaks Hartline. Austin
Lairy Johnson. Hydrometrics, El Paso
Kent Lang. Hydrometrics. Tucson

ASARCO

El Paso Plant
Amarillo Copper Refinery

Thomas E. Martin
Environmental Manager

May 20, 1998

Via FEDEX Airbill # 3670742704

Mr. John Sadlier
Senior Coordinator
Enforcement Division, Multi-Media Section, MC-219
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Revision of Remedial Investigation Schedule for Report Submittal - ASARCO Incorporated El Paso Plant El Paso, Texas (Agreed Order Docket No. 96-02122-MLM-E)

Dear Mr. Sadlier,

In accordance with our telephone conversation on May 11, 1998, and pursuant to the above referenced Agreed Order, ASARCO Incorporated (Asarco) is notifying you of a revision to the original schedule for submittal of the Remedial Investigation Report. This extension is necessitated by the following factors:

- Due to design and construction schedule revisions for the new storm water collection and reuse system, construction is scheduled to begin in or about July 1998. This likely means all of the ponds scheduled to be emptied will not be emptied until approximately March 2000. As mentioned during the May 11, 1998 telephone conversation, we are currently attempting to dry Pond No. 5. The pond will be sampled as soon as it is dry enough. A letter was sent to your office on March 23, 1998, requesting that the investigation into the quantity and extent of pond sediments be postponed for these reasons.

- As of the date of this letter, Asarco has yet to receive a decision from the TNRCC regarding the request to delay the investigation of the three ponds.

In our conversations with you, there was consensus regarding the delay in the investigation of the ponds, and it was decided that data from a preliminary in-house investigation of pond sediments performed in 1996 could be utilized. The 1996 investigation required the collection of three (3) surface sediment grab samples from each pond for analysis of total metals. The data can be incorporated into the *Remedial Investigation and Corrective Action Report* as general data but not be used to classify the sediments or to determine volumes for remedial purposes. The data will be used to establish preliminary goals and to give direction for the required investigation once the ponds have been dewatered and can be more safely sampled.

Pending a decision by the TNRCC with regards to delaying the investigation of the ponds and with the completion of the final quarterly ground water and surface water sampling event and the receipt of analytical results from the laboratory, it is estimated that the Remedial Investigation will be completed as originally scheduled on June 12, 1998.

Therefore, Asarco is requesting approval to amend the its original schedule in order to properly complete the *Remedial Investigation and Corrective Action Report.* The new due date for the report will be October 9, 1998, which is within 120 days of the June 12, 1998, completion date of the Remedial Investigation. This is consistent with Ordering Provision No. 6.

We would appreciate a written confirmation of your acceptance of this proposed revision of the Remedial Investigation schedule. We appreciate your continued cooperation as Asarco continues to undertake this major project.

If you have any questions regarding this letter, please feel free to contact me at (915) 541-1819.

Sincerely,

Thomas E. Martin

Thomas E. Martin

Environmental Manager

cc: Terry McMillan, TNRCC Region 6, El Paso
R. Keith Hopson, Brown McCarroll & Oaks Hartline, Austin
Lairy Johnson, Hydrometrics, El Paso

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

cc: LWC
RKH
L. Johnson
RDC
DAR
TMF

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

June 25, 1999

RECEIVED
... 0 0 1999
HYDROMETRICS, INC.

Mr. Thomas E. Martin
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

RECEIVED
JUL 2 1999
T.E. MARTIN

RE: Remedial Investigation Report
Agreed Order
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Martin:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the Remedial Investigation Report dated October 9, 1998. The TNRCC accepts the report with the following comments concerning the Phase II investigation.

1. For Investigation Area 1, the TNRCC agrees with ASARCO's proposal for additional soil borings to groundwater, however, since this area is near the property boundary additional attention should be focused toward the property boundary or the groundwater pathway. ASARCO has stated that the primary hydrogeologic feature of Area 1 is a slag and soil backfill arroyo and that higher metals concentrations in the groundwater are associated with the arroyos. Since the higher metal concentrations in groundwater are associated with the arroyos, ASARCO may want to focus their investigation on all the backfilled arroyos at the site. The TNRCC believes there is evidence that the old slag in the arroyos may be contributing to the metals in the groundwater. In addition, the old slag may not have the same chemical or physical characteristics as the recently produced slag.

2. ASARCO proposes to conduct six additional borings in the Investigation Area 2 (Boneyard/Slag Storage Area), however Exhibit 2 (Proposed Soil, Monitor Well and Surface Water Locations) displays 8 proposed soil borings for Area 2. The TNRCC requests clarification on the number of borings. Also, the TNRCC recommends that a ground-water monitoring well be installed northwest of well EP-53. Groundwater from Area 2 has been impacted above background concentrations and appears to

migrate northwest toward the northern arroyo. Please establish if this is a potential pathway for the groundwater for this area.

3. ASARCO has proposed an additional eight soil borings for Area 3. The TNRCC agrees with the additional borings but believes a detailed ground-water investigation is needed for Area 3. Area 3 contains some of the highest arsenic concentrations in groundwater at the Facility and is potentially over an old arroyo which is adjacent to the property boundary. The TNRCC believes that the ground water from Area 3 has the potential to migrate offsite, which the TNRCC considers a potential point of exposure for contaminants. Also, the TNRCC is concerned with surface metals concentration in soils along the western property boundary which is included as Investigation Area 4. Once again, the TNRCC considers areas that are adjacent to the property boundary, which have the potential to migrate offsite, potential points of exposure. ASARCO is required to delineate the extent of contamination for site closure or remediation under the TNRCC's Risk Reduction Rules.

4. ASARCO has proposed excavating Category I materials (residual by-products typically associated with specific current and past smelter operations), however, ASARCO's reference to the proposed disposal sites of those materials as "repository sites" may be inaccurate. ASARCO proposes to excavate the pond sediments in Ponds 5 and 6 and recover copper in the sediment by recycling through the smelter. Pond 1 sediments will be dried and compacted and placed in on-site "repositories", which ASARCO proposes to form by excavating and lining of Ponds 5 and 6. Please describe in detail the classification procedure and regulations that ASARCO will use to classify proposed Category I materials to be excavated and of the "repository" concept. For any excavated material generated, including the pond sediments which occur in Ponds 1, 5 and 6, ASARCO should first classify the material before disposal.

5. ASARCO has indicated that surface water flow in the American Canal during the winter months is restricted. ASARCO contends that during these low flow events, the surface water is not representative of the overall water in the American Canal. The TNRCC does not agree with ASARCO's assessment of the American Canal. The TNRCC considers the water in the American Canal surface water in which ASARCO's groundwater is discharging during these low flow periods. Please reevaluate the American Canal based upon a potential pathway for contaminat migration.

6. ASARCO used low and high flow purging rates for groundwater sampling then filtered the groundwater before placement into the sample containers. For future reference, please use one type of monitor well purging technique for all of the wells to be sampled. TNRCC has developed a "Consistency Document' dated July 23,

1998 which provides guidance for the use of purging methods and for the use of filters for groundwater samples. In general, the TNRCC discourages the use of filtered groundwater samples and will only allow filtering under certain conditions described in the "Consistency Document". Please refer to this document when sampling groundwater in the future. Information concerning implementation of the regulations may be accessed via internet at http://www.tnrcc.state.tx.us/waste/consimem.html.

7. ASARCO contends that their employee biomonitoring program is an institutional control which precludes any further remedial action at the facility to protect employees health. The TNRCC disagrees with the assessment that monitoring receptors precludes evaluation of exposure pathways for human or ecological exposure. The TNRCC refers ASARCO to the TNRCC's "Consistency Document" for further explanation on this matter and on the implementation of the TNRCC's Risk Reduction Rules.

Please conduct the Phase II investigation and address these comments in a Phase II Report and submit an original and one copy of the report within 120 days of the date of this letter to the TNRCC Corrective Action Section. Also, send one copy to Mr. Frank Espino, Regional Director, TNRCC Region 6 Office, 7500 Viscount Blvd., Ste 147, El Paso, Texas 79925-5633.

Questions concerning this letter should be directed to Mr. Brad Wilkinson at (512) 239-2350. Please use Mail Code 127 (MC127) when responding by mail.

Sincerely,

David Hastings

David Hastings, Supervisor
Team I, Corrective Action Section
Remediation Division

DH/bw

cc: Mr. Michael D. Goodstein, Senior Attorney, United States Department of Justice, Washington, DC
Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch-Dallas
Mr. Frank Espino, Waste Program Manager, TNRCC Region 6 Office-El Paso

ASARCO

El Paso Plant
Amarillo Copper Refinery

August 6, 1999

Thomas E. Martin
Environmental Manager

Mr. Brad Wilkinson
Corrective Action Team/Section
Industrial & Hazardous Waste Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Completion Schedule for the Remedial Investigation - Phase II
ASARCO Incorporated, El Paso Plant, El Paso, Texas

Dear Mr. Wilkinson:

During our meeting at your offices on July 23, 1999 you agreed that the completion schedule of 120 days in your letter of June 25, 1999 to me was in error. This letter will serve to confirm our understanding that you have approved the use of the 13-month schedule for the Remedial Investigation Phase II as proposed in the Remedial Investigation Report dated October 9, 1998. Unless we hear from you in 15 days from your receipt of this letter, we'll precede with this schedule.

We appreciate your response to our request. Do not hesitate to call me at the number below if you have any questions.

Sincerely,

Thomas E. Martin

Thomas E. Martin

Cc: Kent Waggoner, TNRCC Region 6, El Paso
R. Keith Hopson, Brown McCarroll & Oaks Hartline, Austin
Lairy Johnson, Hydrometrics, Inc., El Paso

1035

ASARCO Incorporated • P.O. Box 1111 • El Paso, Texas 79999 • (915) 541-1819 • Fax (915) 521-3651

ASARCO

El Paso Plant
Amarillo Copper Refinery

Thomas E. Martin
Environmental Manager

October 15, 1999

RECEIVED
OCT 15 1999
HYDROMETRICS, INC.

Mr. Brad Wilkinson
Project Manager
Corrective Action Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78753

Re: ASARCO Incorporated, El Paso Smelter Remedial Investigation

Dear Brad:

At our last meeting, representatives of ASARCO Incorporated (Asarco) discussed with you and David Hastings the utilization of common nomenclature to be used to describe the investigation areas at Asarco's El Paso smelter. To aid in ensuring clear communication between representatives of the Texas Natural Resource Conservation Commission (TNRCC) and Asarco, we have attached three exhibits. The first exhibit is a site map of the facility. The second exhibit identifies various arroyos that existed at the facility. The third exhibit sets out designations of the boundaries of investigation areas based on current and former plant operations. We hope that utilization of these exhibits will aid in clear communication between Asarco and TNRCC representatives.

During our last meeting, we discussed some issues regarding the utilization of pond areas as repositories for possible remediation wastes. In the course of our discussion, we touched briefly on utilization of the Bevill Amendment (which was the subject of a separate September 8, 1999 letter to Mr. David Hastings) and the possible utilization of the Area of Contamination concept (AOC). We have researched various guidance documents regarding the AOC concept as well as identifying past and current projects in which the AOC concept has been successfully utilized. We have informally discussed its possible utilization with you and other TNRCC and Environmental Protection Agency (EPA) representatives. By way of this letter we would respectfully request a meeting to formally confirm our ability to utilize the AOC in the course of the facility investigation and any necessary remediation. We would appreciate your proposing multiple meeting dates acceptable to the TNRCC in the near future in order for us to proceed quickly on this matter.

Finally, we request written approval of Asarco's RI Report as provided for in our agreed TNRCC Order.

ASARCO Incorporated • P.O. Box 1111 • El Paso, Texas 79999 • (915) 541-1819 • Fax (915) 521-3651

We look forward to hearing from you regarding our requested meeting and any desired clarification as to the other matters in the interim or at the meeting. As always, should you have any questions, please do not hesitate to call.

Sincerely,

Thomas E. Martin

Thomas E. Martin

ATTACHMENTS

cc: R. Comer
L. Johnson
K. Hopson

CC LWC
L. Johnson
RKH
RDC

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

December 9, 1999

Mr. Thomas E. Martin
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

RE: Remedial Investigation Report - Approval
Agreed Order
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Martin:

The Texas Natural Resource Conservation Commission (TNRCC) provides the following clarification to the TNRCC's June 25, 1999 letter to ASARCO. The TNRCC' s letter approves with modifications the Remedial Investigation Report dated October 9, 1998. Please proceed with the Phase II investigation and submit the Phase II report according to the approved schedule with the start date the date of this letter.

Questions concerning this letter should be directed to Mr. Brad Wilkinson at (512) 239-2350. Please use Mail Code 127 (MC127) when responding by mail.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division

RECEIVED
DEC 16 1999
T.E. MARTIN

BW/bw

cc: Mr. Michael D. Goodstein, Senior Attorney, United States Department of Justice, Washington, DC
Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch-Dallas
Mr. Frank Espino, Waste Program Manager, TNRCC Region 6 Office-El Paso

Brown McCarroll & Oaks Hartline, L.L.P.

ATTORNEYS AT LAW

111 Congress Avenue, Suite 1400, Austin, TX 78701-4043
Phone 512-472-5456 • Fax 512-479-1101

May 5, 2000

Writer's Direct Number:
512-479-9735

VIA FACSIMILE

Mr. Brad Wilkinson
Project Manager
Corrective Action Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78753

Re: ASARCO Incorporated, El Paso Area of Contamination Matter

Dear Brad:

We appreciate you and your colleagues meeting with us on May 1, 2000. The purpose of this letter is to provide some additional information and contacts regarding the issue of utilizing an area of contamination (AOC) that encompasses virtually all of an industrial site. In fact, we have discovered some sites where the AOC encompassed not only the plant property, but adjacent residential properties as well. In some instances, we were able to discuss the specifics with the contact noted. In other instances, the contact has not been in the office or has not called back at this time. We appreciate your efforts to resolve this matter and we feel confident after our recent calls to various regulators that there is clear precedent for designating an entire plant site as as AOC, and that doing so would certainly be consistent with the guidance available on this subject.

Project: ASARCO Beckemeyer, Illinois
Michael Collins (EPA) 312-886-6436

Project: Stephenson - Bennett Site Organ Mountains, New Mexico
Jim Costello (EPA) 214-655-8045

Project: Federated Metals Sand Springs, Oklahoma
Ray Roberts (ODEQ)
405-702-5100

Project: Murray Smelter, Salt Lake City, Utah

Mr. Brad Wilkinson
May 5, 2000
Page 2

Bonnie Lavelle (EPA) 303-312-6579

Project: ASARCO Tacoma Smelter, Tacoma, Washington
Kevin Rochlin (EPA) 206-553-2106

Project: ASARCO East Helena Smelter, East Helena, Montana
Susan Zazzali (EPA) 406-441-1130

We hope this information is of assistance. We trust that after you have discussed the AOC issue with these other governmental representatives, you will be confident that virtually entire sites (indeed, entire sites plus adjacent residential areas) have been designed as AOCs in the past.

Again, thank you for your consideration. We look forward to hearing from you. As always, should you have any questions, please do not hesitate to call.

Very truly yours,

Keith

Keith Hopson

KH/ed
cc: Ata-Ur-Rahman, Ph.D.
David Hastings
Susan White
Lairy Johnson
Kent Lang
(all via facsimile)
AUS:1808199.1
1.201

AREA OF CONTAMINATION AT THE ASARCO EL PASO COPPER SMELTER EL PASO, TEXAS

Prepared by:

Hydrometrics, Inc.
3275 West Ina Road
Suite 205
Tucson, AZ 85741

and

Brown McCarroll & Oaks Hartline, L.L.P.
1400 Franklin Plaza
111 Congress Avenue
Austin, Texas 78701

May 2000

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LIST OF EXHIBITS

AREA OF CONTAMINATION AT THE
ASARCO EL PASO COPPER SMELTER
EL PASO, TEXAS

1.0 INTRODUCTION

The purpose of this report is to provide additional information requested by the Texas Natural Resource Conservation Commission (TNRCC) regarding the applicability of the Area of Contamination (AOC) concept at the Asarco El Paso Copper Smelter in El Paso, Texas. The AOC concept is important to achieve Corrective Action Goals and Objectives and to successfully implement specific Corrective Action Measures specified in the Remedial Investigation Report (Hydrometrics, 1998).

This report contains the following information:

- A summary overview of the Remedial Investigation Report.
- A discussion about the AOC concept and applicability at the Asarco El Paso Copper Smelter.
- A review of specific Corrective Action Alternatives and Measures relative to the AOC concept.
- Preliminary design plans and specifications for construction of three on-site repositories.

2.0 REMEDIAL INVESTIGATION SUMMARY

The following is a summary of important information presented in the Remedial Investigation (RI) Report:

- Site characterization activities at the subject Plant for phase one of the RI were performed at ten Investigation Areas pursuant to the 1996 Agreed Order.

- Surface water bodies located near the Plant are the Rio Grande and the American Canal.

- Groundwater in the project area generally flows west toward the Rio Grande, and occurs at depths ranging from 40 to 60 feet bgs beneath the Plant to about ten feet bgs in wells adjacent to the Rio Grande. Groundwater underlying the Plant and in the vicinity of the Plant is not used for drinking water purposes. The nearest domestic well is approximately one-half mile north and upgradient from the Plant.

- Primary drinking water standards for arsenic, cadmium and selenium were exceeded in one or more groundwater samples, plus lead exceeded the Federal Action Level. Arsenic was detected above its MCL in 48 groundwater monitor wells. The maximum concentration of arsenic was 464 mg/l in samples from monitor well EP-49. Cadmium was detected above its MCL in 11 groundwater monitor wells with a maximum concentration of 43 mg/l also in monitor well EP-49. Selenium was detected above its MCL in 50 groundwater wells with a maximum concentration of 7 mg/l in a sample from monitor well EP-13. Lead was detected above the action level in nine wells, the maximum concentrations was 0.86 mg/l.

- Arsenic is considered the primary Constituent of Concern in groundwater at the Plant due to its widespread occurrence above the MCL.

- The strong spatial correlation between arsenic concentrations in near surface soil and arsenic concentrations in groundwater suggests that arsenic migration within the aquifer is minimal.

- Source materials occur primarily in the near surface and are not in direct contact with groundwater. This suggests that arsenic and other metals have been transported to the groundwater through the unsaturated zone in response to precipitation and other sources of recharge.

- The Plant is underlain by arroyos that have been back filled with soil, slag, and other materials. The arroyos appear to channel and control the flow of groundwater and migration of constituents beneath the plant.

- Groundwater in back filled arroyos underlying Medford Sump, Acid Plants No. 1 and No. 2, the No. 2 Acid Plant Mist Precipitator, and Ponds 1, 5 and 6 has elevated concentrations of metals. The arroyos appear to have accumulated metals from these source areas. Exhibit A shows concentrations of arsenic in groundwater relative to arroyos that existed in the natural topography prior to being back filled over time with slag.

- Materials associated with potential source areas are separated into three Categories (I, II and III) based on metal concentrations, distribution and volume of materials, visual characteristics, impacts to water resources, and degree of potential toxicity. The following is a definition for source summary of source materials:

    1. Category I materials are residual byproducts from current and past smelter operations and are associated with distinctly elevated concentrations of metals in underlying groundwater. Category I materials include but are not limited to the following:

2. Category II materials are large volumes of diluted residual by-products (most of the same materials listed as Category I) and debris from demolition of smelter facilities with residual concentrations of metals. Category II materials do not currently represent a source of metals to the underlying groundwater but could become a potential source in the future if conditions on the surface are not properly managed.
3. Category III materials are copper slag and unfumed lead slag.

- The results of the Risk Evaluation conclude no imminent health threats exist at the Plant because risks are appropriately managed.

- Metal concentrations in surface water (American Canal and Rio Grande) are below health-based levels of concern (MCLs) and Fresh Water Chronic Criteria.

- Corrective Action Objectives include the following:

1. Reduce the potential for exposure to metals by Plant workers and the public.
2. Minimize the potential for transport of metals to groundwater.
3. Prevent increases in metal concentrations in the American Canal and Rio Grande resulting from the migration of metals in groundwater and/or wind blown dust from the Plant.

- Specific Corrective Action Measures to remediate source areas were developed from Corrective Action Alternatives. Corrective Action Alternatives were selected after an evaluation of Corrective Action Technology and Process Options based on effectiveness, implementability, and cost. Corrective Action Alternatives applicable to the Plant include the following:

1. Institutional controls/deed restrictions (worker health and safety programs).
2. Containment (capping and surface control).

3. Removal/disposal (excavation and on-site disposal).
4. Long-term surface water and groundwater Monitoring.

- Capping and surface control alternatives apply to Category II materials and excavation and on-site disposal alternatives apply to Category I materials.

- Corrective Action Alternatives and Measures do not apply to Category III materials (slag), which will be managed in place or crushed and used as backfill for remedial construction.

- When completed, the storm water Collection and Reuse Project, along with other secondary spill containment, storm water management, best management practices and discharge control technology elements currently in place, will effectively reduce transport of metals to groundwater and surface water.

- Sediments from Ponds 5 and 6 may be sufficiently high in copper to warrant smelting to recover the copper. It is recommended that Ponds 1, 5 and 6 be reworked and converted to lined on-site repositories for the disposal of Category I and other materials as appropriate.

- The Corrective Action Measures implementation schedule for the 10 Investigation Areas has a total duration of 1254 days and starts in July 2000. A Critical Path Method schedule for Corrective Actions is in Exhibit B.

- In Phase I of the RI, additional soil, groundwater, surface water and other types of data have been collected to identify other potential source areas, better define the nature and extent of known source areas and better evaluate off-site risks. Phase II RI data are currently being evaluated and a Phase II RI Report will be submitted to TNRCC in June 2000.

3.0 AREA OF CONTAMINATION (AOC) CONCEPT

3.1 DEFINITION OF AOC

Areas of contamination (AOCs) is a concept by which certain broad areas of contamination may be considered a RCRA landfill unit. Significantly, consideration of these areas of contamination as a landfill unit would allow hazardous waste to be moved within the boundaries of the AOC without triggering RCRA land disposal restrictions or minimum technology requirements.

As noted in the March 13, 1996 guidance titled "Use of the Area of Contamination (AOC) Concept During RCRA Cleanups," the AOC concept was first discussed in detail in the Preamble to the National Contingency Plan (55 Fed. Reg. 8758–8760, 3/8/90). There the agency clarified that certain discrete areas of generally dispersed contamination could be equated to a RCRA landfill and that movement of waste within those areas would not be considered placement of wastes and accordingly would not be considered land disposal and would not trigger RCRA land disposal restrictions. In this context, EPA clarified that "placement does not occur when waste is consolidated within an AOC, when it is treated in situ, or when it is left in place." (Citing the NCP.) The 1996 guidance goes on to explain that, "although the AOC concept was initially discussed in the context of the CERCLA program, it applies equally to RCRA corrective action sites, cleanups under state law, and voluntary cleanups." (emphasis added) According to this memo, advance approval at the federal level is not required for private parties to take advantage of the AOC concept, but EPA encourages parties to consult with the appropriate agency (be it state or federal) to ensure they implement the AOC concept appropriately. The guidance goes on to discuss the similarities and differences between AOCs and corrective action management units (CAMUs) and states that "the AOC concept is particularly useful for consolidation of contiguous units or areas of contaminated soil. Using the AOC concept, a RCRA facility owner/operator with a large contiguous area of soil contamination could consolidate such soils into a single area or engineered unit within an AOC without triggering the RCRA land disposal restrictions or minimum technology requirements." (emphasis added)

In a precursor to even the 1990 NCP, AOCs were discussed in EPA Directive No. 9347.3-05FS, titled "Determining When Land Disposal Restrictions (LDRs) Are Applicable to CERCLA Response Actions", (July 1989). In that document it clarifies that, "An AOC is delineated by the aerial extent (or boundary) of contiguous contamination. Such contamination must be contiguous but may contain varying types and concentrations of hazardous substances. Depending on the site characteristics, one or more AOCs may be delineated."

The guidance regarding AOCs discussed above was more recently touched on in the document titled "Management of Remediation Wastes Under RCRA" (EPA 530-F-98-026), October 1998. In this recent document, EPA reiterated the applicability of the AOC policy and references both the 1990 NCP discussion, as well as the above referenced March 1996 memo.

3.2 APPLICATION OF AOC AT EL PASO COPPER SMELTER

As the agency is well aware, the El Paso smelter of ASARCO Incorporated (Asarco) has been in operation for over 100 years. Over the course of that time, ores and concentrates have been stored in various parts of the facility and winds have dispersed those materials over large parts of the facility. In addition, various facility stacks have emitted contaminants both before and after those emissions were regulated. Consequently, and as sampling that has taken place to date confirms, virtually the entire plant property meets the standard of being an area of generally dispersed contamination. As all the guidance makes clear, this is the threshold issue regarding what property may be designated as an AOC.

As the agency is of course aware, Asarco has committed to close certain non-synthetically-lined surface impoundments on their plant property under the existing Agreed Order. In the course of exploring available regulatory options that were protective of human health and the environment and not cost-prohibitive, Asarco has explored utilization of the AOC concept by proposing to utilize certain contaminated soils as fill material in conjunction with engineered systems to close the ponds.

We are aware that the AOC concept was used in a similar manner (utilization of hazardous waste to fill ponds that were being closed as part of a slurry wall construction project at the Dow Freeport, Texas facility). Further, in response to questions from agency representatives, we have confirmed that a facility may have more than one area of contamination designated (see EPA Directive 9347.3-05FS, July 1989). In addition, we have conferred with EPA Headquarters (Ms. Dawn Messier, 202/564-5517) that AOC guidance does not preclude utilizing an AOC that is bisected by a roadway, body of water, or the like. Finally, based on discussions with Dave Fagan of EPA Headquarters Office of Solid Waste, an entire site can be designated as an AOC if there is contamination site-wide. He indicated that he thought such had been the case at the Reichold Chemical Site in the State of Washington (you may confirm this with Mr. Fagan at 703/308-0603).

Consequently, Asarco proposes to designate their plant site as an AOC. We believe existing data suggests that virtually this entire property meets the definition of generally dispersed contamination and utilization of the AOC would assist Asarco with the proper, protective, and efficient closure of the ponds in conjunction with the overall improvements to the facility property.

Although we have said it before, Asarco is certainly willing to put in writing that these ponds to be utilized under the AOC concept will not be utilized for newly generated process waste. We understand that they may be only used for the waste being generated as part of the site investigation and remediation pursuant to the existing TNRCC Order.

While it may be possible to subdivide the property into multiple AOCs, given the widespread areas of generally dispersed contamination, we see no advantage to such action. Further, attempting to align the ponds to be closed with discrete portions of the property could lead to a situation where one pond could be under-utilized and another pond would not have capacity to accept the remediation waste generated in that particular AOC. Given the nature of the plant property, we believe it would be arbitrary and capricious to attempt to force Asarco to utilize multiple areas of contamination when, consistent with past governmental actions, virtually the entire plant property meets the definition of an AOC. We believe it is important to recall that the AOC concept was designated to help assist and encourage proper remediation in instances where certain restrictions are cost prohibitive and do not serve the function for which they were intended (there is no deterrent value to the MTRs and LDRs for waste that has already been generated; those programs were aimed largely at discouraging future generation and mismanagement of hazardous waste, not for dealing with waste that has already been generated).

3.3 AOC BOUNDARIES AT THE EL PASO COPPER SMELTER

The proposed AOC boundary for the El Paso copper Smelter is in Exhibit C. Exhibit C also shows Phase I RI, Phase II RI, and closed plant Investigation Areas. Areas of Category I materials to be excavated and consolidated in on-site repositories are in Exhibit D. Exhibit D also shows areas of Category II materials to be managed in place and areas where corrective action measures are to be determined as part of the Phase II RI investigation. All proposed corrective action measures involving excavation, consolidation, capping, or other alternatives will occur within the proposed AOC boundary including construction of synthetically lined repositories in the historical Ponds 1, 5, and 6.

4.0 ON-SITE REPOSITORIES

As summarized in Section 1-1 of this report, the Corrective Action Alternative for Category I materials consists of removal and disposal in lined on-site repositories. The use of the on-site repositories for disposal of Category I materials was identified in the Phase I RI Report as an effective and economical Corrective Action alternative.

4.1 REPOSITORY LOCATIONS AND CAPACITIES

Historic Ponds 1, 5, and 6 will be converted to on-site repositories. The location of the ponds and repository footprints are in Figure 4-1. The ponds were historically used for retention of storm water and plant process water. With the completion of the on-site Storm Water Collection & Reuse System (SWCRS) facilities in the first quarter of 2000, the ponds are no longer used. Pond 1 and 5 are currently empty and dry. Pond 6 is currently being de-watered.

The capacity of the three proposed on-site repositories is summarized as follows:

Repository Location	Estimated Capacity (yd^3)
Pond 5	22,000
Pond 1	37,000
Pond 6	25,000

These estimated volumes assume minimum excavation of pond sediments. Repository capacity may increase as a result of additional excavation in the bottom of the ponds. Over excavation requirements will be based on the results of future remedial design investigations.

The on-site repositories will only be used to dispose of Category I materials excavated from within the proposed AOC boundary of the Asarco El Paso Copper Smelter. Wastes generated as part of normal smelter operations (the plant is currently on care and maintenance status) **will not** be disposed of in on-site repositories. Asarco utilizes authorized waste handlers and disposal facilities for disposal of these wastes.

A schedule for disposal of Category I materials is summarized as follows:

Investigation Area	Cat. I Materials for Year 2000 (yd^3)	Cat. I Materials for Year 2001 (yd^3)	Cat. I Materials for Year 2002 (yd^3)	Cat. I Materials for Year 2003 (yd^3)	Total by Area (yd^3)
1	1,663				**1,663**
2			8,066	4,000	**12,066**
3		2,200			**2,200**
4			29,200	10,998	**40,198**
5	2,222				**2,222**
8			4,667		**4,667**
9	5,597	6,889	8,514		**21,000**
Total by Year	9,482	9,089	50,447	14,998	**84,016**

4.2 ON-SITE REPOSITORY DESIGN AND CONSTRUCTION

Design plans, specifications, and operating procedures for the on-site repositories will be prepared according to the results of remedial design investigations. Remedial design investigations will require soil borings to assess the extent of metal affected sediments and soils and to determine applicable geotechnical design parameters.

4.2.1 Repository Bottom Liner System

A typical bottom liner system for the proposed repositories is in Figure 4-2. The bottom liner system is composed of a Flexible Membrane Liner (FML) overlying compacted subgrade materials. In the event slag is encountered during excavation of repository bottoms, the slag will be the extent of over excavation, but then acceptable subgrade materials will be place above the slag to provide a cushion or base between the slag and the FML. A Geosynthetic fabric or Geotextile will be placed above the FML on the repository bottom and side-slopes.

The Geotextile will protect the FML from damage. Both the FML and Geotextile will be anchored along the repository's perimeter by using anchor trenches. Since Category I materials will not generate leachate, and the top liner system will prevent moisture from entering the repository fill materials, the bottom liner will not require a leachate collection system.

4.2.2 Repository Fill Materials

The first 12 inches of Category I materials to be placed in contact with the Geotextile of the bottom liner system will be minus ½-inch. Mechanical screening may be required to achieve the minus ½-inch particle size distribution.

The remaining repository volume will be filled with compacted Category I materials with a maximum particle size of 3-inches. Some crushing and screening of over-sized materials may be required to achieve the minus three-inch size limit. Category I materials will be placed in the repositories at or below optimum moisture content to prevent the introduction of excessive moisture.

4.2.3 Repository Top Liner System

A typical top liner system is in Figure 4-2. A Geotextile cushion will be placed on the top of the final 12 inches of Category I repository fill material. The final 12-inch layer of Category I materials will be minus ½-inch. The Geotextile layer will provide separation and prevent overlying materials from filtering into the repository fill. The top liner system will include a barrier layer consisting of a FML and/or Geosynthetic Clay Liner (GCL). An additional Geotextile layer will be placed over the barrier layer. Above this Geotextile will be compacted subgrade materials that may be used in the cap layer of the top liner system. The first 4-inches of the subgrade materials will be minus 3/8-inch to protect the FML/GCL from puncture.

One purpose of placing fill or subgrade over the last layer of Geotextile fabric in the top liner system is to bring the repository area to a desired final grade. This may be required to adjust final elevations in the event the volumes of Category I are less than initial estimates. Otherwise, the subgrade will be an integral part the cap component of the top liner system.

There are three types of final surface treatments or caps proposed for the repositories (see Figure 4-2) which include the following:

1. A minimum of 12 inches of topsoil.
2. A layer of Hot Mixed Asphaltic Concrete (HMAC).
3. A reinforced concrete slab on grade.

4.3 REPOSITORY OPERATION AND MAINTENANCE

A storm water control plan will be developed and implemented for operation and maintenance of the repositories. Storm water control measures include the use of diversion ditches, berms, site grading or a combination of these, to prevent storm water from entering the repositories during the construction and filling process.

Filling of the repository is not expected to be a continuous operation. The repository fill will be protected with a temporary cover, which can removed and stored during fill placement operations. The repository fill will be covered at the end of each day to prevent precipitation from entering the repository.

Once completed, the repositories will require monitoring and maintenance. A monitoring and maintenance plan will be prepared as part of remedial design. As a minimum, this plan will specify regular inspections, routine preventative maintenance, and compliance monitoring.

The repositories will require regular inspection to ensure the cap components are in good condition. Asphalt and concrete caps will have joints or may develop cracks which will require repairs. In the case of a topsoil cap, placement of additional soil and grading may be required to repair erosion.

An existing network of monitor wells installed as part of the RI may provide post-remediation data. New monitor wells may be installed if deemed necessary to specifically monitor the repositories.

5.0 REFERENCES

Hydrometrics, 1998. Asarco El Paso Copper Smelter Remedial Investigation Report, El Paso, Texas. Prepared for ASARCO, Incorporated. October, 1998.

APPENDIX A

ASARCO RESPONSES TO TNRCC COMMENTS ON PHASE I RI

Following submittal of the Phase I RI report (Hydrometrics, 1998) TNRCC provided comments (TNRCC, 1999) that were addressed in the Phase II RI. TNRCC comments have been incorporated into the Phase II RI, and are summarized below along with ASARCO's responses as follows:

Comment 1: For Investigation Area 1, the TNRCC agrees with ASARCO's proposal for additional soil borings to groundwater, however, since this area is near the property boundary additional attention should be focused toward the property boundary or the groundwater pathway. ASARCO has stated that the primary hydrogeologic feature of Area 1 is a slag and soil backfill arroyo and that higher metals concentrations in the groundwater are associated with the arroyos. Since the higher metal concentrations in groundwater are associated with the arroyos, ASARCO may want to focus their investigation on all the backfilled arroyos at the site. The TNRCC believes there is evidence that the old slag in the arroyos may be contributing to the metals in the groundwater. In addition, the old slag may not have the same chemical or physical characteristics as the recently produced slag.

Response: *Asarco agrees with the TNRCC regarding the issue that the slag-filled arroyos influence the collection and transport mechanism for metals affected groundwater. However, Asarco does not agree with the TNRCC on the issue* *that the slag within the arroyos directly contributes to metals in groundwater. As discussed in the Phase I RI Report of (Hydrometrics, 1998), it has been documented that the surface operations of the Facility are the major contributor to metals in groundwater. Slag deposits in the arroyos do not intercept groundwater. Based on the results from Phase I and II RIs, metals from surface sources migrate to groundwater through relatively high hydraulic conductivity of fractures in the slag.*

Asarco is continuing investigation of groundwater flow paths associated with the arroyos which underlie the Facility. Six monitor wells have been installed in the proximity of the mouths of the arroyos along Paisano Drive during the Phase I and II RIs. As discussed in Sections 2.0 and 3.0 of this Phase II RI Report, data from these monitor wells supports the concept that the impacts of metals from surface source areas to groundwater is influenced by the historic arroyos beneath the Facility.

Comment 2: ASARCO proposes to conduct six additional borings in the Investigation Area 2 (Boneyard/Slag Storage Area), however Exhibit 2 (Proposed Soil, Monitor Well and Surface Water Locations) displays 8 proposed soil borings for Area 2. The TNRCC requests clarification on the number of borings. Also, the TNRCC recommends that a ground water monitoring well be installed northwest of well EP-53. Groundwater from Area 2 has been impacted above background concentrations and appears to migrate toward the northern arroyo. Please establish if this is a potential pathway for the groundwater for this area.

Response: *The number of borings proposed should have been six soil borings as described in the sample matrix, rather than the eight soil borings indicated on the map. Asarco has installed monitor well* EP-99 *(see Exhibit 1) in the area between* EP-53 *and* EP-85 *to continue the investigation of potential pathways in the area of the Boneyard.*

Comment 3: ASARCO has proposed an additional eight soil borings for Area 3. The TNRCC agrees with the additional borings but believes a detailed ground-water investigation is needed for Area 3. Area 3 contains some of the highest arsenic concentrations in groundwater at the Facility and is potentially over an old arroyo which is adjacent to the property boundary. The TNRCC believes that the ground water from Area 3 has the potential to migrate offsite, which the TNRCC considers a potential point of exposure for contaminants. Also, the TNRCC is concerned with surface metals concentrations in soils along the western property boundary which is included as Investigation Area 4. Once again, the TNRCC considers areas that are adjacent to the property boundary, which have the potential to migrate offsite, potential points of exposure. ASARCO is required to delineate the extent of contamination for site closure or remediation under the TNRCC's Risk Reduction Rules.

Response: *Comment 3 from the TNRCC requesting a detailed groundwater investigation of Investigation Area No.3 makes no mention of the eight monitor wells currently located within the investigation area, which were utilized during the RIs. With the current eight monitor wells, Asarco believes that there are a sufficient number of wells to provide adequate control regarding a groundwater investigation. Asarco will continue with the proposed soils investigation of this area. Eight borings were advanced in* IA-3 *during the Phase II RI. The data collected from these borings further delineate source materials as described in Section 3.0 of this report.*

Comment 4: ASARCO has proposed excavating Category I materials (residual by-products typically associated with specific current and past smelter operations), however, ASARCO's reference to the proposed disposal sites of those materials as "repository sites" may be inaccurate. ASARCO proposes to excavate the pond sediments in Ponds 5 and 6 and recover copper in the sediments by recycling through the smelter. Pond 1 sediments will be dried, compacted, and placed in on-site "repositories", which ASARCO proposes to form by excavating and lining of Ponds 5 and 6. Please describe in detail the classification procedure and regulations that ASARCO will use to classify proposed Category I materials to be excavated and of the "repository" concept. For any excavated material generated, including the pond sediments which occur in Ponds 1, 5 and 6, ASARCO should first classify the material before disposal.

Response: *Asarco believes that adequate information and description of the "Category System" has been provide in Section 3.0 of the Phase I RI Report (Hydrometrics, 1998), and reiterated in Section 3.0 of this Phase II RI Report. An excerpt from Section 3.0 is as follows: "Category I soils are those most likely to cause impacts or have caused impacts to groundwater". The "Category System" was developed to provide a basis for Corrective Action that uses soils and groundwater metals concentration, related with past or current operations at the Facility. The issue regarding the "Category System" is not to develop a specific fixed cleanup target, but to actually investigate whether potential source areas impact groundwater. The "Category System" method of delineating areas for specific Corrective Actions is protective of the public, the environment, and the workers at the Facility.*

As summarized in a recent document provided to TNRCC by Hydrometrics (Hydrometrics et al., 2000), and in Sections 1.0 and 4.0 of this Phase II RI Report area of contamination (AOC) is a concept by which soils which impact groundwater in certain broad areas may be deposited in an on-site lined RCRA landfill unit. Significantly, consideration of these AOCs as a landfill unit would allow hazardous waste to be moved within the boundaries of the AOC without triggering RCRA land disposal restrictions or minimum *technology requirements. As noted in the March 13, 1996 guidance titled "Use of the Area of Contamination (AOC) Concept During RCRA Cleanups," the AOC concept was first discussed in detail in the Preamble to the National Contingency Plan (55 Fed. Reg. 8758-8760, 3/8/90).*

Advanced approval at the federal level is not required for private parties to take advantage of the AOC concept, but EPA encourages parties to consult with the appropriate agency (be it state or federal) to ensure they implement the AOC concept appropriately. The guidance goes on to discuss the similarities and differences between AOCs and Corrective Action management units (CAMUs) and states that "the AOC concept is particularly useful for consolidation of contiguous units or areas of contaminated soil.

As TNRCC is aware, Asarco has committed to close certain non-synthetically-lined surface impoundments on their Facility property under the existing Agreed Order (see Section 4.0 of this document and Section 4.0 of the Phase I RI (Hydrometrics, 1998)). In the course of exploring available regulatory options that were protective of human health and the environment and not cost-prohibitive, Asarco has evaluated utilization of the AOC concept by proposing to place certain impacted soils (Category I) as fill material in conjunction with engineered systems to close the ponds.

Asarco is aware that the AOC concept was used in a similar manner to fill ponds with hazardous waste that were being closed as part of a slurry wall construction project at the Dow Freeport, Texas facility. Further, in response to questions from agency representatives, we have confirmed that a facility may have more than one AOC designated (see EPA Directive 9347.3-05FS, July 1989).

In addition, we have conferred with EPA Headquarters (Ms. Dawn Messier, 202/564-5517) that AOC guidance does not preclude utilizing an AOC that is bisected by a roadway, body of water, or the like. Finally, based on discussions with Dave Fagan of EPA Headquarters Office of Solid Waste, an entire site can be designated as an AOC if there are site-wide impacts. Mr. Fagan indicated that he though such had been the case at the Reichold Chemical Site in the State of Washington (you may confirm this with Mr. Fagan at 703/308-0603).

Comment 5: ASARCO has indicated that surface water flow in the American Canal during periods of low flow in the Rio Grande is restricted. ASARCO contends that during these low flow events, the surface water is not representative of the overall water in the American Canal. The TNRCC does not agree with ASARCO's assessment of the American Canal. The TNRCC considers the water in the American Canal surface water in which ASARCO's groundwater is discharging during these low flow periods. Please reevaluate the American Canal based upon a potential pathway for contaminant migration.

Response: *During the relevant period covered by the Phase I RI Report (Hydrometrics, 1998), water in the American Canal was typically one to two inches deep during the November 1997 and February 1998 events. This atypical flow was a result of the American Canal improvements occurring downstream of the Asarco Facility, in which water normal diverted, to the American Canal, was left in the Rio Grande. In addition, during these periods of atypical low flow, the Rio Grande is restricted by seasonal controls from Elephant Butte Dam (high releases from April to September, restrictive releases from October to March). In regards to groundwater impacts to the American Canal, ASARCO has documented in the Phase I RI Report (October 1998) that the groundwater does not intersect the bottom of the American Canal during periods of low flow. Since the final quarterly event (May 1998) of the Phase I*

RI Report, water flow in the American Canal has been more indicative of typical seasonal fluctuations. And as expected, metals concentrations during these typical higher flow volumes resulted in no impacts to the water of the American Canal.

During periods of high flow when ground water only intercepts portions the American Canal adjacent to ASARCO, a concept based on hydrostatic pressure explains why no elevated metals are found when water is present in the American Canal. When the canal is full, the pressure the water exerts prevents water from seeping into the canal.

A potential source of metals during low flow conditions in the canal may be from wind blown sediments. Please refer to Section 2.0 of this report for a discussion of the flow and analytical data regarding the American Canal. Long-term continued monitoring has been proposed by Asarco. Another issue that needs to be addressed is the future plans for the American Canal. The International Boundary and Water Commission (IBWC) is currently evaluating several designs to replace, upgrade or retrofit those sections of the American Canal adjacent to the Asarco Facility. All designs have the goal of sealing the water within the canal and reducing water losses based on evaporation and leakage.

Comment 6: ASARCO used low and high flow purging rates for groundwater sampling then filtered the groundwater before placement into the sample containers. For future reference, please use one type of monitor well purging technique for all of the wells to be sampled. TNRCC has developed a "Consistency Document" dated July 23, 1998 which provides guidance for the use of purging methods and for the use of filters for groundwater samples. In general, the TNRCC discourages the use of filtered groundwater samples and will only allow filtering under certain conditions described in the

"Consistency Document." Please refer to this document when sampling groundwater in the future. Information concerning implementation of the regulations may be accessed via Internet at: http://www.tnrcc.state.tx.us/waste/consimem.html.

Response: *The procedures for collection, preparation and preservation of groundwater samples conducted for the Phase I RI followed the TNRCC approved RI Work Plan (Hydrometrics, 1996), the Agency approved modifications to that Work Plan, and those procedures found and referenced in the TNRCC Consistency Document (1998).*

In response to the first issue (ASARCO using high and low flow purge rates), ASARCO contends that it followed the definitions for an adequate purge which are located in the TNRCC referenced 1996 USEPA document "Environmental Investigations Standard Operating Procedures and Quality Assurance Manual". The procedures for an adequate purge are as follows:

> *"With respect to volume, an adequate purge is normally achieved when three to five times the volume of standing water in the well has been removed." or*
>
> *"With respect to groundwater chemistry, an adequate purge is achieved when the pH, specific conductance, and temperature of the groundwater has stabilized and the turbidity has either stabilized or is below 10 NTU's...". In addition, stabilization is defined in the same paragraph as "Stabilization occurs when the pH measurements remain constant within 0.1 Standard Unit, specific conductance within 10 percent, and the temperature is constant for at least 3 readings." The guidance provides no definition for what is considered to be "stable" in regards to turbidity or "constant" for temperature.*

In regards to the expressed concern that Asarco used high and low purging rates during groundwater sampling, we assume (based on the definition in the TNRCC Consistency Document) that the issue is over using the above definitions for adequate purge (high) versus the use of micro-purging techniques (low). During all 11 sampling events, ASARCO used "high" purging techniques rather than the "low" purging techniques.

The flow rate for achieving an adequate purge will usually vary at each well and such was the case here. The varying flow rates for purging the groundwater monitor wells occur because the site has several different types of groundwater producing formations. Individual monitor wells respond or recharge at varying rates depending on the specific geologic setting in which they are constructed. In addition, varying purge rates were utilized in an attempt to minimize the amount of water level drawdown so as not to aerate the groundwater and avoid purging the well dry. When collecting groundwater samples, the flow rate is reduced to a rate lower than the purge rate, which minimizes aeration of the sample.

As requested by the TNRCC, and consistent with the TNRCC Consistency Document, ASARCO modified its Sampling Parameter list from the sample parameter list that was approved in the RI Work Plan (1996). The modification eliminated dissolved metals analysis and total recoverable metals analysis from the original work plan and required analysis for total metals. The modification was required to resolve the issue of filtration of ground water using a 0.45-micron filter for dissolved metals analysis. The TNRCC Consistency Document discourages the use of filtered ground water samples and indicates the Agency will only allow filtering under certain conditions. The condition agreed to by ASARCO and TNRCC Representatives called for the utilization of filtering groundwater for analysis of total metals *when groundwater turbidity exceeded 10 NTU's. The first sampling event during which the modification was implemented was August 1999.*

Comment 7: ASARCO contends that their employee biomonitoring program is an institutional control, which precludes any further remedial action at the Facility to protect employees' health. The TNRCC disagrees with the assessment that monitoring receptors precludes evaluation of exposure pathways for human or ecological exposure. The TNRCC refers ASARCO to the TNRCC's "Consistency Document" for further explanation on this matter and on the implementation of the TNRCC's Risk Reduction Rules.

Response: *The Consistency Document is assumed to be the July 23, 1998 TNRCC Interoffice Memorandum to Remediation Division Staff. Asarco recognizes, generally and in regard to the memorandum, that a baseline risk assessment evaluates present risk in the absence of any proposed controls. Asarco also recognizes that the memorandum does give TNRCC flexibility to account for institutional controls in special circumstances.*

The risk assessment Appendix L, (Hydrometrics 1998) does address on-site exposures in the absence of institutional controls as follows:

- *Figure L-1 indicates that on-site soil exposures are addressed quantitatively.*
- *Table L-4 provides a comparison of on-site soil concentrations with SAI-Ind levels and other benchmark concentrations.*
- *Appendix L, Section 3.2.2. Indicates that "Elevated metals concentrations predominate throughout the investigation areas."*

The RI Report (Section 4.1.1) concludes, based on information regarding the biomonitoring program provided in the Risk Assessment, that despite elevated on-site metals concentrations, there are no present imminent health risks.

Information regarding a biomonitoring program provided in the Risk Assessment is relevant and should be accounted for in the development of Corrective Action Goals and Objectives. These objectives (Section 4.1.2) include: "Reduce the potential for exposure to metals by Facility workers and the public." In addition to the aforementioned biomonitoring program in place at the Facility, the following additional institutional controls are in place to further reduce risk:

- *Hazard communication program.*
- *Personal protective and safety equipment requirements.*
- *Controlled ingress and egress to the Facility.*
- *Facility operation areas are secured with perimeter fencing and 24-hour security.*

ASARCO has evaluated the on-site exposure pathways without undo expense, and is further addressing the issues as required.

239-0134

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

RECEIVED
JUL 24 2000
ASARCO INC.
EL PASO PLANT
ENVIRONMENTAL

July 13, 2000

Mr. Lairy Johnson, Environmental Manager
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

RE: *Area of Contamination at the ASARCO El Paso Copper Smelter*
Interim Corrective Action
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the referenced report dated May 2000. The TNRCC has the following requests and comments concerning ASARCO's El Paso facility.

1. Area of Contamination

In order for the TNRCC to objectively evaluate your request for the facility wide Area of Contamination (AOC), submit the following information on a facility plat:

a. List of all RCRA waste mangement units (active, inactive, or closed). Please also include ASARCO's notice of registration (NOR);

b. A map showing extent of all current contaminated media. Clearly demarcate any areas which are contaminated with hazardous waste. This includes any and all media that may be characteristically hazardous. Pursuant to 30 TAC § 335.62, include an explanation in the text of the document as to how any of the areas or samples were determined to be hazardous and the chemical of concern associated with that determination, plus the associated lab sheets for the samples;

c. All industrial solid waste management or disposal areas at the facility and include an explanation as to why ASARCO believes the material is solid waste (i.e., Bevill material); and

d. The location of the materials received from Encycle which were placed on the ground or stored in units/areas. Submit a separate plat clearly showing the nature and locations of storage and disposal units/areas which received the Encycle material.

2. Interim Corrective Measure

In ASARCO's *Remedial Investigation Report* dated October 9, 1998, Figure 2-38 "Arsenic Concentrations in Water", groundwater with elevated arsenic concentrations appears to have migrated beyond the facility's boundary in the western section of the plant. The groundwater flow direction is generally in the westward direction toward the Rio Grande. Railroad tracks and Piasano Drive are between the ASARCO's main plant property and ASARCO's historic Smeltertown. The wells located adjacent to the western ASARCO boundary are downgradient wells of the main plant property. One of these wells had the highest reported concentration of arsenic in the groundwater (315 ppm). Monitor wells EP-57, EP-58 and EP-59 located on ASARCO's upgradient side of the Smeltertown property and downgradient and across the Railroad tracks and Piasano Drive contained arsenic concentrations ranging from 1.0 ppm to 3.7 ppm. This appears as evidence that arsenic concentrations in the groundwater have migrated from ASARCO's main plant property onto the adjacent landowner property (Railroad tracks and Piasano Drive) and back onto ASARCO's Smeltertown property.

Since ASARCO does not have authority to discharge contaminated groundwater onto adjacent property, please submit an Interim Corrective Measures Plan to address TNRCC's concerns with the elevated concentrations of arsenic in the groundwater near the facility boundary. The TNRCC directs ASARCO to conduct interim corrective measures to prevent arsenic in the groundwater from migrating off-site. The interim corrective measures evaluation should be submitted in a plan which identifies interim corrective measures to be executed and to abate any possible off-site migration of arsenic contamination related to the site. The plan should identify objectives of the proposed interim corrective measures and include: 1) design, construction, operation, and maintenance requirements; and 2) schedules for design, construction, monitoring, and submittal of progress reports.

Please address these comments in an AOC document and an Interim Corrective Measures Plan and submit an original and one copy of each document within 120 days of the date of this letter to the TNRCC Corrective Action Section. Also, send one copy of each report to Mr. Frank Espino, Regional Director, TNRCC Region 6 Office, 7500 Viscount Blvd., Ste 147, El Paso, Texas 79925-5633.

Questions concerning this letter should be directed to Mr. Brad Wilkinson at (512) 239-2350. Please use Mail Code 127 (MC127) when responding by mail.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission

BW/bw

cc: Mr. Bruce Jones, Associate Regional Council, EPA Region 6 Office - Dallas
Mr. Bill Gallagher, RCRA Permits Section, EPA Region 6 Office - Dallas
Mr. Keith Hopson, Attorney, Brown McCarroll & Oaks Hartline
Mr. Archie Clouse, Waste Program Manager, TNRCC Region 6 Office-El Paso

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

August 11, 2000

HAND DELIVERED

Mr. Brad Wilkinson
Project Manager. Team One
Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin. Texas 78711-3087

Re: TNRCC Letter of July 13, 2000 Regarding Asarco/El Paso Copper Smelter (NOR No. 31235), EPA ID No. TXD990757668

Dear Mr. Wilkinson:

Following is the response of the El Paso Copper Smelter of ASARCO Incorporated (Asarco) to your above referenced letter. This document was prepared by Hydrometrics, Incorporated. Asarco's contractor on this project, in collaboration with Asarco's legal counsel, Brown McCarroll & Oaks Hartline L.L.P.

We look forward to our meeting to discuss the area of contamination (AOC) concept. As Keith Hopson mentioned to Ms. Susan White. Brown McCarroll & Oaks Hartline (BMOH) has video conferencing capabilities between their Austin and Dallas offices. We would be happy to host our meeting at their offices and have the EPA representatives participate from BMOH's Dallas office (which is near EPA's offices) if such an arrangement would help facilitate EPA's participation.

We respectfully request an immediate decision on our proposed use of the AOC concept. This matter has been under consideration for several months and it is necessary that we either proceed quickly with implementation or take this matter up within the Agency as appropriate. The delay thus far has resulted in Asarco being unlikely to both proceed with remediation planned for this year and expend year 2000 budgeted funds. We are confident you can appreciate that it is difficult to carry over unspent budgeted funds with the strict budgetary constraints currently existing in the nonferrous metals smelting industry.

We look forward to quickly resolving this issue. Do not hesitate to contact me at (915) 541-1819, if you have any questions regarding this submittal.

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments: Exhibits 1 through 5

cc: David Van Sost - TNRCC, Austin (1)
Ata-ur-Rahman - TNRCC, Austin (1)
John Sadlier - TNRCC, Austin (1)
David J. Hastings - TNRCC, Austin (1)
Susan Jere White - TNRCC, Austin (1)
Archie Clouse - TNRCC, El Paso (1)
Bruce Jones - U.S. EPA Region 6 Office - Dallas (1)
William J. Gallagher - U.S. EPA Region 6 Office - Dallas (1)
R. Keith Hopson - Brown McCarroll & Oaks Hartline L.L.P., Austin (1)
Harold Kutz - Hydrometrics, Inc., El Paso (1)
Tom Klempel - Hydrometrics, Inc., Tucson (1)
Kent Lang - ARCADIS, Phoenix (1)

ASARCO RESPONSES TO TNRCC
REQUESTS CONCERNING IT'S EL PASO FACILITY

After submittal of the Area of Contamination at the ASARCO El Paso Copper Smelter Report (Hydrometrics / Brown McCarroll & Oaks Hartline, L.L.P., May 2000) the TNRCC, in a letter dated July 13, 2000, has made comments and requests concerning the El Paso Facility. For ease in addressing the matters raised by the TNRCC (Agency), the language from the letter has been repeated in bold type and is followed by Asarco's response. Virtually all of the responses are recompilations of data previously provided to the Agency.

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the referenced report dated May 2000. The TNRCC has the following request and comments concerning Asarco's El Paso facility.

1. Area of Contamination

In order for the TNRCC to objectively evaluate your request for the facility-wide area of contamination (AOC), submit the following information on a facility plat:

a. List of all RCRA waste management units (active, inactive or closed). Please also include Asarco's notice of registration (NOR);

Attached as Exhibit 1 is an active facility base map with sample locations and the Encycle material storage area identified. Attached as Exhibit 2 is the base map with surface sample results. As a point of clarification. Asarco's proposed AOC is not "facility-wide." As was clearly set out in our July 2000 Phase II Remedial Investigation (RI) Report (p. 4-8) (and as we noted in our oral presentation on July 10, 2000), Asarco's proposed AOC consists of less than 50% of Asarco's acreage in El Paso. Not that this is a particularly relevant inquiry as the AOC standard merely requires there to be "discrete areas of generally dispersed contamination"[1] and we have previously provided the Agency with examples where entire sites were designated as an AOC. This same EPA guidance goes on to point out that, "[a]lthough the AOC concept was initially discussed in the context of the CERCLA program, it applies equally to RCRA corrective action sites, cleanups under state law, and voluntary cleanups."[2] As we are confident that you are aware, this makes clear that the concept is available in instances where you are dealing with other than hazardous waste such as "hazardous substances" under the CERCLA program or state authorized cleanups which are premised on protecting human health and the environment without regard to whether a material is a hazardous waste or not.

We have also attached as Exhibit 3 a copy of the notice of registration (NOR) for the El Paso Smelter of Asarco. As we are sure you recognize, the NOR contains the information you requested and is available to you at the TNRCC by use of the Industrial Solid Waste Registration number (31235 as indicated in your 7/13/00 letter). In the way of clarification, there are no hazardous waste management units utilized for disposal. The only site RCRA units are temporary storage areas that are exempt from permitting pursuant to the accumulation time provision found at 30 TAC § 335.69. We understand that these units need not be shown on the requested facility plat.

b. **A map showing extent of all current contaminated media. Clearly demarcate any areas which are contaminated with hazardous waste. This includes any and all media that may be characteristically hazardous. Pursuant to 30 TAC 335.62, include an explanation in the text of the document as to how any of the areas or samples were determined to be hazardous and the chemical of concern associated with that determination, plus the associated lab sheets for the samples.**

---

[1] US EPA memo dated 3/13/96 regarding Use of the Area of Contamination (AOC) Concept During RCRA Cleanups (p. 1).
[2] Id. at p. 2.

As you requested, we have attached a map (Exhibit 2), illustrating the location of all surface soil sampling (top one foot) and the concentration of arsenic. cadmium and lead found at those locations. We will estimate the location of surface slag and provide you the average total metals concentration for the slag based on the initial RI Report sampling. In addition, we refer you to Sections 3 and 4 of the Phase II RI Report. Both of these sections delineate the aerial extent as well as the expected volume of material to be remediated.

Please refer to Section 3 of both the Phase I RI Report dated October 1998 and the Phase II RI Report dated July 2000. Within these documents we described the locations of all soil, groundwater and surface water samples collected and present tables of total metal concentrations. In addition to the analytical data provided within Section 3, we discuss how we delineate the materials which pose the greatest threat to human health and the environment. Provided in Section 3 of the Phase II RI report are estimated volumes of materials that have impacted groundwater.

Based on findings to date, the primary emphasis of remediation is to protect groundwater. The RI performed thus far has illustrated that there is a direct source of metals to groundwater from various current and former operations. Actual concentrations in soil are compared to concentrations in groundwater. Based on observations of soils and analysis of groundwater data. we have designated certain soils. regardless of concentrations. to have an impact on groundwater. In addition. we have designated certain soils with elevated concentrations of metals that can be managed in place. because they do not impact groundwater.

Asarco understands that the AOC concept is valid for remediation wastes only. We will happily sign an agreement that only remediation waste will be placed in the repositories.

With regards to your request to identify areas contaminated by hazardous waste. we believe this request is impossible to comply with and wholly irrelevant (see response to 1.a. above). As we have emphasized time and time again, the proposed assessment and remediation is geared toward being protective of human health and the environment and to protect groundwater. "Hazardous waste" is a term of art with specific legal parameters. Because this definition for hazardous waste is in many ways a legal fiction (two chemically identical wastes might not both be hazardous waste due to either an exemption or the distinction between "listed" and "characteristic" wastes), we felt strongly that making remedial decisions based on such an arbitrary definition would ignore the material's true risk to human health or the environment, which we all believe is our remedial goal and was certainly the basis for the Agency and Asarco entering the Agreed Order that is the genesis of this work. As we have discussed and previously briefed for you, Asarco believes that virtually all wastes at the site that might otherwise qualify as a characteristic hazardous waste are exempt from regulation as a "hazardous waste" by the so-called "Bevil Amendment" adopted by Congress in 1980 and currently addressed regulatorily at 40 CFR § 261.4(b)(7).

Because protection of human health and the environment requires Asarco to base its decisions on actual threats to human health and the environment, rather than characterizations that may be merely legal fictions, the issue of characterization of wastes at the site as "hazardous" or not is irrelevant to the site, especially given Asarco's plans to utilize the AOC concept (which would allow management of the material in the manner proposed without regard to whether it was or was not a "hazardous waste"). As we previously pointed out. EPA guidance makes clear that the AOC concept is not limited to use for hazardous waste only.

c. **All industrial solid waste management or disposal areas at the facility and include an explanation as to why Asarco believes the material is solid waste (i.e. Bevil material).**

We assume you are requesting a listing of the solid waste management units (SWMU) at the facility. Attached is a list of SWMU's at the facility (Attached as

Exhibit 4). This information can be located in both Phase I (Table 1-3) and Phase II (Table 1-3) RI Reports. As to your request for an explanation why Asarco believes the material is solid waste due to the Bevil Amendment, we refer you to documents provided the Agency both pre and post signing the Agreed Order and the discussion under "b." above. See also 54 Fed. Reg. 36596, column 3, number 3 regarding application of the narrowing of the Bevil exclusions. (Attached as Exhibit 5)

d. The location of the materials received from Encycle, which were placed on the ground or stored in units/areas. Submit a separate plat clearly showing the nature and locations of storage and disposal unit/areas, which received the Encycle material.

The location of the Encycle material is noted on Exhibit 1. As you may recall from the meeting which representatives from the EPA, Asarco and the TNRCC (you) attended, the Encycle material was stored on the south side of the Unloading Building in an area designed for its temporary storage. The area is paved and drains towards a central collection point. This design was implemented to insure that if there were a rain event, any material would stay in the temporary storage area. The amount of material briefly held there never exceeded 2% of annual total smelted material. The storage and handling area was included in the original RI due to concerns regarding handling of these materials. This area was designated Investigation Area (IA)-8 which included all rail-yards, and the unloading and bedding buildings. The Phase I RI Report noted that three borings were advanced in the area of concern and that the soils exhibited some of the lowest concentrations of metals in the IA. Based on the inclusion of the Encycle material staging area as part of IA-8, EPA representatives indicated that the TNRCC had everything under control and that no further issue would be made as long as it remained part of the RI. Please refer to Section 3-8 of the Phase I RI Report and Section 3-9 of the Phase II Report for a complete description of soil and groundwater samples collected from this area.

In addition, since there was concern at the time about the potential impacts from Encycle material, a monitor well was proposed and installed as part of the Phase II RI. Again, results of the soil samples collected indicated that the soils are low in metals and, similarly, the groundwater collected exhibits some of the lowest concentrations of all the monitor wells sampled in IA-8. Please refer to Section 3-9 of the Phase II RI Report. A photo of this area is provided in Exhibit 1.

2. **Interim Corrective Measure**

In Asarco's Remedial Investigation Report dated October 9, 1998, Figure 2-38 "Arsenic Concentrations in Water", groundwater with elevated arsenic concentrations appears to have migrated beyond the facility's boundary in the western section of the plant. The groundwater flow direction is generally in the westward direction toward the Rio Grande. Railroad tracts and Paisano Drive are between Asarco's main plant property and Asarco's historic Smeltertown. The wells located adjacent to the western Asarco boundary are downgradient wells of the main plant property. One of these wells had the highest reported concentrations of arsenic in the groundwater (315 ppm). Monitor wells EP-57, EP-58 and EP-59 located on Asarco's upgradient side of the Smeltertown property and downgradient and across the Railroad tracks and Paisano Drive contained arsenic concentrations ranging from 1.0 ppm to 3.7 ppm. This appears as evidence that arsenic concentrations in the groundwater have migrated from Asarco's main plant property onto the adjacent landowner property (Railroad tracks and Paisano Drive) and back onto Asarco's Smeltertown property.

Since Asarco does not have authority to discharge contaminated groundwater onto adjacent property, please submit an Interim Corrective Measures Plan to address TNRCC's concerns with the elevated concentrations of arsenic in the groundwater near the facility boundary. The TNRCC directs Asarco to conduct interim corrective measures to prevent arsenic in the groundwater from migrating off-site. The interim corrective measures evaluation should be submitted in a plan which identifies interim

corrective measures to be executed and to abate any possible off-site migration of arsenic contamination related to the site. The plan should identify objectives of the proposed interim corrective measures and include: 1) design, construction, operation and maintenance requirements; and 2) schedules for design, construction monitoring and submittal of progress reports.

We are somewhat perplexed by the concern expressed by the Agency in item #2. As you note, this data was provided to the Agency in 1998. As we have previously set out, there is no impact on the American Canal or the Rio Grande from this groundwater and it is certainly not being utilized in any way to create an exposure route for humans. Accordingly, we believe the proposals contained in the most recent submission (7/2000) are appropriate for dealing with this issue.

As required by the 1996 Agreed Order, Asarco has provided the TNRCC the information with regards to remediation of groundwater. Please refer to Section 3 and Section 4 of both RI reports. Section 3 provides detail as to actual conditions at each IA including groundwater. Section 4 includes an overview of possible remediation technologies, a corrective action measure section which addresses each IA. cost details and estimates for remediation activities and schedule were included as exhibits in both reports.

Texas Natural Resource Conservation Commission

CONFERENCE RECORD

To: The File
Asarco - El Paso
Solid Waste Registration Number 31235

Thru: David Hastings, Supervisor
Team I, Corrective Action Section

From: Brad Wilkinson, Project Manager
Team I, Corrective Action Section

Date: Thursday, September 14, 2000 (1:00 - 3:30 p.m.)

Location: EPA Region 6, Dallas

Subject: Area of Contamination Proposal

Attendance: Lairy Johnson, Asarco El Paso, Environmental Manager
Kent Lang, ARCADIS Geraghty & Miller
Harold Kutz, Hydrometrics, Inc.
Keith Hopson, Brown, McCarrol & Oaks Hartline, Attorney
Bill Gallagher, EPA Region 6
David Vogler, EPA Region 6
Bruce Jones, EPA Region 6, Regional Counsel
Terri Sykes, EPA Region 6, Regional Counsel
Ata-Ur-Rahman, TNRCC Remediation Division, Section Manager
David Hastings, TNRCC Remediation Division, Supervisor
Brad Wilkinson, TNRCC Remediation Division, Project Manager
J. Mac Vilas, TNRCC Enforcement Division, Coordinator
Susan White, TNRCC Environmental Law Division, Counsel
Wayne Harry, TNRCC Waste Permits Division (by phone)
Richard Carmichael, TNRCC Waste Permits Division (by phone)

The purpose of the conference was to discuss the Area of Contamination (AOC) Concept and how it applies to Asarco El Paso. The major issues discussed are itemized below.

1. Asarco proposes to consolidate what the Company calls Category I (high metal concentration associated with groundwater contamination) materials into three former ponds (repositories). The ponds would be lined before any materials are disposed. The Company proposes that the former ponds will be excavated to native soils 4 to 15 feet before adding a synthetic liner to the bottom. EPA responded by emphasizing the need to run chemical analyses on the native soils

after the excavation of each and before Asarco adds the liner. Asarco would continue groundwater monitoring, and if necessary corrective action during and after the proposed consolidation of Category I materials to determine effectiveness of the remediation program.

2. Asarco stated that the slag does not leach and that it is hard to distinguish the old slag from the newer slag. Asarco did agree to collect slag at depth (apparent old slag) and the recent slag and run a leachate test on both samples and send the TNRCC the results. The nature of waste received, generated, managed and disposed at Asarco site was discussed. EPA's Bruce Jones stated that Asarco El Paso accepted Encycle material which was hazardous either Listed or Characteristic and that Asarco treated Listed waste at their facility. Asarco indicated that it disposed of demolition materials as follows: the refactory brick went to Waste Control Specialists; steel was classified as non-hazardous and was recycled; concrete was non-hazardous; and baghouse dust was sold to Asarco's East Helena facility for recycling.

3. Asarco stated that the fines in the ponds contain high concentration of metals and that the groundwater contamination surrounding the pond areas is due to the contaminated water from the ponds reaching the groundwater. There are three former ponds Asarco plans to excavate in addition to the fourteen other proposed excavations. The TNRCC expressed concerns that excavation waste from 14 proposed areas may not help in reducing the groundwater contamination because these areas do not appear to be the primary sources of contamination.

Asarco stated that vertical and lateral extent of excavation of Category I materials will be based on a pre-approved concentration level. Asarco mentioned that if the excavation did not remove all the Category I materials then Asarco would cap the area for cross-media protection.

4. Asarco claims that the groundwater attenuates metals in the groundwater. Asarco also stated that it is not economically feasible to pump and treat arsenic in the groundwater. Asarco claims that the intersection line between groundwater and the American Canal is south of Pond 1 during high water season, and that the American Canal acts like a losing stream. Weep holes in the Canal are roughly eighteen inches above the base of the Canal and the water in the Canal usually runs nine feet deep. The TNRCC pointed out that diesel was first discovered discharging into the Canal from Asarco's property and that the TNRCC collected a water sample from an expansion joint on the eastern side (Asarco's side) of the Canal which contained Arsenic concentration of 18 ppm. Asarco stated that the Company could not reproduce that result, but failed to state whether the Company sampled the same area or the water entering the Canal via an expansion joint.

The EPA made it clear that approval of AOC shall not be construed to apply to all the wastes generated at the site. Asarco agreed that the proposed engineering units will only be used to consolidate inorganic remediation waste directly associated with the mining operations.

after the excavation of each and before Asarco adds the liner. Asarco would continue groundwater monitoring, and if necessary corrective action during and after the proposed consolidation of Category I materials to determine effectiveness of the remediation program.

2. Asarco stated that the slag does not leach and that it is hard to distinguish the old slag from the newer slag. Asarco did agree to collect slag at depth (apparent old slag) and the recent slag and run a leachate test on both samples and send the TNRCC the results. The nature of waste received, generated, managed and disposed at Asarco site was discussed. EPA's Bruce Jones stated that Asarco El Paso accepted Encycle material which was hazardous either Listed or Characteristic and that Asarco treated Listed waste at their facility. Asarco indicated that it disposed of demolition materials as follows: the refactory brick went to Waste Control Specialists; steel was classified as non-hazardous and was recycled; concrete was non-hazardous; and baghouse dust was sold to Asarco's East Helena facility for recycling.

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The EPA made it clear that approval of AOC shall not be construed to apply to all the wastes generated at the site. Asarco agreed that the proposed engineering units will only be used to consolidate inorganic remediation waste directly associated with the mining operations.

5. Asarco stated that they have done a Base Line Risk Assessment (BLRA) which concluded that there are no human health threats. The TNRCC mentioned that a procedure in the BLRA was in error. A BLRA assumes no institutional controls and calculates current and future risk associated with the site. Asarco included biomonitoring of worker as an institutional control and excluded the workers in their BLRA calculations. The TNRCC also mentioned that biomonitoring of workers is not an institutional control and that prevention of exposure is the goal of the Risk Reduction Rules.

6. Asarco asserts that the AOC concept would eliminate the question as what material is Beville-exempted. Both the EPA and TNRCC made it very clear that an AOC concept approval is contingent upon the TNRCC and EPA accepting a comprehensive monitoring and remediation plan which includes but is not limited to soil assessment, groundwater assessment, demarcation of Category 1 material, limits of excavation, groundwater monitoring and remediation plans. Asarco agreed that the proposed engineering units will only be used to consolidate inorganic remediation waste directly associated with the mining operations. The proposal should also include a schedule necessary to determine whether the Risk Reduction Rules or the Texas Risk Reduction Program applies.

Brad Wilkinson

cc: Mr. Archie Clouse, Waste Program Manager, TNRCC Region 6 Office, El Paso

TNRCC

Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: 11/21/00 NUMBER OF PAGES *(including this cover sheet)*: 4

TO: Name Lairy Johnson

Organization

FAX Number (915) 521-3651

FROM: TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Name

Division/Region Corrective Action Section
Remediation Division

Telephone Number 512-239-

FAX Number 512-239-2346

NOTES:

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

October 23, 2000

Executive Director
C/O Brad Wilkinson
Enforcement Division
Texas Natural Resource Conservation Commission
12100 Park 35 Circle
Austin, Texas 78753

Re: **Technical Memorandums**
Closed Plant Evaluation Plans
ASARCO INCORPORATED (Asarco)
El Paso Copper Smelter

Dear Mr. Wilkinson:

Attached are four individual Technical Memorandums regarding Asarco's proposed investigation activities for the closed plants at the Asarco El Paso Copper Smelter. This sampling will be conducted to comply with the requirements to complete a closed plant evaluation as described in the Texas Natural Resource Conservation Commission (TNRCC) Agreed Order (Docket No. 96-0212-MLM-E). This document was prepared by Hydrometrics, Inc., Asarco's subcontractor on this project.

We understand that your office anticipated receipt of these Technical Memorandums separately with some time gap between each submittal. However, all four Technical Memorandums are now complete and we are forwarding them as a complete package.

We would appreciate your expedited review of these documents individually, or as a package, and look forward to (and thank you for) your timely response or responses.

Upon approval from your office, the investigations of the closed plant areas (Investigation Areas 15, 16, 17 and 18) will begin within 30 days.

Please provide any comments or approval(s) to me at (915) 541-1819 or to Harold Kutz of Hydrometrics, Inc. at (915) 532-3489, with follow-up written confirmation(s).

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments (4)

c: Archie Clouse - TNRCC, El Paso
Don Robbins - ASARCO, Inc.
R. Keith Hopson - Brown McCarroll & Oaks Hartline, L.L.P.
Harold Kutz - Hydrometrics, El Paso
Thomas Klempel - Hydrometrics, Tucson

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

December 5, 2000

Mr. Brad Wilkinson
Project Manager, Team One
Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711 –3087

Re: Response to Texas Natural Resource Conservation Commission Conference Record of September 14, 2000 received November 21, 2000, for ASARCO Incorporated – El Paso Smelter, El Paso, Texas.

Dear Mr. Wilkinson:

Following is a response to the Texas Natural Resource Conservation Commission (TNRCC) Conference Record concerning the Area of Contamination Meeting (AOC) conducted in Dallas, Texas on September 14, 2000. I received my copy on November 21, 2000.

Six points were summarized in the Conference Record by the TNRCC. We do not believe the Conference Record provided to us accurately summarizes the meeting.

In light of the fact, this document (which appears to be in final form), is couched as a document to our file. Asarco is concerned that if this document is permitted to remain in the file uncorrected, we risk that this less than accurate document will in the future be accepted as truth. Accordingly, we wish to formally document Asarco's recollection and interpretation of the six items outlined in the TNRCC's Confernce Record.

ASARCO Incorporated • P.O. Box 1111 • El Paso, Texas 79999 • (915) 541-1800 • Fax (915) 541-1866

Before we address the six issues noted in the TNRCC's Conference Record, Asarco would like to clarify that this meeting was first and foremost a meeting to discuss the application of the AOC concept at Asarco's El Paso Smelter. However, there was an agency agenda that ranged far afield from a discussion regarding AOC. Among these issues were:

- Process material handling,
- Slag,
- Ground water versus Canal Elevation,
- What is and what is not covered by the definition of a hazardous waste,
- Encycle material and handling, and
- The Asarco Phase II Consent Decree.

Asarco does not mind discussing the above issues with any agency representatives, however, we are concerned that much of what was discussed was not really relevant to the topic we had sought to meet on and resolve for quite some time. We believe we have been very patient with the speed at which the TNRCC has acted regarding this issue. We understand that the backlog at the agency is large. but we do expect that our issue will be addressed in a straightforward and professional manner. We have never hidden anything from the TNRCC and have always attempted to perform at a level meeting or exceeding the requirements of our Agreed Order. We are not positive that the TNRCC has reciprocated.

Until Asarco representatives directed the meeting back to the subject of AOC, our meeting might have concluded without any significant discussion on AOC. The purpose of the meeting was to determine if EPA had problems with Asarco's proposed use of the AOC concept at its El Paso Smelter. We believe EPA clearly indicated that it would not second-guess TNRCC's allowing utilization of an AOC at the Asarco Facility. We believe, and continue to believe, that utilization of an AOC is a proper, protective and pragmatic solution for the El Paso Smelter.

Finally, we would like to address what has been submitted to, and approved by the TNRCC. This timeline is very important evidence of why we feel that our project has not always received prompt, professional attention. The following is an abbreviated timeline of submissions and approvals:

- Asarco submits RI Work Plan – November 1996
- TNRCC approval of RI Work Plan – May 1997
- Asarco submits Phase I RI Report – October 1998

  Included: Full Assessment of Soil/Ground water/Surface Water
Risk Assessment
Corrective Action Goals
Corrective Action Technologies/Process Options
Corrective Action Alternatives
Preliminary Corrective Action Measures
Corrective Action Costs and Schedule
- TNRCC acceptance (with comments) of Phase I RI Report – June 1999
- TNRCC approval (with comments) of Phase I RI Report – December 1999
- At the request of the TNRCC, Asarco submits report on Area of Contamination Concept– May 2000
- Asarco submits Phase II RI Report – July 2000
- TNRCC requests information regarding waste management practices, Encycle material, and ground water contamination – July 2000
- Asarco submits response to TNRCC July 2000 letter – August 2000

For ease in addressing the matters memorialized by the TNRCC, the language from the TNRCC's Confernce Record has been repeated in bold type and is followed by Asarco's comments or response to each issue.

Please review what we have provided as a response to your observations of the meeting. We would be happy to discuss with you any and all of the content of this document. We look forward to quickly resolving the matter regarding our proposed AOC. Please do not hesitate to contact me at (915) 541-1819.

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments: see attached

Cc: Leigh Ing, TNRCC
Jackie Hardee, TNRCC
Ata-Ur-Rahman, TNRCC
David Hastings, TNRCC
Grace Nell Tyner, TNRCC
J. Mac Vilas, TNRCC
Susan White, TNRCC
Richard Carmichael, TNRCC
Archie Clouse, TNRCC
Bill Gallagher, EPA Region 6
David Vogler, EPA Region 6
Bruce Jones, EPA Region 6
Terri Sykes, EPA Region 6
Kent Lang, ARCADIS Geraghty & Miller
Harold Kutz, Hydrometrics, Inc.
Keith Hopson, Brown, McCarroll & Oaks Hartline

The purpose of the conference was to discuss the Area of Contamination (AOC) Concept and how it applies to Asarco El Paso. The major issues discussed are itemized below.

1. **Asarco proposes to consolidate what the Company calls Category I (high metal concentration associated with groundwater contamination) materials into three former ponds (repositories). The ponds would be lined before any materials are disposed. The Company proposed that the former ponds will be excavated to native soils 4 to 15 feet before adding a synthetic liner to the bottom. EPA responded by emphasizing the need to run chemical analyses on the native soils after the excavation of each and before Asarco adds the liner. Asarco would continue groundwater monitoring, and if necessary corrective action during and after the proposed consolidation of Category I materials to determine effectiveness of the remediation program.**

   Asarco generally agrees with the statements outlined in this paragraph. However, with regard to the issue of the excavation depths presented, these reported depths were a response to a question regarding the thickness of sediments in the bottom of the ponds before native soils are encountered. The 4 to 15-foot thickness discussed above are from the investigation of Pond No.5. Asarco is still waiting for Pond Nos. 1 and 6 to dry completely enough to begin to assess the vertical and horizontal extent of Category I material in these areas. Data obtained from this investigative phase will be the basis for the preliminary design for conversion of the ponds into disposal units. The pond sediment metals data presented in the Phase II RI Report suggests that elevated metal values occur in the uppermost 2 feet in Pond No.5. Asarco assumes conditions in the other two ponds will be similar, but until the investigation is completed, this is only an estimate.

2. **Asarco stated that the slag does not leach and that it is hard to distinguish the old slag from the newer slag. Asarco did agree to collect slag at depth (apparent old slag) and the recent slag and run a leachate test on both samples and send the TNRCC the results. The nature of waste received, generated, managed and disposed at Asarco site was discussed. EPA's Bruce Jones stated that Asarco El Paso accepted Encycle material which was hazardous either Listed or Characteristic and that Asarco treated Listed waste at their facility. Asarco indicated that it disposed of demolition materials as follows: the refactory [sic] brick went to Waste Control Specialists; steel was classified as non-hazardous and was recycled; concrete was non-hazardous; and baghouse dust was sold to Asarco's East Helena facility for recycling.**

Asarco would like to expand on the first sentence of the above paragraph concerning slag and leaching. Asarco has ascertained and reported in the RI that interaction of slag with low pH fluids potentially could have resulted in the releases of metals from slag to groundwater at the Asarco El Paso facility. However, the slag at the El Paso facility is not considered the source of metals under normal leaching conditions (i.e. rainfall, or other sources of non-acidic water). In addition, the low pH water that has been released at the plant (specifically in the area of the Acid Plants) has been high in metals. A sample that was collected after a release of scrubber water contained 92 mg/L of arsenic. The other source of elevated metals in water is from the ponds, although the metal concentration in pond water was not as high as the water that was released from the Acid Plant area. The average arsenic concentration in Pond No.6 (the active process water pond) was 1.56 mg/L and pH value of the water was greater than 8. Liquids from these unlined ponds (which were built in arroyos) would leak out and migrate to ground water.

Asarco does not agree with the TNRCC's second sentence in their paragraph above. Asarco did not agree to conduct any leachate testing of slag materials (old and/or new). We did mention that by Hydrometrics, Inc. conducted a modified testing program utilizing the synthetic precipitation leaching procedure (SPLP), at several Asarco project sites to access or quantify the leachablity of slag under more natural circumstances (i.e. less acidic conditions than the atypical TCLP test). The results of these studies indicated metal concentrations in the leachate are very low to non-detect.

Asarco never volunteered to obtain samples of old and new slag at depth and run any leachate tests. We did discuss that the slag at the plant does indeed pass the TCLP test and is not considered a hazardous waste. In addition, the discussion focused on the metals data from samples containing slag, which were analyzed and reported as part of the Phase I RI Report (submitted in October 1998). We discussed that the information was available and could be compiled and transmitted to Mr. William Gallagher, Region 6 EPA for informational purposes. Hydrometrics, on behalf of Asarco, submitted these results to Mr. Gallagher in October 2000.

3. **Asarco stated that the fines in the ponds contain high concentration of metals and that the groundwater contamination surrounding the pond areas is due to the contaminated water from the ponds reaching the groundwater. There are three former ponds Asarco plans to excavate in addition to the fourteen other proposed excavations. The TNRCC expressed concerns that excavation waste from 14 proposed areas may not help in reducing the groundwater contamination because these areas do not appear to be the primary sources of contamination.**

Asarco stated that vertical and lateral extent of excavation of Category I materials will be based on a pre-approved concentration level. Asarco mentioned that if the excavation did not remove all the Category I materials then Asarco would cap the area for cross-media protection.

Asarco agrees with the representation that pond fines are high in metals in the historic pond areas. The RI has provided data linking the preferential flow paths formed by the historic slag filled arroyos (in which the ponds were built) to the impact of groundwater down gradient of the ponds. Once again, we believe it is the heavily metal laden fluids flowing through the highly permeable slag filled arroyos that impact the groundwater. not leaching from any underlying slags.

Asarco does not agree with the content of the third sentence in the first TNRCC paragraph above. In this meeting, the TNRCC representatives never indicated to us any concerns relating to the proposed (and TNRCC accepted) corrective action measures outlined in the RI Report submitted to TNRCC in October of 1998. If there are concerns with the corrective action plan. Asarco should be provided a detailed and logical explanation.

Asarco does not agree with the content of the second TNRCC paragraph above. Asarco never indicated that the control of excavation limits for Category I materials will be based on a pre-approved concentration level. Asarco continued to emphasize that the heart of the remediation approach was to be protective of the ground water (which we believe will be more restrictive than the rule). Asarco indicated to the TNRCC at the meeting that there are some areas of concern that would be ignored when a strict concentration based standard is applied to the entire site and that some areas in which groundwater appears to be impacted would be overlooked. Each area to be remediated will be evaluated as to the type of corrective action applied and to what specific limits. This is a very important part of the remedial action plan as provided in both RI Reports dated October 1998 and July 2000.

Asarco did state that if clean up levels were established in accordance with Standard No. 3 of the Risk Reduction Rules, that it is highly likely that the permitted soil contamination levels that could be left in place, could potentially be non-protective of the groundwater. However, based on the exposure pathway analysis, groundwater at and in the vicinity of the site is not used for drinking purposes, therefore, groundwater is not an issue. Furthermore, fate and transport modeling indicated that the current metal concentrations in groundwater at the plant are protective of surface water in the Rio Grande. Asarco did state that proposed corrective actions outlined in the RI reports would be utilized to attain the remediation goals of the project.

4. **Asarco claims that the groundwater attenuates metals in the groundwater. Asarco also stated that it is not economically feasible to pump and treat arsenic in the groundwater. Asarco claims that the intersection line between groundwater and the American Canal is south of Pond 1 during high water season, and that the American Canal acts like a losing stream. Weep holes in the Canal are roughly eighteen inches above the base of the Canal and the water in the Canal usually runs nine feet deep. The TNRCC pointed out that diesel was first discovered discharging into the Canal from Asarco's property and that the TNRCC collected a water sample from an expansion joint on the eastern side (Asarco's side) of the Canal which contained Arsenic concentration of 18 ppm. Asarco stated that the Company could not reproduce that result, but failed to state whether the Company sampled the same area or the water entering the Canal via an expansion joint.**

The EPA made it clear that approval of AOC shall not be construed to apply to all the wastes generated at the site. Asarco agreed that the proposed engineering units will only be used to consolidate inorganic remediation waste directly associated with the mining operations.

Asarco basically disagrees with the recap portion of this statement. The discussion actually centered on the fact that aquifer materials would attenuate metal in the groundwater.

In regards to the TNRCC water sample with a reported arsenic concentration of 18 ppm, Asarco did state that it has not had the opportunity or ability to sample water from either the weep-holes or the expansion joints in the American Canal due to safety concerns. Asarco informed the TNRCC that when low flow conditions occur and the weep holes and the normally submerged portions of the expansion joints are exposed that there is a wetting effect rather than a "flow" of water. Asarco mentioned in the meeting that since this "sample" was collected by the TNRCC without Asarco being given the opportunity to split samples, and no details were provided regarding the location, methodology or time of sample collection, there have been many questions regarding the sample's validity. EPA representatives asked if Asarco questioned the validity of the sample. Asarco responded by indicating that in sampling the American Canal in high and low water flow situations that the arsenic concentration obtained from the water sample collected by TNRCC is significantly out of line with the results obtained in the last 14 calendar quarters of water samples collected from the canal regardless of location (upgradient, adjacent to, or downgradient) to the plant. In addition, given the minimal amount of water available from the weep holes and expansion joints, we believe it is highly unlikely that proper sampling methodology was followed.

In regards to what material will be placed into a disposal unit (repository), Asarco has consistently stated that the proposed engineered units, on-site repositories, landfills or disposal sites (whichever you choose to call them) are solely for the remediation derived waste materials, whether hazardous or non-hazardous. The inclusion of the words inorganic and mining operations, by the TNRCC, is in error, as Asarco representatives never used these words in the meeting. The TNRCC may be confused by the discussion that occurred concerning the placement of the remediation wastes. We did discuss that the disposal site (onsite repositories) remediation wastes back-fill would not produce leachate like organic wastes in a typical municipal landfill, which are primarily organic in nature.

Asarco would also like to reemphasis that the operation in El Paso, Texas is a Primary Copper Smelter and not a mine as indicated by the TNRCC in these notes. At no time in the 100+ year operation of the facility has Asarco conducted mining at the site.

5. **Asarco stated that they have done a Base Line Risk Assessment (BLRA) which concluded that there are no human health threats. The TNRCC mentioned that a procedure in the BLRA was in error. A BLRA assumes no institutional controls and calculates current and future risk associated with the site. Asarco included biomonitoring of worker [sic] as an institutional control and excluded the workers in their BLRA calculations. The TNRCC also mentioned that biomonitoring of workers is not an institutional control and that prevention of exposure is the goal of the Risk Reduction Rules.**

This statement is most puzzling. Our recollection is that the conversation regarding the issue of biomonitoring occurred subsequent to the formal meeting. Most of the attendees from the formal meeting had already left the conference room. Participants in this conversation were Brad Wilkinson of the TNRCC, Lairy Johnson of Asarco, and Asarco's technical consultants. The only part of the above description of the conversation that was discussed was that Mr. Wilkinson did not like the idea that biomonitoring of workers is an institutional control. Mr. Wilkinson considered biomonitoring a reactive control rather than an institutional control. Asarco disagreed and no more was said about the subject.

Since Mr. Wilkinson opinioned that the Base Line Risk Assessment (BLRA), (which was presented as Appendix L of the Phase I RI Report submitted in October 1998), was in error. we will address his issues. as this discussion was not included in the Conference Record. The inability of agency staff to understand Asarco's submission and various other matters concerning this project is of grave concern to Asarco and is leading to significant delays in working towards the remediation goals of the project.

In response to the first sentence from the TNRCC paragraph above, based on data from the RI and the BLRA. no imminent health threats exist from environmental contamination from the Asarco, El Paso Smelter site. This is due to the facts that potential risk to workers from exposure to soils are appropriately managed, there are no exposure routes to groundwater, and metals concentrations in surface waters are below health-based levels of concern.

The meaning of the second sentence in the TNRCC's Conference Record's paragraph is not clear. We do not understand to which procedures the TNRCC is referring.

In response to the TNRCC's third sentence from the paragraph above, the BLRA clearly states that Asarco has implemented an institutional control to address the potential exposure of contaminated soil by on-site workers. The current and future risks associated with the site were not estimated because it was not necessary or applicable at this time. Basically, the BLRA identified available exposure pathways, compared site-specific concentrations to TNRCC default risk-based values and recommended corrective actions. For instance:

As to on facility surface soils, we state that except for arsenic (As), lead (Pb), and cadmium (Cd), facility metal concentrations did not exceed the TNRCC published Industrial Use Standards for the Soil/Air Ingestion pathway (SAI-Ind). We also note that Asarco provides employee monitoring for As, Pb, and Cd in accordance with OSHA requirements and the facility is in compliance with this bio-monitoring program. This institutional control precludes the need for further remedial action at the site to protect facility worker's health.

As to the Smeltertown surface soils: surface soil concentrations at the time of the preparation of the BLRA only exceeded the default TNRCC SAI-Ind standards for arsenic. The Upper Confident Limit of the Mean (UCLM) estimated for As was 64 mg/kg. The SAI-Ind value estimated for As. using specific site parameters. was 7.2 mg/kg. However, the Medium Specific Concentration for As for the SAI-Ind standard was revised on September 11. 1998, to a value of 200 mg/kg (please see TNRCC memo "Arsenic Soil Cleanup Standards for Commercial/Industrial Areas").

In response to the TNRCC's fourth sentence, Asarco considers biomonitoring of workers as an institutional control. The implementation of an institutional control is a legally binding instrument that the responsible party may use as part of a corrective action plan to control or eliminate an otherwise viable exposure pathway to ensure that the exposure to remaining substances is reduced to a human health and environmentally protective level. In other words, the paramount objective of the implementation of an institutional control is to qualitatively eliminate a specific pathway. From a risk point of view, Asarco is not aware if the risk associated with the implementation of a control (engineering or institutional) can be numerically quantified. What Asarco knows is that ***"if there is no exposure potential, there is no Risk".*** Furthermore, the monitoring is legally required; therefore, it appears to meet the definition of an institutional control.

In response to the TNRCC's fifth sentence, the statements appear to contradict each other. The goal of the implementation of a bio-monitoring program is to prevent the exposure (chronic effects) of contaminant(s). It is questionable that biomonitoring is not considered to be a valid institutional control by the TNRCC. As indicated in the previous paragraph, the implementation of an institutional control is a legally binding requirement that a responsible party may use to address site contaminants. Institutional controls may include land record notice, land use restrictions, land access restrictions, medical bio-monitoring or other controls legally binding and practicably feasible.

In order to attain the ***Risk Reduction Standard No. 3***, Asarco chose to close/remediate with controls (engineering or institutional) the El Paso facility, as required in 30 TAC, 335.561 ***(Attainment of Risk Reduction Standard No. 3: Closure/Remediation with Controls***). Also, please note that upon completion of closure/remediation requirements (and within 90 days after TNRCC approval), Asarco will record in the El Paso County deed records all appropriate information as required in 30 TAC, 335.566 ***(Deed Recordation for Risk Reduction Standard No. 3)***.

6. **Asarco asserts that the AOC concept would eliminate the question as what material is Beville-exempted. Both the EPA and TNRCC made it very clear that an AOC concept approval is contingent upon the TNRCC and EPA accepting a comprehensive monitoring and remediation plan which includes but is not limited to soil assessment, groundwater assessment, demarcation of Category I material, limits of excavation, groundwater monitoring and remediation plans. Asarco agreed that the proposed engineering units will only be used to consolidate inorganic remediation waste directly associated with the mining operations. The proposal should also include a schedule necessary to determine whether the Risk Reduction Rules or the Texas Risk Reduction Program Applies.**

Asarco disagrees with the TNRCC's second sentence in the paragraph above. The issue of AOC concept approval is more of an issue with the TNRCC. As a matter of fact, Mr. Bruce Jones of the EPA at the September 14, 2000 meeting indicted that the agency would not second-guess the TNRCC's approval of an AOC at the site. The TNRCC has previously approved use of an AOC to fill a former process pond to be closed at the Dow – Freeport, Texas facility. We are certainly unclear as to why the agency has been so slow to approve the proposed use of an AOC by Asarco.

Approval of the AOC concept, by the EPA, is not required by Federal guidelines. However, to maintain communication with participating parties and because pond closure is addressed by the TNRCC Agreed Order. Asarco is actively seeking a consensus with the State of Texas on use of the AOC concept.

Asarco respectively reminds the TNRCC that the comprehensive monitoring and remediation plan (which includes, but is not limited to, soil assessment, groundwater assessment, demarcation of Category I material, limits of excavation, groundwater monitoring and remediation plans) has been provided in the previously submitted RI Reports, which were submitted in October 1998 (Approved) and July 2000 (Pending). The AOC concept is a legitimate tool to initiate remediation of the project site.

Asarco once again reiterates that the engineering units, on-site repositories, disposal sites, constructed as part of the AOC will receive only remediation derived wastes arising from this Remedial Investigation. The word "inorganic" was never used to define the term "remediation waste" at any time during the meeting, but we expect there to be little organic material. As we noted previously Asarco has never conducted mining at this smelter site.

Asarco stated in the meeting that the Phase I Remedial Investigation indicated that Asarco intends to utilize Standard No.3 under the Risk Reduction Rules on this project. The Remedial Investigation Work Plan submitted to TNRCC in November of 1996, indicated that all work at the Asarco facility would be performed in accordance with 30 TAC, Chapter 335, Subchapter S, Risk Reduction Standards. Moreover, to comply with the notification and initiation requirements for the implementation of a Standard No. 3 remediation, as required in 30 TAC§, 335.s61, Asarco submitted to TNRCC a Remedial Investigation Report in October of 1998 containing the information specified in 30 TAC 335.553(b) ***(Required Information for Risk Reduction Standard No. 3)***.

There was even a discussion initiated by the TNRCC regarding an upcoming deadline regarding the use of the Risk Reduction Rules and the start of corrective action. The TNRCC indicated that if no corrective action were begun by May 2001, then the project would have to utilize the new Texas Risk Reduction Program. Asarco responded that they were well aware of the deadline and that the deadline would not be an issue if the TNRCC staff was reasonably responsive on this project. As an example, the TNRCC usually takes 90 days to respond to a submittal. In our case the response time for the Phase I Remedial Investigation Approval was approximately 9 months. It appears that much of the delay is in part due to the fact that the admittedly busy TNRCC staff has had difficulty understanding the details of the RI Reports.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

RECEIVED

JAN 0 2 2000

ASARCO INC.
EL PASO PLANT
ENVIRONMENTAL

December 22, 2000

Mr. Lairy Johnson
Environmental Manager
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

RE: Asarco's Area of Contamination (AOC) Proposal
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed Asarco's request for approval of a plant-wide AOC to manage/consolidate waste generated from the Facility's smelting operations. The AOC concept is applicable only to management of materials subject to the Resource Conservation Recovery Act (RCRA). It is our understanding that the waste Asarco intends to consolidate meets the exclusions under 40 CFR 261.4, therefore, the waste is not considered hazardous waste and the AOC concept is not applicable. In order to expedite cleanup of the site, Asarco is allowed to manage solid waste which meets 40 CFR 261.4 exclusions without the cover of an AOC, and in accordance with the provisions of the TNRCC Agreed Order and applicable regulations.

Questions concerning this letter should be directed to Mr. Brad Wilkinson at (512) 239-2350. Please use Mail Code 127 (MC127) when responding by mail.

Sincerely,

for Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division

BW/bw

cc: Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch, Dallas
Waste Program Manager, TNRCC Region 6 Office, El Paso

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

THE STATE OF TEXAS

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

January 18, 2001

Mr. Lairy Johnson
Environmental Manager
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

520-798-7783
Rudolfo Rubio

RE: Asarco Closed Plant Evaluation Plans
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has received Asarco's Closed Plant Evaluation Plans dated October 23, 2000. Although activities proposed in the workplan were not technically reviewed, authorization to proceed with the workplan is granted for the investigation of the Closed Plant areas. All activities must be conducted in accordance with the directives contained in this letter, 30 TAC §335.8 and any other applicable regulations. The final report submitted after the workplan activities have been completed is subject to TNRCC technical review. If the TNRCC determines that a self-implemented response action is inappropriate, then the TNRCC will require appropriate response actions to be taken.

The TNRCC Region 6 Office - El Paso must be notified at least ten (10) days prior to any well installation or soil/ground-water sampling activity to allow Region personnel the opportunity to observe these events and collect samples.

To promote consistency in the investigation and within the Agreed Order, please collect and analyze soil samples with the methods approved in Asarco's Remedial Investigation Workplan. It appears that Asarco is non compliant with Ordering Provision (5)c of the Agreed Order, the determination of background conditions in the environmental media, and with Ordering Provision (8) of the Agreed Order, the time frame for submission of the Closed Plant Evaluation Plan.

Please note that it is the continuing obligation of persons associated with a site or facility to ensure that industrial solid wastes and/or municipal hazardous wastes are managed in such a way that it does not cause a discharge or wastes or an imminent threat of discharge, nor a nuisance or an endangerment to either human health or the environment as required by 30 TAC §335.4. Be advised that the burden remains upon the owner/operator to take necessary and authorized action to correct such conditions whenever they exist.

An original and one copy of the Closed Plant Evaluation Report(s) should be submitted to the Corrective Action Section within ninety (90) days from the date of this letter. An additional copy should be submitted to the TNRCC Region 6 Office in El Paso, Texas. The TNRCC Solid Waste Registration Number should be referenced in all submittals.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission

BW/bw

cc: Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch-Dallas
Waste Program Manager, TNRCC Region 6 Office-El Paso

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

February 7, 2001

Mr. Brad Wilkinson
Project Manager, Team One
Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711 -3087

Re: **Response to Texas Natural Resource Conservation Commission Conference Letter of January 18, 2001, regarding the Closed Plant Evaluations, for ASARCO Incorporated – El Paso Smelter, El Paso, Texas.**

Dear Mr. Wilkinson:

Following is a response to your letter of January 18, 2001 regarding the Closed Plant Evaluations. Thank you for your timely return of authorization to proceed with this project. We will perform all the necessary investigations in accordance with the Texas Natural Resource Conservation Commission (TNRCC) approved Remedial Investigation Work Plan (November 1996). However, we are somewhat concerned by the agency's apparent lack of review of this project's work plans. While we understand that we have submitted many large and detailed work plans for investigations, we would prefer that any agency approval follow review of the submission, particularly if unreviewed approval comes with the possibility of subsequent agency modifications to the plans.

We are concerned with your third paragraph in which you describe apparent non-compliant issues with Agreed Order Provisions (5)c and (8). With regards to (5)c on the determination of background conditions, during the implementation of the Phase I and Phase II Remedial Investigation activities, a sufficient number of samples (soil, groundwater, surface water) were collected to address the requirements of (5)c of the

Agreed Order. We have collected and sampled approximately 1300 soil samples from 217 soil borings, over 1100 ground water samples from 80 monitor wells and over 125 surface water samples from the Rio Grande and American Canal. Data obtained from these sampling activities has been used to generate groundwater gradient maps. to evaluate the trend of metal concentrations and to determine background groundwater concentrations. Note that Section 2.1.2 of the Phase II RI Report indicates that ***"monitor wells EP-84, EP-86 and EP-87 are considered the most representative background monitor wells because they are the farthest northeast from facility activities"***. This data has been the cornerstone of both the Phase I and Phase II RI Reports. In addition this data has been used to make corrective action decisions for each Investigation Area.

With regard to the concern over non-compliance with Agreed Order Provision (8), in November 22, 1996, Asarco submitted to Mr. John L. Sadlier a letter report entitled ***"Submittal of Proposed Closed Plan Evaluation Plan"***. Within this Plan was how we are going to perform the Closed Plant Evaluations. The timing issue was discussed as submitting the Technical Memorandums (TMs), prior to completion of closure activities. These TMs were submitted prior to completion of closure activities on October 23, 2000 with closure activities completed on November 29, 2000.

Please refer the Remedial Investigation Work Plan dated November 1996, the Proposed Closed Plant Evaluation Plan submitted November 1996 and the Remedial Investigation Reports dated October of 1998 and July 2000 for a more detailed information of the different remedial investigation activities that Asarco has implemented to comply with the Agreed order.

In addition, as we discussed in a telephone conversation on January 23, 2001, regarding the timeline of 90 days that you had established for the Closed Plant Evaluations, at your request, we are providing you a detailed project outline which includes the completion of all investigations as well as providing you a report. The attached timeline is approximately 150 working days with a submittal date of August 31, 2001.

Finally, I feel that I need to raise the issue of how we have been communicating with your agency on project issues. I would like to offer an invitation to you and your team to feel free to contact us by telephone regarding issues of concern, rather than notifying us of your concerns via official state document. We have always been happy to discuss with you and your team any comments or suggestions that the agency may have regarding this project. We look forward to quickly resolving these matters. Please do not hesitate to contact me at (915) 541-1819.

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments: see attached

Cc: Leigh Ing, TNRCC
Jackie Hardee, TNRCC
Ata-Ur-Rahman, TNRCC
Grace Nell Tyner, TNRCC
Susan White, TNRCC
Archie Clouse, TNRCC
Bruce Jones, EPA Region 6
Terri Sykes, EPA Region 6
Kent Lang, ARCADIS
Arturo Burgos. Hydrometrics, Inc.
Keith Hopson, Brown McCarroll & Oaks Hartline

Hydrometrics, Inc.®
consulting scientists and engineers

MEMORANDUM

DATE: February 13, 2001

TO: Brad Wilkinson

FROM: Harold Kutz

SUBJECT: El Paso Corrective Action Implementation Schedule

Please find the amended Corrective Action Implementation Schedule for the El Paso Plant. In response to Mr. Ata-Ur-Rahman preference, as discussed in the Dallas meeting, of receiving a complete Engineering package for the project(s), all the Remedial Design and Investigation activities for the various Investigation Areas have been grouped together in 2001 - 2002

This schedule also includes detailed information for the Close Plant Evaluation, previously submitted to your office.

If you have any questions concerning this information or schedule, please call me at (915) 532-3489

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

RECEIVED
FEB 20 2001
ASARCO INC.
EL PASO PLANT
ENVIRONMENTAL

February 14, 2001

Mr. Lairy Johnson
Environmental Manager
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

CERTIFIED MAIL # 9036
RETURN RECEIPT REQUESTED

RE: Comments to *Asarco El Paso Copper Smelter Phase II Remedial Investigation Report El Paso, Texas*
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the Phase II Remedial Investigation Report dated July 10, 2000. Please address the following TNRCC comments to the Phase II investigation in a Phase III report.

1. In the June 25, 1999 letter the TNRCC expressed concern over a basic assumption in the Baseline Risk Assessment (BLRA) for the Asarco El Paso facility. In Appendix A of the Phase II investigation Asarco responded to the June 25, 1999 TNRCC letter and expressed confidence in their BLRA assumptions. The Corrective Action staff provide Asarco's BLRA to the Toxicology and Risk Assessment (TARA) Section of the TNRCC for comments. Please review and address TARA's comments in the enclosure with this letter.

2. In order to meet the requirements of 30 TAC §335.553, Asarco must define the full nature and extent of contamination to background for all media at the site. Asarco should formally propose background concentrations for all media at the site. Asarco has mentioned a range of groundwater values that they believe are naturally occurring for three of the eight metals of concern and has not developed background concentrations for soil. Extent of contamination is necessary to fulfill the TNRCC Risk Reduction Rules (RRR) and will help identify possible receptors in the BLRA. Therefore, it is suggested that before a revised BLRA is submitted the full extent of contamination should be defined.

3. In the Northern section of the facility please further define the extent of groundwater contamination between monitor wells EP-80 and EP-59. Also, please fill in the groundwater data gap between the American Canal and wells EP-80 and EP-59. This area is the discharge point for two separate arroyos, in which the groundwater contains some of the

highest arsenic concentrations. Please define the extent and fill the data gaps in the area surrounding monitor wells EP-66, EP-111, EP-116 and EP-117. Data gaps are areas in which there are at least two separate points with information (in this case arsenic) and no points correlating the information together. Monitor well EP-111 contains arsenic values greater than the federal Maximum Contaminant Level (MCL) adjacent to the Rio Grande. Please define the full lateral extent of contamination in the area of monitor wells EP-29, EP-35 and EP-118. This is the area in which Asarco claims groundwater intersects the American Canal.

In Appendix A of the Phase II report, Asarco responds to the TNRCC's concern about groundwater flow in the American Canal. Asarco claims that because of hydrostatic pressure no elevated metals are found in the Canal when water is present in the American Canal. The TNRCC believes that it is the hydraulic head which acts on the water in the Canal and on the groundwater. Asarco has not demonstrated that the difference in head is preventing the groundwater from flowing into the American Canal.

Asarco has additional monitor wells at the site which were not identified on the plats that were submitted. These wells are associated with the diesel spill, but may also provide information for corrective measures. Please identify all the monitor wells at or associated with Asarco El Paso facility. Please further investigate the groundwater associated and surrounding EP-20 and EP-75. These wells have arsenic concentrations greater than the MCL value. Well EP-20 is adjacent to the property line and is associated with a former arroyo discharge point and although well EP-75 doesn't appear to be associated with a former arroyo, the TNRCC is concerned about the source of the contamination surrounding this well.

4. Asarco has presented average groundwater concentration data in the Phase II report. Provide groundwater analyses for each monitor well and date of when that monitor well was sampled. Do not average the concentration for each well.

5. Asarco states that groundwater modeling indicates that it would take between 280 to 540 years for concentrations of concern (COC) to reach the Rio Grande River. However, there is evidence that arsenic may have already impacted the Rio Grande. Monitor Well EP-111 had arsenic values in the groundwater significantly higher than the MCL. Groundwater background concentrations for arsenic have not been formally established, however, there are several upgradient wells and surface water sampling points along the Rio Grande with arsenic concentrations below the MCL established for arsenic.

6. Asarco proposes additional borings, which may include monitor wells for Investigation Areas 2, 8, 11, 12, and 14. The proposal does not require TNRCC technical review prior to implementation and you may proceed with the investigation of contaminated media at your facility. The final investigation report to be submitted after the investigation activities are completed is subject to TNRCC technical review. Please provide a detailed explanation and study of the mechanism(s) that Asarco believes is the cause for potential releases from the site or for each of the investigation areas with potential groundwater impacts.

The TNRCC Region 6 Office - El Paso must be notified at least ten (10) days prior to any well installation or soil/ground-water sampling activity to allow Region personnel the opportunity to observe these events and collect samples.

Please note that it is the continuing obligation of persons associated with a site or facility to ensure that industrial solid wastes and/or municipal hazardous wastes are managed in such a way that it does not cause a discharge or wastes or an imminent threat of discharge, nor a nuisance or an endangerment to either human health or the environment as required by 30 TAC §335.4. Be advised that the burden remains upon the owner/operator to take necessary and authorized action to correct such conditions whenever they exist.

An original and one copy of a Phase III Report(s) delineating the full horizontal and vertical extent of contamination in all affected media and which addresses comments in this letter and in the Enclosure must be submitted to the Corrective Action Section within two hundred seventy (270) days from the date of this letter. An additional copy should be submitted to the TNRCC Region 6 Office in El Paso, Texas. The TNRCC Solid Waste Registration Number should be referenced in all submittals.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission

BW/bw

Enclosure

cc: Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch-Dallas
Waste Program Manager, TNRCC Region 6 Office-El Paso

TNRCC letter dated February 14, 2001
ENCLOSURE 1
TNRCC SWR No. 31235
Asarco El Paso BLRA Review

Overall Evaluation

Overall, TARA does not believe that the BLRA adequately characterizes the "baseline risks" at the Asarco, El Paso facility. The specifics of this conclusion are detailed as "Risk Assessment Issues" below. Although Asarco may be anticipating corrective action plans that will address the unacceptable contaminant levels at their facility, the BLRA is inadequate because it does not clearly indicate the presence of metals at unacceptable levels both in soil and groundwater, and does not address off-site contaminants in a quantitative manner.

Risk Assessment Issues

1. **Exposure Pathways Chart (Figure L-1).** The exposure pathways chart is incomplete and should consider both current and future exposures. Site-specific factors, like exposure frequency, can be incorporated into the current exposure analysis; however institutional or engineering controls are not allowed as a justification for ruling out exposure scenarios or pathways when evaluating either current or future exposures for a BLRA (Sec. V, TNRCC 1998). Asarco might consider including two flowcharts, one for current exposures and one for future exposures. As explained in Section VII of the TNRCC interoffice memorandum "Implementation of the Existing Risk Reduction Rule" (Consistency Document), the dermal pathway should be considered for on-site and off-site surface soil exposure (TNRCC 1998). The Consistency Document can be downloaded from the TNRCC website at the following address: http://www.tnrcc.state.tx.us/permitting/rrr.htm. Potential future groundwater ingestion should be included for both on-site and off-site exposures. A quantitative evaluation of off-site residents should be performed, not just a qualitative evaluation.

2. **On-Site Workers.** A BLRA should evaluate current worker exposure in the absence of controls (30 TAC Sec.335.553(b)(2)). This evaluation would demonstrate the need for institutional controls and/or clean-up by indicating that elevated levels of metals exist at the Asarco property. In addition, since there are significant uncertainties associated with predicting likely future activity at a site, a future worker should be considered by Asarco. This evaluation should consider all appropriate exposure pathways as discussed in the 1993 Risk Reduction Rule (1993 rule) and the Consistency Document (see Item 1).

   Levels of arsenic, cadmium and lead exceed levels of concern at much of the facility. However, in the BLRA Asarco makes the statement that the company "provides employee biomonitoring for arsenic, lead and cadmium in accordance with OSHA requirements, and is in compliance with this biomonitoring program. This institutional control precludes the need for further remedial action at the site to protect on-facility worker health." The issue of biomonitoring was initially addressed in TNRCC comments on the Asarco Phase I RI-

Report. While Asarco responded to the TNRCC comments in Appendix A of the Phase II RI, the response did not properly address current workers and neglected to consider future workers. Biomonitoring does not meet the requirements of 30 TAC Sec. 335.562(c) concerning long-term effectiveness and permanence. The goal of a remedy is to prevent current and future exposure to unacceptable levels of contaminants, not to biomonitor for exposures that have already occurred. A discussion of the appropriate use of engineering and institutional controls is provided in Section V of the Consistency Document.

3. **Off-Site Residents.** Since air dispersion modeling is being used to predict air concentrations for off-site worker exposure, then modeling should be used to predict off-site residental air exposures as well. Asarco indicates that low-volume air monitoring from the nearby executive center indicates compliance with health-based standards for metals, but no data are presented. Asarco states that historic emissions may have deposited contamination in the residential area to the north of the slag pile, but there are no soil data from the residential area that would allow an evaluation. As discussed in Item 1, a complete BLRA must consider a quantitative evaluation of off-site residential exposure, particularly since the nature and extent of the metal contamination has not been fully delineated by Asarco (see Item 10). The quantitative evaluation should consider standard exposure pathways discussed in the 1993 rule and the Consistency Document.

4. **Off-Site Workers.** Air exposures are being evaluated using air dispersion modeling. Appropriate TNRCC staff should review this modeling. No direct evaluation of off-site soil exposures are evaluated, just incidental ingestion of windblown dust and fugitive air emissions. The potential for off-site soil exposures should be considered at any adjacent property where future uses could expose workers, particularly since nature and extent information is lacking (see Item 10). The evaluation should consider standard exposure pathways discussed in the 1993 rule and the Consistency Document.

5. **Loading of Contaminants to Surface Water.** The fate and transport model in Appendix K which evaluates future potential contaminant loads to surface water bodies and resulting surface water concentrations should be evaluated by appropriate TNRCC staff. A discussion of the model results is presented in Section 5.5 of Appendix L.

6. **Inhalation Rate Adjustment.** Although Asarco explains that the off-site worker evaluation is focusing specifically on office workers and would like to adjust the worker inhalation rate downward to 15 m^3/day, TARA does not agree that this is an appropriate adjustment. As discussed in Section X.1 of the Consistency Document, inhalation toxicity values in the EPA Integrated Risk Information System (IRIS) are now expressed in terms of concentrations in air (reference concentrations (RfCs) and unit risk factors (URFs)) and not in terms of dose (i.e., as for inhalation reference doses and inhalation slope factors in units of mg/kg-day).

These toxicity factors already incorporate an inhalation rate of 20 m^3/day. Due to the inability to accurately predict the type of future work that may take place at a commercial/industrial (C/I) facility, Asarco should not adjust the inhalation rate, as the IRIS values will be protective of either an office worker or an outdoor C/I worker (Sections X.1 and X.1.1, Consistency Document).

7. **Adult Lead Exposure.** Asarco makes the statement, "While the EPA has developed the Integrated Exposure Biokinetic Model for lead in children, no model has been developed by the EPA for evaluating lead exposure in adults." The EPA has developed an adult lead model which is available from U.S. EPA Region 6. The TNRCC recognizes the use of this model, discusses its use, and presents an acceptable list of default parameters in the currently available Texas Risk Reduction Program (TRRP) rule (30 TAC Sec. 350.76(c)). Although Asarco is evaluating their site under the 1993 Rule, they are still allowed to use the EPA adult lead model with acceptable TNRCC inputs to calculate a C/I clean-up level. Asarco should use the EPA adult lead model to calculate soil clean-up levels for lead, not the Bowers model that is presented in Attachment L-3.

8. **Toxicity Factors (Section 4.0) and Toxicity Profiles (Attachment L-4).**

    1. Many of the toxicity factors cited in Section 4.0 of Appendix L and in Attachment L-4 are either outdated or incorrect. In July of 1998, the TNRCC promulgated the Consistency Document, which provided additional and up-to-date toxicity factors. According to Asarco's own timeline, the Phase I RI Report was submitted in October 1998, several months after the promulgation of the Consistency Document. Therefore, many of the toxicity factors cited in the Asarco profiles were out of date, even at the time of the Phase I submittal.
    2. The residential (SAI-Res) and C/I (SAI-Ind) medium-specific concentrations (MSCs) that Asarco cites in Tables L-4 and L-5 are outdated and should be updated to reflect the values associated with the Consistency Document which incorporate the dermal exposure pathway. These MSCs that incorporate the latest toxicity information and the dermal exposure pathway replaced the MSCs in the 1993 rule Appendix II Table (30 TAC Sec. 335.568).
    3. The TNRCC has established a policy number for clean-up of arsenic at residential and at commercial industrial sites, so that calculation of an MSC from a toxicity factor is not necessary (Consistency Document).
    4. It is inappropriate to assume that inhalation reference doses (RfDs) are equivalent to oral RfDs as route-to-route extrapolation is not recommended by the EPA in most cases (p. 4-5, EPA 1994). Acceptable RfCs (see Item 6) can be found in the updated toxicity factors table associated with the Consistency Document.

9. **Reasonable Maximum Exposure (RME) Concentrations.** Although Asarco's RME calculations are done appropriately, there is no discussion of exposure area size or location. Asarco should demonstrate that their exposure areas are appropriate as discussed in Section IV.3.1 of the Consistency Document. An exposure area should always be defined as the smallest area within which it is believed that exposure could be limited under the most conservative, reasonable current or future use scenario.

10. **Nature and Extent Evaluation to Background.** It does not appear that Asarco has evaluated contaminant levels in soil to background at each investigation area, or at the property line of their facility. The TNRCC Corrective Action Section should evaluate whether the chosen background sites (surface soil collected at wells EP-86 and EP-87) (Table L-4) are at appropriate locations and whether the maximum value from the two sites should be used as a comparison value. On-facility concentrations of all metals exceed both measured background concentrations for the site and background concentrations for the United States. If on-site concentrations exceed background, it seems as if the nature and extent evaluation of contaminants has not been completed adequately. Given the requirement for deed notice specified in Sec. 335.55(b) for Remedy Standard 3, when contaminants are left in soil or groundwater at concentrations in excess of background levels, it is necessary to investigate the extent of contamination in the lateral and vertical directions to background concentrations under all three standards of the rule. Otherwise, there is no way to determine which areas require deed recordation, especially along perimeter areas that border on properties owned by other individuals.

11. **Smeltertown Surface Soils.** Asarco calculated a RME concentration for the entire Smeltertown area. Averaging over a larger area of a site than could routinely be contacted by an individual has the potential to underestimate actual exposures. In an effort to decrease the uncertainty associated with the concentration term, as well as to minimize the potential for inappropriate characterization of exposure, the exposure area for a residential scenario should be assumed to be equal to a default of 1/8 acre (EPA, 1989), or in the case of an existing affected residential lot, to the size of either the front or back yard not to exceed ½ acre (Consistency Document IV.3.1.1). An exposure concentration should be calculated for each individual yard to protect individual life-time residential exposure (see Item 9).

    Asarco indicates that without remedial action at the site there is the potential for a health risk associated with future residential use of the property. In addition they indicate that the SAI-Ind MSCs are exceeded for arsenic and lead. The current TNRCC arsenic clean-up level for C/I property is not exceeded, however lead is elevated. Asarco asserts that there is little to no health risk to employees at the International Boundary Water Commission (IBWC) or to future businesses. Asarco then states, "Rather than rely on these modeling efforts, urinary arsenic biomonitoring of IBWC employees during the winter months, when winds predominate from the north, could be conducted to confirm or refute excess exposure." The TNRCC does not believe that biomonitoring is an acceptable solution to elevated levels of contaminants (see Item 2).

12. **Surface Water.** Since the American Canal is a source of drinking water for part of the year, there is the potential for it to be used for drinking water at any time of year, particularly considering the water issues facing West Texas. Either the MCLs should be met for surface water in the American Canal, or a series of quarterly samples that indicate a consistent trend of concentrations below the MCL should be demonstrated.

    A comparison is also made to Freshwater Chronic Criteria for protection of Aquatic Life in the the Rio Grande (Table L-6). Appropriate TNRCC staff should review the Aquatic Life Criteria calculations and determine whether the assumed hardness of 250 mg/L is appropriate.

13. **Groundwater Data.** Asarco statistically summarized groundwater data across their site and provides a summary in Table L-8. Section IV.2.1 of the Consistency Document states, "Statistical methods should not be used to determine representative contaminant concentrations across groundwater wells (inter-well) except when determining representative source groundwater concentrations for the groundwater-to-air pathway." Maximum measured values for each contaminant or a well-by-well comparison should be made to MCLs to evaluate future potential groundwater use.

14. **Summary (Section 5.6).** Asarco indicates that there are no imminent health threats as a result of environmental contamination because worker exposure to soil is managed and there is no exposure to groundwater. The TNRCC does not consider biomonitoring of workers to be an acceptable way to limit worker exposure on site, and contaminant levels above C/I protective levels in surface soil indicate the potential for an imminent health threat. Future workers are not protected by the current biomonitoring program, or from accessing the groundwater, which has unacceptable levels of contamination. The BLRA should clearly indicate that levels of contaminants both in the surface soil and in the groundwater are at unacceptable levels; thereby demonstrating the need for clean-up or for institutional controls to prevent exposure.

    Low-flow levels of surface water contaminants are also at unacceptable levels in the American Canal. This should be clearly indicated in the summary because the canal is a source of drinking water.

    As indicated by Asarco, future impacts to the American Canal and the Rio Grande should be addressed, as well as soil sampling in the residential areas that are adjacent to the Asarco property. Without sampling in the residential area, it is impossible to gauge the potential for adverse health effects from exposure to surface soil.

Conclusion

Asarco must re-evaluate the baseline risks at the El Paso facility in accordance with the preceding comments. If you have any questions about this evaluation, please call me at (512) 239-1822.

References

EPA 1994. Methods for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry. USEPA Office of Research and Development. EPA/600/8-90/006F.

EPA 1989. Risk Assessment Guidance Document for Superfund, Vol. I, Human Health Evaluation Manual (Part A), Interim Final. EPA/540/1-89/002.

TNRCC 1998. Interoffice Memorandum, "Implementation of the Existing Risk Reduction Rule." From Ronald R. Pedde, P.E., Division Director Remediation Division, Office of Waste Management. To Remediation Division Staff. July 23, 1998.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

RECEIVED
MAR 02 2001
HYDROMETRICS, INC.

March 13, 2001

Mr. Lairy Johnson
Environmental Manager
ASARCO Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

RE: Asarco Closed Plant Evaluations Extension Request
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has received Asarco's letter dated February 7, 2001, requesting an extension of approximately 133 days from the previously TNRCC imposed due date for the submittal of the Closed Plant Evaluation Report(s). This letter approves the request extension for the Closed Plant Evaluation Report(s) submittal to August 31, 2001.

The TNRCC is committed to working with Asarco to expedite the investigation and remediation of this site and will respond to the concerns that were raised in Asarco's February 7, 2001 letter. Asarco expressed concern that the TNRCC may not have reviewed the workplan for the Closed Plants. In fact, the TNRCC did review Asarco's workplan(s) for this project and provided initial comments which were essential to steer the Closed Plant Evaluations in a manner consistent with Asarco's previous investigation. However, the responsibility of determining complete extent of contamination remains with the facility.

As previously discussed in the TNRCC letter dated February 14, 2001, Asarco should formally propose background concentrations for all media at the site. The TNRCC will review any values that Asarco believes to be background concentrations. However, to accelerate review of the background concentrations, proposed background values should be reported for all media in table format with appropriate documentation.

In regard to the concern about Agreed Order Provision (8), it was not clear that the Closed Plant Evaluation Plan document dated October 23, 2000 was preceded by other documents, which Asarco believes fulfill the requirements of the Agreed Order. It will greatly facilitate expedient review of reports/workplans if Asarco consolidates all the pertinent information in one document. Any relevant information submitted in historical documents should be incorporated in the current document for an objective and comprehensive review. However, Asarco can provide references to raw data (e.g. lab sheets and field notes) submitted in previous documents.

An original and one copy of the Closed Plant Evaluation Report(s) should be submitted to the Corrective Action Section within the new time frame deadline which is August 31, 2001. An additional copy should be submitted to the TNRCC Region 6 Office in El Paso, Texas. The TNRCC Solid Waste Registration Number should be referenced in all submittals.

We appreciate Asarco's offer to discuss issues of concern by telephone. As a public entity it is the obligation of the agency to maintain complete records of our communications with facilities. However, the TNRCC strongly encourages utilization of all means of communication to provide excellent service to the public and the regulated community. If you have any questions regarding this project or the contents of this letter please contact me at (512) 239-2350.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission

BW/bw

cc: Mr. Don Robbins, Director of Environmental Services, Asarco Incorporated,
Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch-Dallas
Waste Program Manager, TNRCC Region 6 Office-El Paso

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

April 27, 2001

Mr. Brad Wilkinson
Project Manager. Team One
Correctice Action Section
Remediation Division
Texas Natural Resource Conservation Comission
P.O. Box 13087
Austin, Texas 78711-3087

Re: Response to Comments in TNRCC Letter Dated February 14, 2001
ASARCO Incorporated El Paso Copper Smelter

Dear Mr. Wilkinson:

Following is our response to comments in the Texas Natural Resource and Conservation Commission (TNRCC) letter dated February 14, 2001 regarding the Phase II Remedial Investigation Report (RI Report) for the ASARCO, Incorporated (Asarco) El Paso Copper Smelter. Thank you for your authorization to proceed with additional investigations (Phase III) as proposed in the Phase II RI report. Asarco will conduct the Phase III investigation in accordance with the approved Remedial Investigation Work Plan (Hydrometrics, 1996).

For ease in addressing comments. the language from TNRCC's letter is repeated in bold type and is followed by Asarco's response.

We appreaciate your reviewing the information we are providing to address your concerns. Should you have any questions. please contact me at (915) 541-1819.

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments: see attached

Cc: Leigh Ing, TNRCC
Jackie Hardee, TNRCC
Ata-Ur-Rahman, TNRCC
David Hastings, TNRCC
Grace Nell Tyner, TNRCC
J. Mac Vilas, TNRCC
Susan White, TNRCC
Richard Carmichael, TNRCC
Archie Close, TNRCC
Bill Gallagher, EPA Region
David Vogler, EPA Region 6
Bruce Jones, EPA Region 6
Terri Sykes, EPA Region 6
Kent Lang, ARCADIS Geraghty & Miller
Keith Hopson-Brown McCarroll L.L.P.
Arturo Burgos, Hydrometrics
Tom Klempel, Hydrometrics, Tucson.

1. **In the June 25, 1999 letter the TNRCC expressed concern over a basic assumption in the Baseline Risk Assessment (BLRA) for the Asarco El Paso facility. In Appendix A of the Phase II investigation Asarco responded to the June 25, 1999 TNRCC letter and expressed confidence in their BLRA assumptions. The Corrective Action staff provide Asarco's BLRA to the Toxicology and Risk Assessment (TARA) Section of the TNRCC for comments. Please review and address TARA's comments in the enclosure with this letter.**

   Responses to TNRCC's issues and concerns about the Toxicology and Risk Assessment are included in Attachment A.

2. **In order to meet the requirements of 30 TAC §335.553, Asarco must define the full nature and extent of contamination to background for all media at the site. Asarco should formally propose background concentrations for all media at the site. Asarco has mentioned a range of groundwater values that they believe are naturally occurring for three of the eight metals of concern and has not developed background concentrations for soil. Extent of contamination is necessary to fulfill the TNRCC Risk Reduction Rules (RRR) and will help identify possible receptors in the BLRA. Therefore, it is suggested that before a revised BLRA is submitted the full extent of contamination should be defined.**

   Asarco believes the Remedial Investigation activities performed at the El Paso facility adequately address the Risk Reduction Standards, as required in 30 TAC §335.553. Specifically, Asarco believes that the investigation activities conducted adequately characterized the nature, extent, direction, rate of movement, volume, composition, and background concentrations of chemicals of concern in environmental media pursuant to TAC §335.553(b)(1)).

   As indicated in a letter to the TNRCC dated February 7, 2001, during the Phase I and II Remedial Investigation, approximately 217 soil borings (ranging from 3 ft to 77 feet deep) were installed at the facility (on-plant and off-plant) to determine the vertical and horizontal extent of soil affected. During drilling activities, about 1,300 soil samples were obtained for laboratory analysis. To determine the lateral extent of groundwater affected, about 80 of the above mentioned borings were completed as monitor wells. Approximately 1,080 groundwater and 165 surface water samples, obtained over the course of twelve sampling events, have been collected as part of the Remedial Investigation activities.

   With respect to background concentrations, Asarco believes that background concentrations for all media of concern have already been determined. Section 5 of the Baseline Risk Assessment (Appendix L of the October 1998 Remedial Investigation Report) provides information of background concentrations determined for surface soil, surface water and groundwater. Furthemore, in the Phase II Remedial Investigation Report, Asarco indicates that "monitor wells EP-84, EP-86, and EP-87 were considered the most representative background monitor wells because they are the farthest northeast upgradient from facility activities".

Therefore, as highlighted in the above-mentioned information, Asarco considers that the vertical and horizontal extent of impacted media and the determination of background concentrations for all media of concern have already been determined.

3. **In the Northern section of the facility please further define the extent of groundwater contamination between monitor wells EP-80 and EP-59. Also, please fill in the groundwater data gap between the American Canal and wells EP-80 and EP-59. This area is the discharge point for two separate arroyos, in which the groundwater contains some of the highest arsenic concentrations. Please define the extent and fill the data gaps in the area surrounding monitor wells EP-66, EP-111, EP-116 and EP-117. Data gaps are areas in which there are at least two separate points with information (in this case arsenic) and no points correlating the information together.**

To evaluate the potential discharge of impacted groundwater in the America Canal, Asarco has implemented a monitoring and gauging program. Results obtained from this program indicate the groundwater table elevations in the vicinity of the American Canal are lower than the bottom of the American Canal. Therefore, the potential for impacted groundwater to discharge in the American Canal appears to be unlikely.

To further delineate the extent of affected groundwater in the northern part of the Smeltertown area, two additional wells will be installed. One will be located between EP-80 and EP-59 and the other will be installed adjacent to the American Canal, just west of EP-59. In addition, to adequately define the extent of groundwater impacted and to fill data gaps in the area represented by monitor wells EP-66, EP-111, EP-116, and EP-117, two additional monitor wells will be installed. One monitor well will be located between EP-112 and EP-111 and another will be located approximately 250-ft southeast of EP-111.

Monitor well EP-111 contains arsenic values greater than the federal Maximum Contaminant Level (MCL) adjacent to the Rio Grande. Please define the full lateral extent of contamination in the area of monitor wells EP-29, EP-35 and EP-118. This is the area in which Asarco claims groundwater intersects the American Canal.

Asarco believes that the extent of groundwater affected in the area of EP-29, EP-35, and EP-118 has already been established with the installation of EP-4 and EP-5. Although groundwater samples obtained from these wells have arsenic and lead concentrations that slightly exceed MCL's, surface water samples obtained from the Rio Grande Monitoring Station SEP-12, west of the referenced wells, have arsenic concentrations below regulatory limits. Attachement B contains the cumulative list of surface water samples obtained from the Rio Grande and American Canal monitoring stations.

In Appendix A of the Phase II report, Asarco responds to the TNRCC's concern about groundwater flow in the American Canal. Asarco claims that because of hydrostatic pressure no elevated metals are found in the Canal when water is present in the American Canal. The TNRCC believes that it is the hydraulic head which acts on the water in the Canal and on the groundwater. Asarco has not demonstrated that the

reducing water losses. You may contact Ms. Silvia Waggoner, Environmental Engineer. at (915) 832-4740 for additional information on this subject.

Asarco has additional monitor wells at the site which were not identified on the plats that were submitted. These wells are associated with the diesel spill, but may also provide information for corrective measures. Please identify all the monitor wells at or associated with Asarco El Paso facility. Please further investigate the groundwater associated and surrounding EP-20 and EP-75. These wells have arsenic concentrations greater than the MCL value. Well EP-20 is adjacent to the property line and is associated with a former arroyo discharge point and although well EP-75 doesn't appear to be associated with a former arroyo, the TNRCC is concerned about the source of the contamination surrounding this well.

Attachment C contains a map that identifies all monitoring wells and surface water monitoring stations associated with the Asarco El Paso facility.

Note that Section 3.2 of the 1998 Remedial Investigation Report (Investigation Area 2) indicates that the primary source of metals detected in soil and groundwater samples obtained from EP-53, EP-75, and EP-76 is probably sludge from the Acids Plants, which we believe were historically stored in this area.

In order to properly delineate the extent of soil and groundwater affected in the area of EP-75 (Investigation Area 2) Asarco has proposed. as part of the Phase III Remedial Investigation. to advance eight additional soil borings to groundwater. and three monitor wells.

With respect to the area surrounding EP-20. Asarco believes the downgradient extent of groundwater affected in this area has already been addressed by EP-6. Laboratory reports of groundwater samples obtained in the last six sampling events indicate Constituents Of Concern (COCs) concentrations below regulatory limits.

4. **Asarco has presented average groundwater concentration data in the Phase II report. Provide groundwater analyses for each monitor well and date of when that monitor well was sampled. Do not average the concentration for each well.**

   In both Remedial Investigation (RI) reports, a cumulative list of groundwater analytical results for each individiadual monitor well was provided to TNRCC. Please refere to Appendix G and Appendix H of the October of 1998 and July 2000.RI reports, respectively. Averaged data were used only to generate maps of metal concentrations in groundwater.

5. **Asarco states that groundwater modeling indicates that it would take between 280 to 540 years for concentrations of concern (COC) to reach the Rio Grande River. However, there is evidence that arsenic may have already impacted the Rio Grande. Monitor Well EP-111 had arsenic values in the groundwater significantly higher than the MCL. Groundwater background concentrations for arsenic have not been**

formally established, however, there are several upgradient wells and surface water sampling points along the Rio Grande with arsenic concentrations below the MCL established for arsenic.

Further investigations will be performed to assess groundwater impacts downgradient of Ponds 5 and 6. Specifically, the groundwater conditions in the vicinity of EP-111 will be evaluated. The groundwater arsenic impact detected in this area is relatively new information

Asarco considers that background concentrations of constituents of concern for surface soil, surface water and groundwater were properly determined during the performance of the Baseline Risk Assessment. Please refer to section 5.1 "Determination of Reasonable Maximum Exposure Concentrations and Background Concentrations", Appendix L of the Phase I Remedial Investigation Report, October 1998.

Also note that the rationale followed to established the background concentations is consistent with section VI.3 of the TNRCC Interoffice Memorandum dated July 23, 1998 (Consistency Document). As indicated in the Memo, the establishment of background concentrations were based on samples taken from an area that has not been impacted by site activities.

Background concentrations for surface soil (upper two feet) were based on data obtained from monitoring wells EP-86 and EP-87. Please refer to Table L-4 of Appendix L. Background concentration for surface water were determined by Monitoring Station SEP-9. Background concentrations for groundwater were based on data obtained from monitoring wells EP-86, EP-87 and EP-89. Please refer to Table L-8 of Appendix L.

6. **Asarco proposes additional borings, which may include monitor wells for Investigation Areas 2, 8, 11, 12, and 14. The proposal does not require TNRCC technical review prior to implementation and you may proceed with the investigation of contaminated media at your facility. The final investigation report to be submitted after the investigation activities are completed is subject to TNRCC technical review. Please provide a detailed explanation and study of the mechanism(s) that Asarco believes is the cause for potential releases from the site or for each of the investigation areas with potential groundwater impacts.**

The additional remedial investigation activities (Phase III) proposed in the Phase II RI Report will be performed in accordance with the TNRCC approved Remedial Investigation Work Plan (Hydrometrics, 1996). A report containing the results of this investigative phase will be submitted to TNRCC within two hundred and seventy (270) calendardays days from the February 14, 2001 TNRCC letter.

ATCHMENT A

Response to Risk Assessment Issues

Response to the Toxicology and Risk Assessment Concerns.

Overall Evaluation.

Overall, TARA does not believe that the BLRA adequately characterizes the "baseline risks" at the Asarco, El Paso facility. The specifics of this conclusion are detailed as "Risk Assessment Issues" below. Although Asarco may be anticipating corrective action plans that will address the unacceptable contaminant levels at their facility, the BLRA is inadequate because it does not clearly indicate the presence of metals at unacceptable levels both in soil and groundwater, and does not address off-site contaminants in a quantitative manner.

Overall Response

Asarco recognizes that the BLRA is focused and brief. The BLRA concedes through simple comparison tables, but without much discussion and analysis, that metals concentrations are elevated and would result in excess risk in the absence of controls. (See tables L-4 for on-site soils, L-5 for former Smeltertown soils, and L-8 for groundwater.)

The brief BLRA may give the impression that it does not properly support required and necessary corrective measures when it is reviewed without consideration of other remedial investigation results and remedial plans. However, Asarco is committed to a broad range of remedial actions, and among these are institutional controls. By considering certain remedial actions and institutional controls, such as worker biomonitoring and restricted access, we have gone beyond the scope of a baseline risk assessment to consider risks under the proposed remedial plan.

Asarco's goal in responding to the risk assessment comments is to reach a common understanding with TNRCC regarding site risks and how the proposed remedial plans will act to control these risks in an acceptable manner.

Risk Assessment Issues

1. **Exposure Pathways Chart (Figure L-1). The exposure pathways chart is incomplete and should consider both current and future exposures. Site-specific factors, like exposure frequency, can be incorporated into the current exposure analysis; however institutional or engineering controls are not allowed as a justification for ruling out exposure scenarios or pathways when evaluating either current or future exposures for a BLRA (Sec. V, TNRCC 1998). Asarco might consider including two flowcharts, one for current exposures and one for future exposures. As explained in Section VII of the TNRCC interoffice memorandum "Implementation of the Existing Risk Reduction Rule" (Consistency Document), the dermal pathway should be considered for on-site and off-site surface soil exposure (TNRCC 1998). The Consistency Document can be downloaded from the TNRCC website at the following address:http://www.tnrcc.state.tx.us/permitting/rrr.htm. Potential future groundwater ingestion should be included for both on-site and off-site exposures. A quantitative evaluation of off-site residents should be performed, not just a qualitative evaluation.**

Asarco recognizes that explanations supporting Figure L-1 are brief. Figure L-1 identifies the major pathways principally controlling exposure. Additional pathways for dermal exposure and groundwater exposure can be identified on Figure L-1. Further clarification of these pathways in Figure L-1 will not result in substantive changes in BLRA conclusions. The dermal pathway was incorporated in the risk assessment with default MSCs. MCLs were compared with groundwater concentrations in the BLRA.

Asarco understands that TNRCC evaluated the residential area prior to initiating the Agreed Order. The residential area was not identified in the order as an area-of-concern; therefore, data was not collected as part of the investigation to support a risk evaluation.

2. ***On-Site Workers. A BLRA should evaluate current worker exposure in the absence of controls (30 TAC Sec.335.553 (b)(2)). This evaluation would demonstrate the need for institutional controls and/or clean-up by indicating that elevated levels of metals exist at the Asarco property. In addition, since there are significant uncertainties associated with predicting likely future activity at a site, a future worker should be considered by Asarco. This evaluation should consider all appropriate exposure pathways as discussed in the 1993 Risk Reduction Rule (1993 rule) and the Consistency Document (see Item 1).***

   Levels of arsenic, cadmium and lead exceed levels of concern at much of the facility. However, in the BLRA Asarco makes the statement that the company "provides employee biomonitoring for arsenic, lead and cadmium in accordance with OSHA requirements, and is in compliance with this biomonitoring program. This institutional control precludes the need for further remedial action at the site to protect on-facility worker health." The issue of biomonitoring was initially addressed in TNRCC comments on the Asarco Phase I RI-Report. While Asarco responded to the TNRCC comments in Appendix A of the Phase II RI, the response did not properly address current workers and neglected to consider future workers. Biomonitoring does not meet the requirements of 30 TAC Sec. 335.562(c) concerning long-term effectiveness and performance. The goal of a remedy is to prevent current and future exposure to unacceptable levels of contaminants, not to biomonitor for exposures that have already occurred. A discussion of the appropriate use of engineering and institutional controls is provided in Section V of the Consistency Document.

   The BLRA did evaluate worker exposure to on-site soils by comparison of on-site soil concentrations with MSC's (Section 5.2). Asarco recognizes that on-site soil concentrations exceed TNRCC default cleanup levels. Asarco believes it was appropriate to also communicate that actions are being taken to preclude excess worker risk using a successful worker health and safety program that includes biomonitoring.

3. **Off-Site Residents. Since air dispersion modeling is being used to predict air concentrations for off-site worker exposure, then modeling should be used to predict off-site residential air exposures as well. Asarco indicates that low-volume air monitoring from the nearby executive center indicates compliance with health-based standards for metals, but no data are presented. Asarco states that historic emissions**

may have deposited contamination in the residential area to the north of the slag pile, but there are no soil data from the residential area that would allow an evaluation. As discussed in Item 1, a complete BLRA must consider a quantitative evaluation of off-site residential exposure, particularly since the nature and extent of the metal contamination has not been fully delineated by Asarco (see Item 10). The quantitative evaluation should consider standard exposure pathways discussed in the 1993 rule and the Consistency Document.

Please see the response to comment 1, second paragraph.

4. Off-Site Workers. Air exposures are being evaluated using air dispersion modeling. Appropriate TNRCC staff should review this modeling. No direct evaluation of off-site soil exposures are evaluated, just incidental ingestion of windblown dust and fugitive air emissions. The potential for off-site soil exposures should be considered at any adjacent property where future uses could expose workers, particularly since nature and extent information is lacking (see Item 10). The evaluation should consider standard exposure pathways discussed in the 1993 rule and the Consistency Document.

   The BLRA did evaluate worker exposure to off-site soils (former Smeltertown area) by comparison of on-site soil concentrations with MSC's (Section 5.3 and Table L-5). The evaluation considered both ingestion and inhalation pathways (Table L-2).

5. Loading of Contaminants to Surface Water. The fate and transport model in Appendix K which evaluates future potential contaminant loads to surface water bodies and resulting surface water concentrations should be evaluated by appropriate TNRCC staff. A discussion of the model results is presented in Section 5.5 of Appendix L.

   No response required.

6. Inhalation Rate Adjustment. Although Asarco explains that the off-site worker evaluation is focusing specifically on office workers and would like to adjust the worker inhalation rate downward to 15 m^3/day, TARA does not agree that this is an appropriate adjustment. As discussed in Section X.1 of the Consistency Document, inhalation toxicity values in the EPA Integrated Risk Information System (IRIS) are now expressed in terms of concentrations in air (reference concentrations (RfCs) and unit risk factors (URFs)) and not in terms of dose (i.e., as for inhalation reference doses and inhalation slope factors in units of mg/kg-day).

   These toxicity factors already incorporate an inhalation rate of 20 m^3/day. Due to the inability to accurately predict the type of future work that may take place at a commercial/industrial (C/I) facility, Asarco should not adjust the inhalation rate, as the MS values will be protective of either an office worker or an outdoor C/I worker (Sections X.1 and X.1.1, Consistency Document).

The off-site exposure assessment as conducted was intended to evaluate existing office workers. This evaluation was considered appropriate for the type of exposure that presently exists. Additional commercial use of the property was not anticipated at the time the risk assessment was completed. Nevertheless, please refer to the responses to comments number 7 and 8 which present updated TNRCC MSCs using default exposure values. Please recognize that the EPA lead model requested in the response to comment number 7 does not incorporate a dust inhalation pathway, making the issue of inhalation rate a mute point.

7. **Adult Lead Exposure. Asarco makes the statement, "While the EPA has developed the Integrated Exposure Biokinetic Model for lead in children, no model has been developed by the EPA for evaluating lead exposure in adults." The EPA has developed an adult lead model which is available from U.S. EPA Region 6. The TNRCC recognizes the use of this model, discusses its use, and presents an acceptable list of default parameters in the currently available Texas Risk Reduction Program (TRRP) rule (30 TAC Sec. 350.76(c)). Although Asarco is evaluating their site under the 1993 Rule, they are still allowed to use the EPA adult lead model with acceptable TNRCC inputs to calculate a C/I clean-up level. Asarco should use the EPA adult lead model to calculate soil clean-up levels for lead, not the Bowers model that is presented in Attachment L-3.**

   Asarco's contractor was not aware of the EPA Adult Lead model at the time the BLRA was conducted. Applying the TNRCC default values in the EPA model results in a commercial/industrial soil-lead cleanup level of 1,600 mg/kg. The arithmetic average soil lead concentration from 45 measurements in the Smeltertown area is 790 mg/kg (see Attachment L-5 of the BLRA, page 6) and the upper confidence limit estimate of the mean is 1,884 mg/kg.

   Asarco recognizes that present soil-lead concentrations are an issue for residential use of the former Smeltertown area. Asarco's site-specific evaluation of present off-site worker exposure does not indicate a need for concern. Asarco recognizes that certain types of commercial and industrial property uses that result in exposures consistent with default TNRCC assumptions, or greater, may pose some health concerns.

8. **Toxicity Factors (Section 4.0) and Toxicity Profiles (Attachment L-4)1.**

   1. **Many of the toxicity factors cited in Section 4.0 of Appendix L and in Attachment L-4 are either outdated or incorrect. In July of 1998, the TNRCC promulgated the Consistency Document, which provided additional and up-to-date toxicity factors. According to Asarco's own timeline, the Phase I RI Report was submitted in October 1998, several months after the promulgation of the Consistency Document. Therefore, many of the toxicity factors cited in the Asarco profiles were out of date, even at the time of the Phase I submittal.**

2. The residential (SAI-Res) and C/I (SAI-Ind) medium-specific concentrations (MSCS) that Asarco cites in Tables L-4 and L-5 are outdated and should be updated to reflect the values associated with the Consistency Document which incorporate the dermal exposure pathway. These MSCs that incorporate the latest toxicity information and the dermal exposure pathway replaced the MSCs in the 1993 rule Appendix 11 Table (30 TAC Sec. 335.568).

3. The TNRCC has established a policy number for clean-up of arsenic at residential and at commercial industrial sites, so that calculation of an MSC from a toxicity factor is not necessary (Consistency Document).

4. It is inappropriate to assume that inhalation reference doses (RfDs) are equivalent to oral RfDs as route-to-route extrapolation is not recommended by the EPA in most cases (p. 4-5, EPA 1994). Acceptable RfCs (see Item 6) can be found in the updated toxicity factors table associated with the Consistency Document.

As of September of 1998, the Consistency Document was still considered a "Dreaft" and should be considered as such. Revised Tables L-4 and L-5 are attached. For on-site soils, the arsenic MSC increased while there was mostly a modest decrease in a few other parameters. However, there is no change in conclusions regarding areas that exceed standards. All on-site areas exceed the MSC for one or more parameters. Similarly, nearly all samples in the off-site, historic Smeltertown area continue to exceed residential MSCs. Lead is possibly a concern for future commerical/industrial uses of the historic Smeltertown area, depending upon the characteristics of exposure anticipated.

9. Reasonable Maximum Exposure (RME) Concentrations. Although Asarco's RME calculations are done appropriately, there is no discussion of exposure area size or location. Asarco should demonstrate that their exposure areas are appropriate as discussed in Section IV.3.1 of the Consistency Document. An exposure area should always be defined as the smallest area within which it is believed that exposure could be limited under the most conservative, reasonable current or future use scenario.

The exposure areas evaluated were identified in the work plan completed in 1996 and accepted by TNRCC. They were based on areas-of-concern originally identified by TNRCC. Asarco believes the investigation areas are appropriately sized. Areas were determined by historic site use and anticipated variability in soil metals concentrations. Concentrations are sufficiently uniform within areas that subdividing the areas further would not substantially change remedial plans. Subdividing the areas further would result in reducing the number of measurements within an area and reduce statistical power. If TNRCC has a particular area they believe should now be subdivided, please comment more specifically.

10. Nature and Extent Evaluation to Background. It does not appear that Asarco has evaluated contaminant levels in soil to background at each investigation area, or at the property line of their facility. The TNRCC Corrective Action Section should evaluate

whether the chosen background sites (surface soil collected at wells EP-86 and EP-87) (Table. L-4) are at appropriate locations and whether the maximum value from the two sites should be used as a comparison value. On-facility concentrations of all metals exceed both measured background concentrations for the site and background concentrations for the United States. If on-site concentrations exceed background, it seems as if the nature and extent evaluation of contaminants has not been completed adequately. Given the requirement for deed notice specified in Sec. 335.55(b) for Remedy, Standard 3, when contaminants are left in soil or groundwater at concentrations in excess of background levels, it is necessary to investigate the extent of contamination in the lateral and vertical directions to background concentrations under all three standards of the rule. Otherwise, there is no way to determine which areas require deed recordation, especially along perimeter areas that border on properties owned by other individuals.

Background soil concentrations were based on subsurface soil samples collected during groundwater monitor well installation. These sample locations were deemed to best reflect background conditions. Additional background samples would refine our understanding of "true" background concentrations. However, the benefits of this refinement are not clear to Asarco. Areas of soil impact clearly exceed background levels leaving little uncertainty in regards to any necessary deed notification.

11. Smeltertown Surface Soils. Asarco calculated a RME concentration for the entire Smeltertown area. Averaging over a larger area of a site than could routinely be contacted by an individual has the potential to underestimate actual exposures. In an effort to decrease the uncertainty associated with the concentration term, as well as to minimize the potential for inappropriate characterization of exposure, the exposure area for a residential scenario should be assumed to be equal to a default of 1/8 acre (EPA, 1989), or in the case of an existing affected residential lot, to the size of either the front or back yard not to exceed 1/2 acre (Consistency Document IV.3.1.1). An exposure concentration should be calculated for each individual yard to protect individual life-time residential exposure (see Item 9). Asarco indicates that without remedial action at the site there is the potential for a health risk associated with future residential use of the property. In addition they indicate that the SAI-Ind MSCs are exceeded for arsenic and lead. The current TNRCC arsenic clean-up level for C/I property is not exceeded, however lead is elevated. Asarco asserts that there is little to no health risk to employees at the International Boundary Water Commission (IBWC) or to future businesses. Asarco then states, "Rather than rely on these modeling efforts, urinary arsenic blomonitoring of IBWC employees during the winter months, when winds predominate from the north, could be conducted to confirm or refute excess exposure." The TNRCC does not believe that biomonitoring is an acceptable solution to elevated levels of contaminants (see Item 2).

Arsenic concentrations greater than 20 mg/kg but less than 200 mg/kg predominate in surface sample results. Lead concentrations greater than 500 mg/kg also predominate. There are seven surface soil-lead values exceeding 1,600 mg/kg, and these seven values are uniformly distributed throughout the property. The number of samples required to *characterize each 1/8th acre with statistical power is burdensome and is not expected to provide an improved understanding of contaminant distributions. Also, no arsenic biomonitoring is planned.*

12. Surface Water. Since the American Canal is a source of drinking water for part of the year, there is the potential for it to be used for drinking water at any time of year, particularly considering the water issues facing West Texas. Either the MCLs should be met for surface water in the American Canal, or a series of quarterly samples that indicate a consistent trend of concentrations below the MCL should be demonstrated.

    A comparison is also made to Freshwater Chronic Criteria for protection of Aquatic Life in the Rio Grande (Table L-6). Appropriate TNRCC staff should review the Aquatic Life Criteria calculations and determine whether the assumed hardness of 250 mg/L is appropriate.

    Additional quarterly data collected to date at site SEP-3 indicates that water concentrations in the American Canal as it leaves the Asarco site are below the MCL at all times of year. Please refer to all data provided in the RI Reports of October of 1998 and July 2000.

13. Groundwater Data. Asarco statistically summarized groundwater data across their site and provides a summary in Table L-8. Section IV.2.1 of the Consistency Document states, "Statistical methods should not be used to determine representative contaminant concentrations across groundwater wells (inter-well) except when determining representative source groundwater concentrations for the groundwater-to-air pathway." Maximum measured values for each contaminant or a well-by-well comparison should be made to MCLs to evaluate future potential groundwater use.

    Table L-8 can be used to demonstrate that maximum concentrations in groundwater exceed the MCLs. Areas of groundwater concern are addressed in the Phase I and Phase II site investigation reports. Asarco is committed to developing remedial plans that will result in improved groundwater quality in accordance with regulatory requirements.

14. Summary (Section 5.6). Asarco indicates that there are no imminent health threats as a result of environmental contamination because worker exposure to soil is managed and there is no exposure to groundwater. The TNRCC does not consider biomonitoring of workers to be an acceptable way to limit worker exposure on site, and contaminant levels above C/I protective levels in surface soil indicate the potential for an imminent health threat. Future workers are not protected by the current biomonitoring program, or from accessing the groundwater, which has unacceptable levels of contamination. The BLRA should clearly indicate that levels of contaminants both in the surface soil and in the groundwater are at unacceptable levels; thereby demonstrating the need for clean-up or for institutional controls to prevent exposure.

    Low-flow levels of surface water contaminants are also at unacceptable levels in the

American Canal. This should be clearly indicated in the summary because the canal is a source of drinking water.

As indicated by Asarco, future impacts to the American Canal and the Rio Grande should be addressed, as well as soil sampling in the residential areas that are adjacent to the Asarco property. Without sampling in the residential area, it is impossible to gauge the potential for adverse health effects from exposure to surface soil.

Asarco agrees that the BLRA should have summarized the surface soil and groundwater quality conditions. The American Canal does not exceed MCLs, as addressed in the response to comment 12. The BLRA addresses the Rio Grande. Page L-20 summarizes the groundwater modeling effort by stating that arsenic loads from groundwater to the Rio Grande are predicted to increase in the absense of source controls. The BLRA summary then concludes that "clean-up objectives should focus on prevention of future impacts to ..... the Rio Grande .....". Asarco desires further clarification from TNRCC regarding the sudden interest in the residential area.

TABLE L-4. (revised) SURFACE SOIL CONCENTRATION SUMMARY

Units in mg/kg

Parameters	On-Site UCL/Max. Concentration [1]						Comparison Values		
	Area 1	Area 2	Area 3	Area 4	Area 8	Entrance	Back-ground [2]	USGS [3]	SAI-Ind [4]
Arsenic	22,000	1,800	7,800	5,961	3,397	750	10	5.2	200 [5]
Cadmium	1,900	420	1,600	799	516	250	5	N/A	410
Chromium	330	340	432	122	112	139	86	37	230,000 [7]
Copper	36,419	12,000	20,000	50,265	57,303	12,000	76	17	74,000
Iron	74,981	179,222	75,951	190,000	81,319	30,198	19,000	18,000	--- [6]
Lead	11,000	9,500	25,000	31,960	16,518	5,700	87	16	1,000
Selenium	1,300	82	73	49	28.8	11.44	5	0.26	9,200
Zinc	13,000	110,000	16,000	13,737	13,763	5,700	100	44	410,000

(1) Upper Confidence Limit (UCL) of the mean for a lognormal distribution (EPA, 1992), except maximum measured value used where UCL exceeds maximum value. One-half the detection limit used for not-detected values. Calculations provided in Enclosure 5.

(2) Based on maximum surface soil concentration at EP-86 or EP-87.

(3) From Elemental Composition of Surficial Materials in the Conterminous United States. Geological Survey Professional Paper 1270, 1984. Values listed are geometric means for the conterminous United States.

(4) SAI-Ind = Soil/Air and Ingestion Standard for Industrial Use. Maximum Concentration in Industrial Soil Considering Cross-media Contamination of Air and the Human Ingestion and Inhalation Pathways (mg/kg). From Implementation of the Existing Risk Reduction Rule. TNRCC. July 23, 1998, updated on April 7, 1999.

(5) Cleanup level established by the Executive Director. TNRCC Interoffice Memo. Arsenic Soil Cleanup Standards. May 19, 1995, updated on April 7, 1999.

(6) EPA has not established a RfD to support quantitative risk assessment.

(7) Cleanup level based on Chromium III.

TABLE L-5 (revised). SMELTERTOWN SURFACE SOIL CONCENTRATION SUMMARY

Units in mg/kg

Parameters	Smeltertown (A5) UCL/Max. Concentration (1)	Comparison Values: Background	Comparison Values: USGS	Comparison Values: SAI-Res (2)	Comparison Values: SAI-Ind (3)
Arsenic	64	10	5.2	20	200
Cadmium	52.3	5	N/A	120	410
Chromium	50.7	86	37	5,300	230,000 (6)
Copper	4,741	76	17	10,000	74,000
Iron	20,826	19,000	18,000	--- (4)	--- (4)
Lead	1,884	87	16	500	11,804 (5)
Selenium	7.78	5	0.26	1,300	9,200
Zinc	1,344	100	44	59,000	410,000

(1) Upper Confidence Limit (UCL) of the mean for a lognormal distribution (EPA, 1992), except maximum measured value used where UCL exceeds maximum value. One-half the detection limit used for not-detected values. Calculations provided in Enclosure 5.

(2) SAI-Res = Soil/Air and Ingestion Standard for Residential Use. Maximum Concentration in Residential Soil Considering Cross-media Contamination of Air and the Human Ingestion and Inhalation Pathways (mg/kg). From Implementation of the Existing Risk Reduction Rule. TNRCC, July 23, 1998.

(3) From Implementation of the Existing Risk Reduction Rule. TNRCC, July 23, 1998, updated on April 7, 1999.

(4) EPA has not established a RfD to support quantitative risk assessment.

(5) Derived using the Bowers (1994) model.

(6) Based on Chromium III.

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

June 14, 2001

Mr. Brad Wilkinson
Project Manager, Team One
Correctice Action Section
Remediation Division
Texas Natural Resource Conservation Comission
P.O. Box 13087
Austin, Texas 78711-3087

RE: New Deliverable Dates for Closed Plant Evaluation Report and Phase III Remedial Investigation Report.

Dear Mr. Wilkinson:

The purpose of this letter is to request your concurrance with the rescheduling of the deliverable dates of the Closed Plants Evaluations and the Phase III Remedial Investigation Reports. As you are aware, in our meeting of March 19, 20001, we agreed in the following submittal schedules:

- August 31, 2001, submittal of the Closed Plant Evaluation Report.
- November 16, 2001, submittal of the Remedial Design Plans and Specifications Documents.
- February 27, 2002, submittal of the phase III Remedial Investigation Report.

To minimize paper work and facilitate the review of the above-mentioned documents, Hydrometrics, Inc., our environmental consultant, has determined to submit a single report documenting the findings of both the Closed Plants evaluations and of the Phase III Remedial Investigation would be more practical. This report will be entitled ***"Phase III Remedial Investigation Report"*** and will be submitted to your office on November 16, 2001, concurrent with the deliverey of the Remedial Design Documents..

Note that the field work associated with the Closed Plants evaluation and for the Phase III RI has already been concluded. Results obtained from these investigations suggested further investigation activities, which we are proceeding with. Data gathered from these investigation activities will be used to support the Remedial Design Activities.

If you have any question concerning this new proposed schedule, please do not hesitate to contact me at (915) 541-1819.

Sincerely,

Lairy A. Johnson
Environmental Manager

Cc: Ata-Ur-Rahman, TNRCC
Grace Nell Tyner, TNRCC
Archie Clouse, TNRCC
Kent Lang, ARCADIS Geraghty & Miller
Keith Hopson-Brown McCarroll L.L.P.
Arturo Burgos, Hydrometrics.
Tom Klempel, Hydrometrics, Tucson.

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

July 10, 2001

RECEIVED
JUL 17 2001
ASARCO INC.
EL PASO PLANT
ENVIRONMENTAL

Mr. Lairy Johnson
Environmental Manager
Asarco Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

Re: Closed Plant Evaluation Report - Extension Approval
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission ("TNRCC") has reviewed the Asarco's extension request for submitting the Closed Plant Evaluation Report for the subject facility. The TNRCC hereby approves the extension for the Closed Plant Evaluation Report resulting with the new due date of November 16, 2001. Asarco has agreed to submit the Remedial Design Plans and Specifications Document and the Phase III Remedial Investigation Report on the same date.

Questions concerning this letter should be directed to me at (512) 239-2350. Please use Mail Code 127 (MC-127) when responding by mail.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division

BW/bw

cc: Mr. Don Robbins, Director of Environmental Services, Asarco Incorporated
Ms. Terry Sykes, Senior Counsel, EPA Region 6, Legal RCRA Enforcement Branch- Dallas
Waste Program Manager, TNRCC Region 6 Office - El Paso

Robert J. Huston, *Chairman*
R. B. "Ralph" Marquez, *Commissioner*
John M. Baker, *Commissioner*
Jeffrey A. Saitas, *Executive Director*

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

RECEIVED
OCT 0 9 2001
HYDROMETRICS, INC

October 2, 2001

Mr. Lairy Johnson
Environmental Manager
Asarco Incorporated - El Paso
P. O. Box 1111
El Paso, TX 79999

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

RE: Comments to Asarco document received April 27, 2001
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Johnson:

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed Asarco document dated April 27, 2001 in which Asarco responded to TNRCC letter dated February 14, 2001. The TNRCC's comments are listed below:

1 In the June 25, 1999 letter the TNRCC expressed concern over a basic assumption in the Baseline Risk Assessment (BLRA) for the Asarco El Paso facility. In Appendix A of the Phase II investigation Asarco responded to the June 25, 1999 TNRCC letter and expressed confidence in their BLRA assumptions. The Toxicology and Risk Assessment (TARA) Section of the TNRCC reviewed Asarco's BLRA. Their comments were included in the TNRCC's letter dated February 14, 2001. The TARA section has also reviewed Asarco's latest comments and their response is enclosed.

2. Asarco stated that they believe they have selected monitoring wells are the most representative of background around the Asarco facility and that they have adequately characterized the nature, extent, direction, rate of movement, volume, composition of chemicals of concern in the environmental media pursuant to TAC §335.553.b.1. Asarco collected two soil samples from borings at wells locations EP-86 and EP-87 and used the highest concentration to represent background. This procedure is

inadequate. Location EP-87 is in an area where Asarco has managed waste from slag to other waste material that has been excavated from the main Asarco plant. Some of the waste material has since been removed or been recycled. For groundwater, Asarco sampled wells EP-86, EP-87 and EP-89 and chose the highest metals concentration as a proposed background. Once again this procedure is inadequate at the present time. Also, the TNRCC does not believe that 2 or 3 samples can accurately characterize background.

3. A) Asarco believes that the extent of Arsenic contamination in the groundwater downgradient of their facility is defined by the low concentration of arsenic in the Rio Grande River. Since, Asarco is currently using the Risk Reduction Rules the TNRCC has consistently viewed that groundwater entering a surface water body has to meet surface water quality standards in Chapter 307. Asarco's groundwater well EP-111 adjacent to the Rio Grande has arsenic concentrations in excess of the surface water quality standards. Please address this concern.

B) Asarco states " The intersection of groundwater with the bottom of the American Canal occurs at monitor well EP-66 (May through October) and further states " the difference between groundwater and surface water elevations near the Canal prevents any groundwater flow from entering the Canal during high flows." Then Asarco states "Groundwater gauging data obtained from monitoring wells EP-62, EP-66, EP-29, and EP-113, EP-111, EP-4, located upgradient and downgradient, respectively, of the American Canal have consistently indicated that the groundwater table in the vicinity of the Canal is located at a lower elevation than the bottom of the American Canal." Asarco in one instance claims the groundwater flows underneath the American Canal then in another paragraph states the groundwater intersects the bottom of American Canal occurs at well EP-66. In a September 1990 report, page 19, Hydrometrics, Inc. stated that "the Diesel No. 1 investigation indicated that the American Canal apparently acts as a groundwater interception trench in the vicinity of the ASARCO facility." The TNRCC has not received any elevation data for the bottom of the American Canal, please provide elevation data for points along the bottom of the American Canal to the TNRCC. Also, since groundwater and diesel has been observed entering the American Canal in 1990 there is physical evidence that the groundwater intersects and flow into the Canal. The TNRCC realizes that the observed flow into the canal will only occur during the Canal low flow to no flow. The TNRCC requested Asarco to demonstrate the difference in head pressure between the groundwater and the American Canal. From cross sections Asarco provided, the difference in head pressure between the groundwater and the bottom of the canal may range from ten to twenty feet. Please resurvey monitor wells along the American Canal and submit groundwater elevation monitoring data to the

TNRCC in Table format. Please correct and submit new cross sections to the TNRCC, if necessary.

4. Asarco states in point 4 of their April 27, 2001 response that "Averaged data were only used to generate maps of metal concentrations in the groundwater." Please refer to Tables 3-7, 3-9, 3-11, 3-13, 3-15, 3-16, 3-20, 3-22, 3-24, and 3-26 in Asarco's Phase II Remedial Investigation Report July 2000. Arsenic concentrations were evaluated for the tables listed above and found that either some or all the arsenic concentrations are average concentrations according to the summary of Groundwater Analytical Results in Appendix H. The TNRCC restates its position that average metal concentrations should <u>not</u> be presented in the investigation phase of a report. For presentation of the concentrations in the groundwater please use a table similar to the Summary of Groundwater Analytical Results in Appendix H without the calculations.

5. Asarco has made an apparent transcription error between the lab sheet and the Summary of Groundwater Analytical Results table. Please refer to monitor well EP-49 in the Summary of Groundwater Analytical Results table. The May 14, 1999 sampling event, Asarco reported a concentration of 0.302 ppm for arsenic in the groundwater. The previous sampling event (February 25, 1999) from the same well reported a concentration of 320 ppm for arsenic in the groundwater. On further review, well EP-49 has a sample identification # EPRI-9905-118. Finding that sample identification in the lab sheets appendix, the lab reported a concentration of 302 ppm for arsenic in the groundwater. Please correct the table and incorporate a procedure to include well identification numbers corresponding to submitted plats on lab reports.

6. Data provided by Asarco indicates that arsenic contamination exist both upgradient and downgradient of offsite properties. Since offsite properties are contaminated, please notify all offsite property owners to protect the owners from potential exposure. Asarco will notify the impacted property owners of all media which may have been affected. The proof of notification of contaminates should be sent to the Corrective Action Section within twenty-one (21) days from the date of this letter. The notification should include the contaminates and the media which may have been impacted and Asarco and TNRCC contacts if any questions arise.

7. In the TNRCC letter dated July 13, 2000, the TNRCC requested Asarco to address the contaminated groundwater flowing offsite in an interim corrective measure. Asarco has continued to present the case for monitored Natural Attenuation of metals contaminated groundwater for their remedial response. At present time the TNRCC

has not approved Natural Attenuation as a remedy. It should be kept in mind that a final remedy would need acceptance from affected property owners and the state.

The TNRCC Region 6 Office - El Paso must be notified at least ten (10) days prior to any well installation or soil/ground-water sampling activity to allow Region personnel the opportunity to observe these events and collect samples.

Please note that it is the continuing obligation of persons associated with a site or facility to ensure that industrial solid wastes and/or municipal hazardous wastes are managed in such a way that it does not cause a discharge or wastes or an imminent threat of discharge, nor a nuisance or an endangerment to either human health or the environment as required by 30 TAC §335.4. Be advised that the burden remains upon the owner/operator to take necessary and authorized action to correct such conditions whenever they exist.

An original and one copy of a Phase III Report(s) delineating the full horizontal and vertical extent of contamination in all affected media and which addresses comments in this letter and in the enclosure must be submitted to the Corrective Action Section within two hundred seventy (270) days from the date of this letter. An additional copy should be submitted to the TNRCC Region 6 Office in El Paso, Texas. The TNRCC Solid Waste Registration Number should be referenced in all submittals.

Sincerely,

Brad Wilkinson

Brad Wilkinson, Project Manager
Team I, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission

BW/bw

Enclosure

cc: Mr. Don Robbins, Director of Environmental Services, Asarco Incorporated
Mr. Bob Wilkinson, Environmental Scientist, EPA Region 6, RCRA Technical Enforcement Branch-Dallas Mail Code 6EN-HX
Waste Program Manager, TNRCC Region 6 Office-El Paso

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

November 19, 2001

HAND DELIVERED

Mr. Brad Wilkinson, Project Manager
Team One, Corrective Action Section
Remediation Division
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Re: TNRCC Letter of October 2, 2001
Regarding Asarco El Paso Copper Smelter
Agreed Order Docket No. 96-0212-MLM-E
TNRCC Industrial Solid Waste Registration No. 31235
EPA ID No. TXD990757668

Dear Mr. Wilkinson:

Following is the response of the El Paso Copper Smelter of ASARCO Incorporated (Asarco) to your above referenced letter. This document was prepared by Hydrometrics, Incorporated, Asarco's contractor on this project, in collaboration with Asarco's legal counsel, Brown McCarroll, L.L.P. For ease in addressing comments, the language from TNRCC's letter is repeated in bold type and is followed by Asarco's response in italics.

Do not hesitate to contact me at (915) 541-1819, if you have any questions regarding this submittal.

Sincerely,

Lairy A. Johnson
Environmental Manager

Attachments: Attachment A - Response to the Toxicology and Risk Assessment Concerns
Attachment B - Updated Hydrogeological Cross Sections
Attachment C - Copies of Notifications to Off-Site Property Owners for Potential Exposure to Soil Contaminates

cc: Archie Clouse - TNRCC, El Paso (1)
R. Keith Hopson - Brown McCarroll L.L.P., Austin (1)
Arturo Burgos - Hydrometrics, Inc., El Paso (1)
Tom Klempel - Hydrometrics, Inc., Tucson (1)
Kent Lang - ARCADIS, Phoenix (1)

ASARCO RESPONSES TO
TNRCC LETTER DATED OCTOBER 2, 2001

ASARCO Incorporated (Asarco) is in reciept of the Texas Natural Resources Conservation Commission (TNRCC or Agency) letter dated October 2, 2001. This letter made comments and requests for clarification and/or additional information concerning the ongoing Remedial Investigation (RI) of the El Paso Asarco Copper Smelter. For ease in addressing the matters raised by the TNRCC, the language from the various sections of the letter has been repeated in bold type. Immediately following is Asarco's response in italics.

The Texas Natural Resource Conservation Commission (TNRCC) has reviewed the Asarco document dated April 27, 2001 in which Asarco responded to TNRCC letter dated February 14, 2001. The TNRCC's comments are listed below:

1. **In the June 25, 1999 letter the TNRCC expressed concern over a basic assumption in the Baseline Risk Assessment (BLRA) for the Asarco El Paso facility. In Appendix A of the Phase II investigation Asarco responded to the June 25, 1999 TNRCC letter and expressed confidence in their BLRA assumptions. The Toxicology and Risk Assessment (TARA) Section of the TNRCC reviewed Asarco's BLRA. Their comments were included in the TNRCC's letter dated February 14, 2001. The TARA section has also reviewed Asarco's latest comments and their response is enclosed.**

   Our response to Baseline Risk Assessment concerns raised in the August 23, 2001 TNRCC Interoffice Memorandum is included as Attachment A to this correspondence.

2. **Asarco stated that they believe they have selected monitoring wells that are the most representative of background around the Asarco facility and that they have adequately characterized the nature, extent, direction, rate of movement, volume, composition of chemicals of concern in the environmental media pursuant to TAC § 335.553.b.1. Asarco collected two soil samples from borings at well locations EP-86 and EP-87 and used the highest concentration to represent background. This procedure is inadequate. Location EP-87 is in area where Asarco has managed waste from slag to other waste material that has been excavated from the main Asarco plant. Some of the waste material has since been removed or been recycled. For groundwater Asarco sampled wells EP-86, EP-87 and EP-89 and chose the highest metals concentration as a proposed background. Once again this procedure is inadequate at the present time. Also, the TNRCC does not believe that 2 or 3 samples can accurately characterize background.**

During the March 19, 2001 meeting, the TNRCC was informed that background concentrations for surface water, surface soil, and groundwater had been determined during the initial Remedial Investigation activities (Phase I RI). This information was presented in Appendix L of the October of 1998 Remedial Investigation Report. In the meeting, a substantial amount of time was dedicated to discuss the methodology used and the background concentrations developed by Asarco. Mr. Wilkinson indicated the TNRCC did not have any problem with the background numbers determined by Asarco. Mr. Wilkinson thought that Asarco could have possibly obtained higher numbers based on a larger number of background samples. In summary, no specific directives were given by TNRCC staff for getting more background information.

However, to delineate all affected media and to further evaluate background concentrations, during the months of May though July 2001, Asarco conducted an extensive soil sampling program in area east of the Asarco Plant (IA-20).

Consistent with the requirements of the Texas Risk Reduction Rules and as indicated in section VI.3 (Background Determination) of the July 23, 1998, "Consistency Memorandum of the Implementation of the Existing Risk Reduction Rule", the determination of site specific background concentrations for both surficial soil and groundwater were based on samples collected from areas thought as of have not been impacted by plant activities).

One additional monitoring well (EP-129) was installed for determining groundwater background concentrations. The monitoring well was installed east and upgradient of IA-11, away from the areas that Asarco historically used for the management of materials or wastes.

To evaluate a soil background concentration, seventy-one soil samples were obtained from thirty-one sampling locations within IA-20 (attached Table 1 and Figures 2-40a and 2-40b).

A total of forty-eight (48) surficial soil samples (0 to 4 inches) were obtained from sample locations BL3 to BL5, BL17 to BL24, and from BL31 to BL50.

Laboratory reports for these samples indicated arsenic, cadmium, and lead concentrations ranging from below laboratory detection limit (bldl) (10 mg/kg) to 235 mg/kg, from bldl to 47 mg/kg, and from 13 mg/kg to 1180, respectively. The average concentrations for arsenic, cadmium, and lead, based on the 95 % Upper Confident Limit of samples analyzed using RFX techniques, were 54.6 mg/kg, 11.7 mg/kg, and 279.5 mg/kg, respectively.

Seven soil samples were obtained from bedrock (BL14 to BL20)). Laboratory reports indicated arsenic and lead concentrations ranging from bldl to 34 mg/kg and from 25 mg/kg, and 280 mg/kg, respectively. Cadmium concentrations were bldl. The bedrock average concentrations for arsenic and lead, based on the 95 % Upper Confident

Limit of samples analyzed using RFX techniques, were 29 mg/kg and 113 mg/kg, respectively.

Borings BL3, BL4, and BL5 were drilled to depths ranging from 18 ft to 25 ft below ground surface (bgs). Soil samples were obtained from 0 to 2 ft, from 5 to 6 ft, from 10 to 11.5 ft, from 15 to 16.5 ft, from 20 to 21.5 ft, and from 25 to 26.5 ft bgs.

Laboratory reports for samples obtained from the 5 to 6 ft bgs interval indicated average arsenic and lead concentrations of 14.7 mg/kg and 133.3 mg/kg, respectively. Cadmium was bldl. Samples collected from the 10 to 11.5 ft bgs interval indicated average arsenic and lead concentrations of 7 mg/kg and 72 mg/kg, respectively. Cadmium was bldl. Samples collected from the 14 to 16.5 ft bgs interval indicated average arsenic and lead concentrations of 10 mg/kg and 67 mg/kg, respectively. Cadmium was bldl. Samples obtained from the 17.5 to 21.5 ft bgs interval displayed an average lead concentration of 40 mg/kg. The sample obtained at the 25 to 26.5 ft bgs interval displayed a lead concentration of 33 mg/kg. Samples obtained from the last two intervals indicated arsenic and cadmium were bldl.

Figures 2-40a and 2-40b and Table 1 show the sampling location where metal analysis have been obtained.

3. **A) Asarco believes that the extent of Arsenic contamination in the groundwater downgradient of their facility is defined by the low concentration of arsenic in the Rio Grande River. Since, Asarco is currently using the Risk Reduction Rules the TNRCC has consistently viewed that groundwater entering a surface water body has to meet surface water quality standards in Chapter 307. Asarco's groundwater well EP-111 adjacent to the Rio Grande has arsenic concentrations in excess of the surface water quality standards. Please address this concern.**

   Asarco is aware of groundwater arsenic concentrations at monitor well EP-111 location. To date there have not been any Rio Grande metal concentrations in excess of the surface water quality standards in immediate area of, and down gradient from, EP-111 (surface water sample locations SEP-2, SEP-12, SEP-13 and SEP-4). However, Asarco recognizes that this fact does not absolve the company from the fact that elevated arsenic concentrations do occur in EP-111.

   As discussed in the Phase III RI Report, hydrogeological characterization of the area indicates that very little flux from the shallow aquifer reaches the Rio Grande for the following reasons:

   - *The hydraulic gradient of groundwater flow in the floodplain in which EP-111 is located is very low, and the direction of flow is oblique to the river.*

- *The Rio Grande is a loosing stream much of the year, which means it supplies the aquifer. Our studies indicate that if the river gains, it is very little and may occur in an area that has not shown metal impacts in groundwater (EP-7 and SEP-4).*

* *During periods of low flow in the Rio Grande, adjacent groundwater levels are lower, which indicates groundwater flow may not directly enter the river.*

In response to this, during Phase III RI, Asarco initiated additional investigations in the area around EP-111. These investigations included additional soil sampling and the installation of four additional groundwater monitor wells (EP-127, EP-128, EP-130 and EP-132). This work assisted in further characterization and identification of the source(s) contributing to the elevated arsenic concentrations at EP-111.

Following the phased approach, the area around monitor well EP-111 will continue to be investigated for possible source materials (see Phase III RI Report). If this endeavor proves unsuccessful in finding sources for the elevated concentrations in Ep-111, Asarco believes that with the implementation of corrective action in Investigation Area 4 (Front Slope), the groundwater quality may improve in this area.

B) Asarco states "The intersection of groundwater with the bottom of the American Canal occurs at monitor well EP-66 (May through October) and further states "the difference between groundwater and surface water elevations near the Canal prevents any groundwater flow from entering the Canal during high flows." Then Asarco states "Groundwater gauging data obtained from monitoring wells EP-62, EP-66, EP-29, and EP-113, EP-111, EP-4, located upgradient and downgradient, respectively, of the American Canal have consistently indicated that the groundwater table in the vicinity of the canal is located at a lower elevation than the bottom of the American Canal." Asarco in one instance claim the groundwater flows underneath the American Canal then in another paragraph states the groundwater intersect the bottom of American Canal occurs at well EP-66. In a September 1990 report, page 19, Hydrometrics, Inc. stated that "the Diesel No.1 investigation indicated that the American Canal apparently acts as a groundwater interception trench in the vicinity of the ASARCO facility." The TNRCC has not received any elevation data for the bottom of the American Canal, please provide elevation data for points along the bottom of the American Canal to the TNRCC. Also, since groundwater and diesel had been observed entering the American Canal in 1990 there is physical evidence that the groundwater intersects and flows into the Canal. The TNRCC realizes that the observed flow into the canal will only occur during the Canal low flow to no flow. The TNRCC requested Asarco to demonstrate the difference in head pressure between the groundwater and the American Canal. From cross sections Asarco provided, the difference in head pressure between the groundwater and the bottom of the canal may range from ten to twenty feet. Please resurvey monitor wells along the American Canal and submit groundwater elevation monitoring data to the TNRCC in Table format. Please correct and submit new cross sections to the TNRCC, if necessary.

All monitoring wells have recently been resurveyed. A cumulative list of groundwater gauging data for all RI monitoring wells is presented in Appendix M of the Phase III RI Report. The data is presented in a table format. The list includes monitor wells ID No., sample date, top of the casing, depth to the water, and groundwater elevation. Updated cross-sections are included in Attachment B.

4. **Asarco states in point 4 of their April 27, 2001 response that "Averaged data were only used to generate maps of metal concentrations in the groundwater." Please refer to Tables 3-7, 3-9, 3-11, 3-13, 3-15, 3-16, 3-20, 3-22, 3-24, and 3-26 in Asarco's Phase II Remedial Investigation Report July 2000. Arsenic concentrations were evaluated for the tables listed above and found that either some or all the arsenic concentrations are average concentrations according to the summary of Groundwater Analytical Results in Appendix H. The TNRCC restates its position that average metal concentrations should <u>not</u> be presented in the investigation phase of a report. For presentation of the concentrations in the groundwater please use a table similar to the Summary of Groundwater Analytical Results in Appendix H without the calculations.**

   Asarco acknowledges that the information provided in the tables mentioned above is a summary of groundwater monitoring results averaged over four monitoring events. The TNRCC's comment "average metal concentrations should <u>not</u> be presented in the investigation phase of the report" has been noted and adjustments concerning the presentation of analytical data have been implemented in the Phase III RI Report. Summaries (no averages) of groundwater analytical result for each Investigation Area are provided in tables discussed in Section 2 of the Phase III RI Report. Cumulative lists of groundwater analytical results, general chemistry and metal analysis, for the period of record are included in Appendices D and E, respectively.

5. **Asarco has made an apparent transcription error between the lab sheet and the Summary of Groundwater Analytical Results table. Please refer to monitor well EP-49 in the Summary of Groundwater Analytical Results table. The May 14, 1999 sampling event, Asarco reported a concentration of 0.302 ppm for arsenic in the groundwater. The previous sampling event (February 25, 1999) from the same well reported a concentration of 320 ppm for arsenic in the groundwater. On further review, well EP-49 has a sample identification #EPRI-9905-118. Finding that sample identification in the lab sheets appendix, the lab reported a concentration of 302 ppm for arsenic in the groundwater. Please correct the table and incorporate a procedure to include well identification numbers corresponding to submitted plats on lab reports.**

   Asarco acknowledges that there was a transcription error in the dissolved arsenic concentration reported for EP-49 during the May of 1999 sampling event as reported in the July 2000 Phase II RI Report. The dissolved arsenic concentration reported in Appendix H-2 of the Phase II RI was 0.302 ppm. Review of laboratory and data validation reports indicate that the correct dissolved arsenic concentration in EP-49 *for the May of 1999 sampling event is 354 ppm. The dissolved arsenic concentration for the February sampling event is 320 ppm. Table 2-23 and Appendix E of the Phase III RI Report have been updated to reflect the correct dissolved arsenic concentration in EP-49.*

As for your request to "incorporate a procedure to include well identification numbers corresponding to submitted plats on lab reports", Asarco believes that the information requested is in the associated Data Validation Reports provided in the RI Reports. Sample identification numbers are unique to for each discrete sample, providing information pertaining the year, month and sample identification. Currently the project database contains approximately 69,650 data points or results for soil and water. We do not believe that changing the current methodology for sample identification at this stage of the investigation would be beneficial, therefore we propose no action concerning this request.

6. **Data provided by Asarco indicates that arsenic contamination exist both upgradient and downgradient of offsite properties. Since offsite properties are contaminated, please notify all offsite property owners to protect the owners from potential exposure. Asarco will notify the impacted property owners of all media which may have been affected. The proof of notification of contaminates should be sent to the Corrective Action Section within twenty-one (21) days from the date of this letter. The notification should include the contaminates and the media which may have been impacted and Asarco and TNRCC contacts if any questions arise.**

Asarco assumes that the TNRCC is referring to impacted groundwater occurring down gradient of Asarco properties. All upgradient monitor wells in the RI to date are located on Asarco property and no information upgradient of the Asarco property is available at this stage of the investigation.

Asarco has obtained access agreements with both the International Boundary and Water Commission (IBWC) and the Burlington Northern Santa Fe Railroad (BNSF), to permit the installation and maintenance of monitor wells on their properties, which are adjacent/downgradient to Asarco properties.

Currently, Asarco maintains five monitor wells (EP-111 through EP-113, EP-127 and EP-128) on IBWC property, and eight monitor wells (EP-20, EP-29, EP-35 EP-114 through EP-118) on BNSF property.

However, to properly comply with the TNRCC off-site notification requirements, all property owners adjacent to the Asarco Plant have been notified of potential exposure to soil contaminants resulting from historic smelting operations. The documentation of the notifications is included for your records in Attachment C.

7. **In the TNRCC letter dated July 13, 2000, the TNRCC requested Asarco to address the contaminated groundwater flowing offsite in an interim corrective measure. Asarco has continued to present the case for monitored Natural Attenuation of metals contaminated groundwater for their remedial response. At present time the TNRCC has not approved Natural Attenuation as a remedy. It should be kept in mind that a final remedy would need acceptance from affected property owners and the state.**

Asarco has not portrayed our "interim groundwater remediation plan" as strictly natural attenuation monitoring. We have provided the following actions that serve to minimize the migration of metals to groundwater:

- *Stopped leaks of acid at the surface, which had the potential to reach the shallow aquifer.*
- *Capping and storm water routing to prevent percolation and migration off-site.*
- *Removal of contaminated soils in areas like the Medford Sump.*

Asarco realizes that some of the items referenced above only gradually improve the groundwater impacts that currently exist. The following related issues contribute to our understanding that, in our phased approach, our corrective actions to date are appropriate:

- *Nothing has yet been approved by the state regarding interim groundwater remediation, so we have acted in good faith, voluntarily, in doing the actions described above, to address the groundwater impacts.*
- *If groundwater leaving the property is the trigger for such actions to be performed, we are unsure about what constitutes "leaving the property". Particularly when it passes under 2 narrow pieces of property that will not be utilized for ground water withdrawal before continuing under Asarco property.*
- *Our risk evaluation concludes that the pertinent exposure pathway is if the groundwater impacts the Rio Grande, which it does not.*
- *Groundwater is not used for, nor classified as, a potable water source in this area.*

Therefore at this time groundwater interim remediation is not critical to the preservation of human health.

Asarco does not intend to ignore groundwater impact issues. We are currently undertaking additional investigations and implementing selected corrective actions. It is possible that if additional information is gathered pertaining to source(s) and extents of COCs in groundwater, additional specific feasibility studies may be required. These studies may be, but are not limited to, best available demonstrated technologies that address abatement of groundwater issues, whether they be passive or direct treatment of impacted groundwater in individual IAs, based on appropriate objective criteria.

Investigation and subsequent corrective actions are in progress in the area of EP-111.

Finally, to ensure the effectiveness of the corrective actions, a detailed groundwater monitoring and sampling program will be implemented during the 3rd quarter of 2002 (see section 4.2.3 and 4.2.4 of the Phase III RI Report). Compliance wells (located along the Rio Grande) will be sampled quarterly to evaluate the effectiveness of the corrective actions and to verify regulatory compliance. If concentrations in these wells increase noticeably over three or mores sampling events, or if there is a sudden and substantial increase in any one compliance well when compared to the previous event, a contingency plan will be implemented to address groundwater problems.

ATTACHMENT A

RESPONSE TO THE TOXICOLOGY AND RISK ASSESSMENT CONCERNS

Response to the Toxicology and Risk Assessment Concerns

Asarco is pleased that many of the issues regarding the risk assessment have been addressed and that a common understanding of the Site's risks and corrective action needs is being achieved. Asarco recognizes that additional investigations in off-site areas are needed. These needs are identified in our responses below. A comprehensive presentation of our approach for addressing off-site areas is presented in the Phase III Report.

For ease in addressing comments, the language from TNRCC's letter is repeated in bold and is followed by Asarco's responses in Italics.

Overall Response

As the revised tables L-4 and L-5 indicate there are metals which are present at concentrations that would result in excess risks in the absence of controls for on-site soils, Smeltertown soils, and groundwater. Although this potential for excess risk was not the focus of the original Asarco submittal, the TNRCC and Asarco appear to be in agreement that metals concentrations present on-site are elevated above health-protective levels. The challenge will be coming to an agreement on the appropriate corrective measures to address the metals in a manner that is health protective and is consistent with TNRCC rules.

Asarco concurs and is pleased that there is agreement about on-site risks. We also agree that developing appropriate corrective measures is challenging. We endeavor to work within a spirit of cooperation, with mutual respect for our different positions, needs and understanding of the project.

1. Exposure Pathways Chart (Figure L-1).
Based on the response from Asarco that metals concentrations in soil exceed acceptable levels, the TNRCC agrees that changing the exposure pathways chart will not result in substantive changes in the BLRA conclusions for the on-site soils already identified as impacted. However, inclusion of the dermal pathway could impact decisions regarding the extent of contaminated soils both on-site and off-site. Although a revised BLRA has not been submitted, the simple comparison of metals concentrations to the revised Standard 2 MSCs presented in Tables L-7 and L-5 is a clear indication that health based levels are exceeded for soils already identified as impacted (see response). In addition, the TNRCC has confirmed that the dermal pathway has been incorporated into the derivation of the revised Standard 2 MSCs presented in Tables L-4 and L-5. Finally, as stated in the original TNRCC comment, the BLRA must consider both current and future exposure scenarios.

The dermal pathway will be shown on the flow chart provided in the Phase III Report. It is our understanding however, that dermal absorption is minimal to non-existent. The flow chart will also show all pathways in the absence of any controls.

The TNRCC did some off-site sampling for metals in the vicinity of Asarco, but these samples were not intended to be a comprehensive evaluation of potential soil contamination. The Agreed Order (Docket No. 06-0212-MLM-E). Ordering Provision 5(c) states that "Asarco shall pursue contamination across property boundaries in the SATE of Texas as necessary to determine the extent of contamination". In addition the 1993 Risk Reduction Rule and the Consistency Memorandum both clearly require that contaminants be investigated and delineated both horizontally and vertically in a given medium to background or to the practical quantification limit (PQL). This includes extending the

investigation to off-site properties when the PQL or background level has not been achieved at the property boundary. Further, for purposes of defining the extent of contamination, it should be noted that the PQL is defined as the lowest non-zero standard in the laboratory" calibration curve. The PQL as defined by the TNRCC is analogous to the MQL as it is currently defined in Update III of Test Methods for Evaluating Solid Waste (SW-846, 1996). As such, Asarco must evaluate any off-site area that has been potentially impacted by facility activities or operations, including adjacent residential and commercial property.

Asarco recognizes the need to evaluate potentially impacted off-Plant areas. Additional investigations have been performed along the east side of I-10 (Investigation Area 20, Phase III RI Report), surrounding the Calavera community (Investigation Area 19), and on the west side of the Rio Grande (a possible background location).

2. On-site Workers.
TARA agrees that comparisons of soil concentrations at Asarco with current TNRCC MSCs indicate concentrations above TNRCC default clean-up levels. TARA also concurs that it is appropriate to communicate information about the health and safety program that is in place to demonstrate that current workers are being protected, although this would not typically be part of a BLRA. As originally stated, biomonitoring alone does not afford sufficient protection and cannot be used to preclude the need for further remedial action at the site.

Asarco concurs, and we are developing a comprehensive corrective action plan.

3. Off-Site Residents.
Please see the TNRCC response under comment 1.

No response required.

4. Off-Site Workers.
Asarco did include a comparison of Smeltertown soil concentrations to MSCs in Table L-5, which is discussed in Section 5.3. With regards to the off-site workers, concern about the original TNRCC comment was in reference to the property where the International Boundary Water Commission (IBWC) is located, and to any other off-site commercial/industrial (C/I) properties. Section 3.2 of the BLRA explains the specifics of current exposure at the IBWC property, which is "completely paved" thereby preventing direct ingestion of soil at this time.

However, section 335.553 (b) (2) of the 1993 Risk Reduction Rule states that a BLRA should be prepared which describes potential adverse effects under both current and future conditions caused by the release of contaminants in the absence of any actions to control or mitigate the release. Therefore, because the risk assessment must reflect site conditions absent any controls, the presence of engineering (e.g., fences, caps, groundwater extraction systems) controls, or institutional (e.g., deed restrictions, personal protective equipment (PPE), etc.) controls should NOT be allowed as justification for ruling out exposure scenarios or pathways (Section V. Consistency Document). If an unacceptable risk or hazard is determined for a site assuming the absence of existing engineering or institutional controls, then such controls may be proposed as a risk management option during remedy selection.

In order future exposure scenarios, soil concentrations at impacted C/I property must be included in the calculations. The evaluation of IBWC workers did look at ingestion and

inhalation of dust, but not soil. All potential exposure routes from all affected medial should be considered at adjacent C/I properties that have been impacted by Asarco operations, including the IBWC.

Based on TNRCC's comments, Asarco intends to collect samples from 10 borings on the IBWC property. Samples will be collected at the surface and at regular intervals to a depth of 5 feet. Please see the Propòsed Additional Remedial Investigation Activities Section (4.6) of the Phase III RI Report.

5. Loading of Contaminants to Surface Water.
TARA agrees with this response.

No response required.

6. Inhalation Rate Adjustment.
As already discussed in our response to Comment 4 above, the BLRA must consider both current and future exposures to metals concentrations in soils in the absence of any controls. Therefore, potential exposures to metals in soils should be evaluated even if the area is paved over at this time. Although Asarco has provided updated TNRCC MSCs in Table L-4 and L-5, there is still not an adequate evaluation of potential future risk to a worker at the IBWC property because soil has not been evaluated. TARA agrees the EPA adult lead model does not require a separate input for inhalation. However, the inhalation pathway is relevant for other COCs.

Please refer to our response to comment 4.

7. Adult Lead Exposure.
TARA agrees with Asarco's response to Comment 7, which indicates that present lead levels in Smeltertown would preclude residential use. In addition, it appears that the measured lead levels in the Smeltertown area would also preclude full C/I use. The TNRCC also agrees that current IBWC workers may not be exposed to lead at levels of concern. However, current soil metal concentrations on the IBWC property may preclude full unrestricted C/I use and should be addressed. Adequate sampling must be completed to fully characterize the nature and extent of contamination on all potentially affected off-site properties.

Asarco concurs and is pleased that there is agreement on former Smeltertown issues. Regarding the IBWC, please refer again to our response to comment 4.

8. Toxicity Factors (Section 4.0) and Toxicity Profiles (Attachment L-4).
At the time that Asarco was preparing their BLRA, the recommendations outlined in the Consistency Document were being fully implemented across the agency. In fact, most of the recommendations outlined in the Consistency Document had been routinely utilized for many years prior to their incorporation of the most current toxicity factors and exposure pathways does not change the comparison to the revised Standard 2 MSCs presented in Tables L-4 and L-5 indicate metals in soil above levels of concern. All on-site areas exceed the MSC for one or more parameters. Similarly, nearly all samples in off-site, historic Smeltertown continue to exceed residential MSCs, with lead also being a concern for future C/I use. Additional information on the nature and extent of contamination is needed to make an appropriate decision regarding the IBWC property and other off-site areas. When such information becomes available, it is critical that the latest toxicity information be

utilized to determine potential risks associated with any contaminated soils in those areas.

We will continue to work with TNRCC in our efforts to keep current on developments. Additional off-site investigations are being undertaken, as addressed in the last paragraph of our response to comment 1.

9. Reasonable Maximum Exposure (RME) Concentrations.
The specific areas in the 1996 TNRCC-accepted workplan are areas of concern that were identified for investigation, and are not necessarily equivalent to exposure areas in a baseline risk assessment. Asarco asserts that concentrations of contaminants are sufficiently uniform within areas that subdividing the areas further would not substantially change remedial plans. The TNRCC agrees that the homogeneity of contamination is a legitimate justification for considering exposure areas manager will need to evaluate the data to determine if levels of contaminants are in fact similar across each investigation area. A map which clearly identifies each proposed exposure area, the square footage that each area represents, and the number of samples that will be used in risk calculations should be included in a baseline risk assessment to facilitate review of the proposed exposure areas. In addition, Asarco should be aware that if a response action is determined to be necessary for a specific exposure area, the remedy must apply to the entire exposure area which served as the basis for the determination of potential health risks.

A comprehensive correction action plan for the former Smeltertown area is provided in the Phase III Report (Section 4.0). We believe we now understand the issues associated with exposure area boundaries.

10. Nature and Extent Evaluation to Background.
The TNRCC agrees that on-site soils have metals present at concentrations well above background levels, clearly indicating the need for deed notification. However, the issue of whether or not background concentrations were appropriately determined will be more critical for off-site areas, as these areas have yet to be adequately characterized in terms of the nature and extent of contamination. A background value that is artificially elevated could lead to an erroneous conclusion that areas off-site have not been impacted, when in fact they may have been impacted. Again, due to the requirement to investigate all environmental media down to the PQL or background concentration, as well as the requirement for deed notice, it is critical that the background values be appropriately derived. The project manager will need to determine whether the background metals from well locations EP-86 and E)-87 are appropriate for this purpose.

Asarco recognizes that with the expansion of the investigation into off-site areas there is a greater need to determine contaminant background levels. It has been more challenging than initially anticipated to find a sufficient number of sites in the area that can be confidently identified as background. Plans for addressing this issue are presented in the Phase III Report. The EPA has already collected numerous samples in the area. Off-site investigation plans and schedules, including the development of background levels, may make use of information from EPA's investigation.

11. Smeltertown Surface Soil
As discussed in Comment 9, the project manager will need to determine whether the data supports the assertion that chemical concentrations are uniformly distributed. As previously mentioned, Asarco should be aware that if a response action is determined to be

necessary for a specific exposure area, the remedy must apply to the entire exposure area, which served as the basis for the determination of potential health risks.

Please see the second part of our response to comment number 9.

12. Surface Water.
In previous samples there were metals measured above their respective MCLs. Asarco has indicated that quarterly data collected to date indicate a consistent trend of concentrations below the MCL at all times of year. The project manager should verify this assertion.

Analytical data of water samples obtained from SEPs stations (American Canal and Rio Grande) during the Phase III RI, indicate concentration within regulatory limits (MCLs).

13. Groundwater Data.
The TNRCC agrees that Table L-8 indicates that maximum concentrations of contaminants in groundwater wells exceed MCLs. The remedial plans that are developed should focus on attainment of acceptable contaminant levels in groundwater, and future protection of the groundwater resource.

Agreed.

14. Summary.
One major concern with the original BLRA submittal was that it did not clearly indicate that on-site metals exceeded health protective levels in soil, and that certain metals in groundwater exceeded their respective MCLs. Another major concern was that the nature and extent of contamination had never been adequately delineated, especially off-site. Without this delineation, the risks associated with potential exposure could not be addressed.

TNRCC's interest in off-site properties is not unusual or sudden, given the history of the site. Understanding the potential impacts to off-site properties, both residential and C/I, is critical to making informed decisions about remedial activities at any facility, particularly when there is the potential for historical air deposition of contaminants. In addition, as already discussed in our response to Comment 1 above, the Agreed Order (Docket No. 96-0212-MLM-E) Ordering Provision 5(c) states that "Asarco shall pursue contamination across property boundaries in the State of Texas as necessary to determine the extent of contamination." As such, Asarco must delineate the full nature and extent of contamination, which includes extending the investigation off-site if necessary. Once the off-site contamination has been full delineated, Asarco should evaluate both the current and future health risks.

Off-site investigations have been initiated. Current and future health risks will be considered.

ATTACHMENT B

UPDATED HYDROGEOLOGICAL CROSS SECTIONS

ATTACHMENT C

COPIES OF NOTIFICATIONS TO OFF-SITE PROPERTY OWNERS FOR POTENTIAL EXPOSURE TO SOIL CONTAMINANTS

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

October 22, 2001

Mr. Ray Spangler
Burlington Northern and Santa Fe Railway Company
P.O. Box 961050
Ft. Worth, Texas 76161

**Re: Notification of Off-Site Property Owner
Burlington Northern and Santa Fe Railway Company
In Regards to the Remedial Investigation of the El Paso, Texas
Asarco Copper Smelter**

Dear Mr. Spangler:

By way of this letter ASARCO Incorporated (Asarco) notifies the Burlington Northern and Santa Fe Railway Company (BNSF) that BNSF owns property located adjacent to the El Paso Asarco Smelter may have been impacted by historic smelting operations.

Asarco is currently conducting a Remedial Investigation (RI) of its El Paso facility. The investigation includes, among other things, the characterization of metals (arsenic, cadmium, chromium, copper, iron, lead, selenium and zinc) in the soil, surface water, and groundwater at and near the Asarco Smelter.

Preliminary results of the RI indicate **no** imminent threat(s) to human health and/or the environment. These results do suggest that elevated levels of metals may exist in the soil and groundwater at your property.

Upon completion of the RI work, a copy of the report containing the findings will be provided to your office. Please feel free to contact me at (915) 541-1819 if you have any question or would like to discuss this subject further. If you would like, please fell free to call our project manager at the Texas Natural Resource Conservation Commission (TNRCC), Brad Wilkinson [(512) 239-2350].

Sincerely,

Lairy A. Johnson
Environmental Manager

C: Brad Wilkinson - TNRCC, Austin (1)
R. Keith Hopson - Brown McCarroll L.L.P., Austin. (1)
Arturo Burgos - Hydrometrics, Inc., El Paso (1)

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

October 22, 2001

Mr. Norman Siler
Director of Environmental Management
Union Pacific Railroad Company
1416 Dodge Street, Room 930
Omaha, Nebraska 68179

Re: **Notification of Off-Site Property Owner**
Union Pacific Railroad Company
In Regards to the Remedial Investigation of the El Paso, Texas
Asarco Copper Smelter

Dear Mr. Siler:

By way of this letter ASARCO Incorporated (Asarco) notifies the Union Pacific Railroad (UPR) that UPR owns property located adjacent to the El Paso Asarco Smelter may have been impacted by historic smelting operations.

Asarco is currently conducting a Remedial Investigation (RI) of its El Paso facility. The investigation includes, among other things, the characterization of metals (arsenic, cadmium, chromium, copper, iron, lead, selenium and zinc) in the soil, surface water, and groundwater at and near the Asarco Smelter.

Preliminary results of the RI indicate **no** imminent threat(s) to human health and/or the environment. These results do suggest that elevated levels of metals may exist in the soil and groundwater at your property.

Upon completion of the RI work, a copy of the report containing the findings will be provided to your office. Please feel free to contact me at (915) 541-1819 if you have any question or would like to discuss this subject further. If you would like, please fell free to call our project manager at the Texas Natural Resource Conservation Commission (TNRCC), Brad Wilkinson [(512) 239-2350].

Sincerely,

Lairy A. Johnson
Environmental Manager

C: Brad Wilkinson - TNRCC, Austin (1)
R. Keith Hopson - Brown McCarroll L.L.P., Austin. (1)
Arturo Burgos - Hydrometrics, Inc., El Paso (1)

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

October 22, 2001

Ms. Sylvia Waggoner
Environmental Engineer
International Boundary and Water Commission
4141 N. Mesa, C-310
El Paso, Texas 79902-1441

Re: Notification of Off-Site Property Owner
International Boundary and Water Commission
In Regards to the Remedial Investigation of the El Paso, Texas
Asarco Copper Smelter

Dear Ms. Waggoner:

By way of this letter ASARCO Incorporated (Asarco) notifies the International Boundary and Water Commission (IBWC) that property IBWC owns located adjacent to the El Paso Asarco Smelter may have been impacted by historical smelting operations.

Asarco is currently conducting a Remedial Investigation (RI) of its El Paso facility. The investigation includes, among other things, the characterization of metals (arsenic, cadmium, chromium, copper, iron, lead, selenium and zinc) in the soil, surface water, and groundwater at and near the Asarco Smelter.

Preliminary results of the RI indicate **no** imminent threat(s) to human health and/~~or~~ the environment. These results do suggest that elevated levels of metals may exist in the soil and groundwater at your property.

Upon completion of the RI work, a copy of the report containing the findings will be provided to your office. Please feel free to contact me at (915) 541-1819 if you have any question or would like to discuss this subject further. If you would like, please fell free to call our project manager at the Texas Natural Resource Conservation Commission (TNRCC), Brad Wilkinson [(512) 239-2350].

Sincerely,

Lairy A. Johnson
Environmental Manager

C: Brad Wilkinson - TNRCC, Austin (1)
R. Keith Hopson - Brown McCarroll L.L.P., Austin. (1)
Arturo Burgos - Hydrometrics, Inc., El Paso (1)

ASARCO

El Paso Plant
L. W. Castor, Unit Manager

October 22, 2001

Ms. Maribel P. Chavez, P.E.
District Engineer
Texas Department of Transportation
13301 Gateway West
El Paso, Texas 79928

Re: Notification of Off-Site Property Owner
Texas Department of Transportation
In Regards to the Remedial Investigation of the El Paso, Texas
Asarco Copper Smelter

Dear Ms. Chavez:

By way of this letter ASARCO Incorporated (Asarco) notifies the Texas Department of Transportation (TxDOT) that property TxDOT owns located adjacent to the El Paso Asarco Smelter may have been impacted by historical smelting operations.

Asarco is currently conducting a Remedial Investigation (RI) of its El Paso facility. The investigation includes, among other things, the characterization of metals (arsenic, cadmium, chromium, copper, iron, lead, selenium and zinc) in the soil, surface water, and groundwater at and near the Asarco Smelter.

Preliminary results of the RI indicate **no** imminent threat(s) to human health and/~~or~~ the environment. These results do suggest that elevated levels of metals may exist in the soil and groundwater at your property.

Upon completion of the RI work, a copy of the report containing the findings will be provided to your office. Please feel free to contact me at (915) 541-1819 if you have any question or would like to discuss this subject further. If you would like, please fell free to call our project manager at the Texas Natural Resource Conservation Commission (TNRCC), Brad Wilkinson [(512) 239-2350].

Sincerely,

Lairy A. Johnson
Environmental Manager

C: Brad Wilkinson - TNRCC, Austin (1)
R. Keith Hopson - Brown McCarroll L.L.P., Austin. (1)
Arturo Burgos - Hydrometrics, Inc., El Paso (1)

APPENDIX B

CUMULATIVE LIST OF SURFACE WATER QUALITY RESULTS (GENERAL CHEMISTRY)

APPENDIX B

CUMULATIVE LIST OF SURFACE WATER QUALITY RESULTS (GENERAL CHEMISTRY)

Cummulative List of Surface Water Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field		TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
SEP-1	8/15/97	6.03	8.38	8.3	910		873		635	275			66.9	62	15	114	8.4	180	220		1	U	156		81		0.65		0.5	
SEP-1	11/10/97	12.2	8.04	8	4660		4680		3424	13			65.5	196	77	793	60		381		1	U	1616		438		2.3		4.1	
SEP-1	2/13/98		7.38	7.9	4580		868	A	3300	20			79.5	203	76	748	67		388		1	U	1676		481		2.1		3.8	
SEP-1	5/20/98	6.79	8.75	8.2	1095		967		668	99			85.8	71	17	129	6.9		218		1	U	226		107		0.68		0.34	
SEP-1	8/11/98	5.9	8.46	8.3	951		958		630	242			67.6	66	15	113	8.1		237		1	,UJ4	185		82		0.64		0.17	
SEP-1	2/19/99	10.9	8.54	8.3	2100		1831		1363	28			77.4	109	26	315	13		275		1	U	313		248		0.83		2.6	
SEP-1	5/12/99	5	7.48	8	1172	J3	1319		746	76			74.1	73	18	140	7.6		190	J3	5	J3	216		92		0.72		0.14	UJ1,J4
SEP-1	8/20/99	5.1	8.05	8.3	918		913		572	522			61.2	59	12	102	6.9		242		1	,UJ4	196		76		0.64		0.58	
SEP-1	11/1/99	7.2	8.15	8.3	1803		1808		1135	29		12.7	55.0	99	25	215	11		276		1	U	423		220		0.73		1.3	UJ1
SEP-1	1/31/00	7.1	8.33	8.3	1402		1350		841	67	J4	29.6	78.3	85	19	191	7.3		244		1	U	232		167		0.74		1.1	UJ1
SEP-1	5/9/00	6.3	8.51	8.3	1120		1104		723	107		25	83.8	85	18	171	10		224		1	U	227		102		0.73	UJ1	0.47	
SEP-1	8/14/00	5.6	8.41	8.6	984		878		611	278		26	83.8	67	16	103	9.1		222		11		213		80		0.66	J3	0.66	J4
SEP-1	8/14/00	5.7	8.4	8.6	987		880		626	275			51.4	68	16	99	8.5		224		11		207		73		0.68	J3	0.51	J4
SEP-1	11/10/00	8.1	8.14	8.2	1728		1631		1177	307		27	61.0	106	26	211	11		338		1	U	310		206	J4	0.68		1.8	
SEP-1	2/23/01	8.4	8.61	8.4	1299		1368		805	86		40	71.6	66	15	128	7.2		244		4.8	J4	199		143		0.75		0.8	
SEP-1	5/16/01	9.5	8.6	8.3	946		868		606	265		52.1	88.2	68	16	116	9.1		207		1	U	207		90		0.7		0.53	
SEP-1	7/31/01	9	8.38	8.2	1046		1089		674	153		98.8	89.2	60	15	125	7.5		206		1	U	217		105		0.7		0.34	
SEP-1	7/31/01	8.9	8.52	8.3	1045		1099		664	155		98.1	83.1	61	16	130	8.3		215		1	U	210		100		0.71		0.32	
SEP-10	8/15/97	6.22	8.4	8.4	835		818		576	286			32.0	60	14	100	8.2	170	203		2		145		69		0.64		0.36	
SEP-10	8/15/97			8.3	837				543	339			60.8	60	14	100	8.3	174	212		1	U	131		67		0.64		0.37	
SEP-10	11/19/97	7.32	8.38	8.5	1970		2180		1337	16			51.8	103	25	278	13		278		12		436		255		0.82		3	
SEP-10	2/13/98		8.29	8.3	1474		230	A	960	80			80.1	82	17	228	7.4		229		1	U	264		175		0.68		3	
SEP-10	5/19/98	7.43	8.84	8.3	1066		1072		650	102			32.0	74	17	130	8		201		1	,UJ4	229		112		0.68		0.21	
SEP-10	5/19/98			8.4	1066				684	105			84.7	72	17	126	8.4		188		7	J4	229		109		0.68		0.21	
SEP-10	8/18/98	6.5	8.58	8.7	969		875		608	190			66.9	64	14	113	9		207		11		207		85		0.62		0.17	
SEP-10	11/18/98	7.5	8.32	8.4	1894		1882		1268	18			61.7	100	23	278	12		259		5		439		243		0.73		2.3	
SEP-10	2/19/99	10.4	8.41	8.2	2060		1675		1282	28			73.4	110	27	307	15		293		1	U	290		239		0.77		1.7	
SEP-10	5/13/99	6	7.14	8.3	1153		1068		748	62			82.2	77	20	135	8.1		242		1	U	204		92		0.72		0.1	U,UJ4
SEP-10	8/20/99	5.3	8.17	8.2	892		889		592	481			70.9	62	12	99	7.2		239		1	,UJ4	180		67		0.68		0.53	
SEP-10	11/1/99	9.3	8.21	8.3	2120		2080		1342	41		28.9	58.3	105	29	261	12		282		1	U	512		251		0.86		0.75	UJ1
SEP-10	2/14/00	9.1	8.37	8.5	2210		2100		1458	35		13	74.7	108	26	294	13		255		14.4	J4	382		290		0.87		1.6	
SEP-10	5/10/00	5.9	8.35	8.3	1076		1066		685	75		21.3	74.8	77	17	135	9.7		220		1	,UJ4	215	J4	94		0.72	UJ1	6.1	J4
SEP-10	5/10/00	6	8.36	8.5	1072		1067		678	78			79.9	78	17	138	9.5		206		7	J4	277	J3,J4	104		0.72	UJ1	0.18	J4
SEP-10	8/21/00	5.4	8.2	8.5	927		902		588	406		16.5	55.9	75	18	94	8.7		226	J3	10	J3	172		78		0.66		0.61	
SEP-10	11/15/00	11.5	8.62	8	2000		1958		1326	32		16.1	53.2	103	25	257	11		310		1	U	423		237		0.86		1.3	
SEP-10	2/28/01	7.4	8.55	8.2	1074		1048		675	154		86	72.9	64	14	107	7.3		233		1	U	201		117		0.71		0.49	J4
SEP-10	5/17/01	9.9	8.52	8.4	1094		1012		713	81		32	82.9	70	17	133	9.1		215		3.6		244		133		0.75		0.45	
SEP-10	7/31/01	8.3	8.17	8	1000		1041		657	228		133	32.0	61	15	119	9.7		209		1	U	193		101		0.7		0.15	
SEP-11	8/15/97	6.33	8.42	8.1	814		810		526	432			57.7	60	14	101	8.3	162	198		1	U	140		73		0.57		0.36	
SEP-11	11/10/97	6.97	8.3	8.3	1933		1741		1258	23			52.7	104	25	272	9.2		282		1	U	415		246		0.74		2.2	
SEP-11	2/13/98		8.32	8.4	1447		228	A	949	91			84.7	85	18	225	8.2		224		7		259		178		0.71		2.5	
SEP-11	5/19/98	7.19	8.79	8.5	1071		1063		660	104			85.5	72	17	126	9.4		178		17	J4	229		110		0.66		0.21	
SEP-11	8/18/98	6.43	8.59	8.7	968		869		623	202			69.3	65	15	115	9.7		207		11		203		86		0.6		0.14	
SEP-11	11/18/98	7.8	8.53	8.5	1877		1860		1219	23			32.0	102	24	276	12		261		5		438		246		0.74		2	
SEP-11	11/18/98			8.5	1885				1256	17			58.5	102	24	275	12		261		5		430		234		0.73		2.1	
SEP-11	2/19/99	10.9	8.47	8.3	2060		1633		1390	31			73.2	112	28	292	15		289		1	U	299		237		0.79		1.9	

Cummulative List of Surface Water Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l	F mg/l		N mg/l	
SEP-11	5/13/99	5.8	7.06	8.4	1151	1099		755	70		73.4	75	19	140	7.8		239		5		204		98	0.72		0.25	J4
SEP-11	5/13/99	5.7	7.07	8.4	1154	1101		727	65		83.3	75	19	140	7.6		227		5		192		103	0.72		0.1	U,UJ4
SEP-11	8/20/99	5.4	8.18	8.3	895	887		581	500		50.0	63	13	100	7.3		244		1	,UJ4	191		69	0.64		0.51	
SEP-11	11/2/99	7.8	7.63	8.4	1972	2110		1294	37	22.9	58.3	106	28	240	11		289		1	U	415		206	0.78		0.62	
SEP-11	2/14/00	9.5	8.52	8.6	2300	2222		1517	17	16	75.4	112	29	315	14		246		13.8	J4	344		310	0.86		1.6	
SEP-11	5/10/00	6.2	8.36	8.3	1083	1067		687	79	28.5	80.4	79	18	137	10		218		1	,UJ4	217	J4	98	0.72	UJ1	0.32	J4
SEP-11	8/21/00	5.8	8.2	8.3	929	907		583	401	17	54.9	69	17	89	8.2		250	J3	1	,UJ3	186		83	0.65		0.58	
SEP-11	11/15/00	10.7	8.6	8	2060	2010		1359	30	17.3	54.9	104	26	267	11		311		1	U	450		251	0.8		1.5	
SEP-11	11/15/00	10.9	8.61	8	2060	2010		1371	32		54.0	105	25	261	11		312		1	U	395		243	0.82		1.6	
SEP-11	2/28/01	7.7	8.51	8.1	1141	1119		739	131	74.9	72.3	70	16	129	8.2		235		1	U	230		130	0.72		0.56	J4
SEP-11	5/17/01	7.5	8.45	8.4	1083	984		690	107	29	82.8	72	17	134	9.3		223		3.6		215		126	0.73		0.6	
SEP-11	7/31/01	8	8.17	7.9	1003	1042		654	213	139	32.0	60	15	119	8.4		195		1	U	221		99	0.68		0.15	
SEP-12	8/15/97	6.34	8.47	8.3	850	834		590	224		52.5	61	14	101	8.2	176	215		1	U	134		68	0.64		0.38	
SEP-12	11/10/97	6.64	8.37	8.3	1970	1648		1323	31		48.9	105	26	272	11		285		1	U	427		254	0.75		2.2	
SEP-12	2/13/98		8.39	8.4	1422	212	A	911	97		82.6	85	18	211	7.5		223		10		253		176	0.68		1.8	
SEP-12	5/19/98	6.87	8.82	8.4	1064	1125		646	99		76.6	71	17	127	14		185		10	J4	216		105	0.66		0.22	
SEP-12	8/20/98	5.55	8.6	8.4	952	974		644	204		69.3	60	14	112	8.2		224		2		180		81	0.62		0.29	
SEP-12	11/18/98	8	8.24	8.4	1877	1866		1283	20		57.9	105	25	277	12		266		5		431		232	0.72		1.9	
SEP-12	2/19/99	9.9	8.39	8.3	2070	1573		1100	26		70.3	113	30	303	16		295		1	U	301		238	0.78		1.5	
SEP-12	5/13/99	5.8	6.94	8.4	1166	1214		735	57		81.0	76	20	145	7.5		239		1		220		97	0.69		0.16	J4
SEP-12	8/20/99	5.5	8.15	8.3	902	900		597	476		70.3	62	13	97	7.2		237		1	,UJ4	195		69	0.66		0.53	
SEP-12	11/1/99	7.8	8.34	8.5	2060	2070		1316	31	22.1	68.5	100	30	254	12		251		8.4		479		259	0.8		0.8	UJ1
SEP-12	11/1/99	9.1	8.36	8.5	2060	2070		1311	30	25.3	53.1	101	29	256	12		253		8.4		450		250	0.78		0.89	
SEP-12	2/14/00	9.6	8.42	8.5	2330	2300		1525	22	16	72.0	113	30	315	13		283		12	J4	598		299	0.9		1.5	
SEP-12	5/10/00	5.7	8.35	8.2	1092	1084		688	64	33.3	80.1	76	17	133	9.3		220		1	,UJ4	223	J4	108	0.71	UJ1	0.27	J4
SEP-12	8/21/00	5.4	8.25	8.4	930	917		594	418	17	51.6	77	19	95	9.3		266	J3	4.8	J3	190		85	0.66		0.69	
SEP-12	11/15/00	10.2	8.44	8.3	2060	2040		1367	29	42	52.0	103	25	257	10		314		1	U	456		245	0.79		1.6	
SEP-12	2/28/01	10.1	8.64	8.1	1180	1152		744	95	57	70.0	67	16	134	8.1		220		1	U	237		127	0.74		0.57	J4
SEP-12	5/17/01	8.7	8.46	8.3	1090	972		697	92	32	78.6	73	18	136	9.8		215		1	U	208		111	0.75		0.49	
SEP-12	8/1/01	7.4	8.22	8.2	1027	979		661	170	167	32.0	65	16	120	11		205		1	U	214		100	0.69		0.4	J4
SEP-13	8/15/97	7	8.47	8.2	854	852		554	305		50.9	61	14	102	8.3	180	220		1	U	141		76	0.65		0.38	
SEP-13	11/10/97	6.1	8.42	8.3	1993	1613		1304	38		49.6	107	27	286	9.7		287		1	U	422		249	0.77		2.1	
SEP-13	2/13/98		8.39	8.4	1394	207	A	911	95		79.0	88	19	209	8		234		7		246		166	0.7		1.5	
SEP-13	5/19/98	7.64	8.68	8.5	1051	1058		621	79		77.0	71	17	129	8.8		198		10	J4	221		109	0.65		0.24	
SEP-13	8/20/98	5.37	8.6	8.4	954	965		671	234		32.0	61	14	111	7.5		223		2		179		80	0.62		0.27	
SEP-13	8/20/98			8.4	954			642	227		68.0	61	14	111	6.9		220		2		177		81	0.62		0.26	
SEP-13	11/18/98	8.8	8.06	8.5	1884	1868		1259	19		57.2	102	24	273	12		266		5		443		238	0.72		1.9	
SEP-13	2/19/99	11.4	7.92	8.3	2090	1584		1169	24		68.7	117	32	300	16		304		1	U	309		238	0.8		1.4	
SEP-13	5/13/99	5.8	6.89	8.6	1182	1321		735	55		84.0	75	19	140	7.8		249		7		217		99	0.6		0.1	U,UJ4
SEP-13	8/20/99	5.5	8.17	8.3	889	880		614	455		70.9	58	12	99	7.1		220		1	,UJ4	182		67	0.66		0.5	
SEP-13	11/1/99	9.7	8.34	8.5	2070	2070		1299	33	22.6	52.7	99	30	263	12		238		10.8		444		240	0.79		0.74	UJ1
SEP-13	2/14/00	8.4	8.42	8.5	2330	2290		1554	17	13.2	52.9	117	31	316	14		277		9.6	J4	575		291	0.86		1.5	
SEP-13	2/14/00	8.3	8.42	8.5	2320	2290		1534	17		71.4	113	31	319	14		264		14.4	J4	484		291	0.86		1.5	
SEP-13	5/10/00	5.9	8.38	8.5	1100	1091		684	62	27.4	84.6	78	18	142	9.4		220		4.8	J4	211	J4	103	0.72	UJ1	0.23	J4
SEP-13	8/21/00	6	8.16	8.3	931	914		602	427	17.6	79.7	78	18	94	9.3		255	J3	1	,UJ3	172		81	0.65		0.69	
SEP-13	8/21/00	6	8.21	8.3	931	916		607	428		51.8	74	18	94	9.3		265	J3	1	,UJ3	178		82	0.65		0.71	

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Cummulative List of Surface Water Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
SEP-13	11/15/00	10.5	8.42	8.3	2100	2080	1420	52	38	52.2	106	27	270	10		317	1 U	454	259	0.82	1.6
SEP-13	2/28/01	10.4	8.56	8	1201	1177	753	90	51.2	52.2	62	15	129	7.4		207	1 U	256	140	0.75	0.53 J4
SEP-13	2/28/01	10.6	8.56	8	1201	1176	735	90		65.8	63	15	125	7.4		221	1 U	217	142	0.71	0.69 J4
SEP-13	5/17/01	8	8.46	8.4	1099	948	704	66	28.3	79.3	70	17	135	9.1		211	2.4	244	131	0.75	0.64
SEP-13	8/1/01	7.4	8.03	8.3	1030	985	687	180	130	32.0	64	16	120	11		217	1 U	220	97	0.71	0.36 J4
SEP-14	11/12/98		9.33	8.9	272	255	182	50 J4		88.5	24	4	22	5 U		77	10	65	7.6	0.32	0.1 U
SEP-14	8/11/99	6.4	9.03	7.8	160	165	103	53		87.1	15	2.7	12	5 U		51	1 U	20	1.1	0.28	0.09
SEP-14	8/21/00	5.9	8.33	7.7	183	182	136	49	5.8	55.8	12	3	16	2.6		54	1 U	33	6	0.24	0.41
SEP-14	11/14/00	10.2	8.43	7.6	152	148.1	116	51	6.11	55.8	15	2.9	8.9	2.5		59	1 U	20	3.7	0.16	0.55
SEP-14	11/14/00	10.2	8.36	7.8	151	148	106	43		90.9	14	2.7	8.2	3		93	1 U	20	4.8	0.16	0.39
SEP-14	6/27/01	4.6	6.79	6.8	306	3500 A	262	71	88.2	91.4	23	4.5	26	7.7	42	51	1 U	75	9.2	0.35	1.1
SEP-14	6/27/01	4.7	6.81	6.5	308	3490 A	232	75	89.7	32.0	24	4.8	26	7.9	52	63	1 U	73	9.6	0.35	1.2
SEP-2	8/15/97	6.25	8.4	8.3	842	830	585	180		53.2	61	14	102	8.2	172	210	1 U	131	75	0.64	0.35
SEP-2	11/10/97	6.48	8.39	8.3	1950	1643	1289	25		50.9	104	25	277	7.7		271	1 U	415	248	0.75	2.3
SEP-2	2/13/98		8.38	8.4	1440	218 A	961	95		81.0	84	18	217	7.5		231	7	256	171	0.69	1.8
SEP-2	5/19/98	7.15	8.83	8.5	1068	1071	667	92		86.0	72	17	128	8.4		192	9 J4	233	108	0.66	0.22
SEP-2	8/18/98	6.33	8.6	8.7	966	854	621	202		67.5	66	15	116	9.3		206	11	204	84	0.62	0.13
SEP-2	11/18/98	8.4	8.46	8.5	1877	1865	1269	20		55.9	102	24	275	12		264	5	436	234	0.72	2.1
SEP-2	2/19/99	9.4	8.48	8.3	2080	1576	1252	31		54.3	115	33	299	18		295	1 U	294	237	0.79	1.5
SEP-2	2/19/99	9.8	8.5	8.3	2070	1571	1195	32		71.4	115	30	300	16		293	1 U	246	247	0.8	1.4
SEP-2	5/13/99	6	7.04	8.4	1179	1116	746	63		78.1	77	19	140	7.7		227	5	226	95	0.72	1.4
SEP-2	8/20/99	5.9	8.12	8.3	887	887	556	339		70.5	58	12	97	7		234	1 UJ4	185	77	0.64	0.23 J4
SEP-2	11/1/99	10.2	8.32	8.5	2110	2120	1345	36	26.9	55.0	103	30	261	13		249	8.4	516	244	0.82	0.75 UJ1
SEP-2	2/14/00	10.2	8.46	8.5	2330	2280	1551	24	13	72.5	119	31	315	13		275	12 J4	593	297	0.85	1.3
SEP-2	5/10/00	5.2	8.38	8.3	1086	1084	694	74	24.2	80.2	77	17	131	9.5		220	1 UJ4	211 J4	103	0.72 UJ1	0.33 J4
SEP-2	8/21/00	5.4	8.25	8.3	931	911	609	426	17.8	52.9	75	19	91	8.4		272 J3	1 UJ3	184	87	0.69	0.69
SEP-2	11/15/00	10.4	8.53	7.9	2070	2040	1363	50	17.8	53.4	107	26	261	11		342	1 U	443	210	0.82	1.3
SEP-2	2/28/01	10	8.65	8	1179	1147	739	116	64	73.0	72	17	142	8.5		232	1 U	244	136	0.72	0.59 J4
SEP-2	5/17/01	9	8.44	8.3	1090	1009	697	116	27	73.2	71	17	135	9.9		207	1 U	239	130	0.74	0.47
SEP-2	5/17/01	9	8.43	8.4	1090	1012	691	107	27	80.4	71	17	130	9.1		212	2.4	240	116	0.73	0.52
SEP-2	7/31/01	7.5	8.14	8.1	988	1030	624	254	210	32.0	57	15	119	7.9		270	1 U	191	92	0.69	0.16
SEP-3	8/18/97	5.33	8.25	8.4	959	946	633	229		70.3	66	15	124	8.2	172	205	2	182	82	0.66	0.63
SEP-3	11/19/97	12.4	7.8	7.6	5250	6200	3954	14		68.9	225	94	943	53		239	1 U	1839	597	2.1	12
SEP-3	2/13/98		7.84	8.1	5410	1054 A	3979	21		80.6	216	89	965	54		342	1 U	1832	679	1.8	8.6
SEP-3	5/20/98	6.65	8.76	8.2	1092	967	661	98		89.8	70	17	126	8.1		218	1 U	226	107	0.68	0.33
SEP-3	8/11/98	6.44	8.45	8.5	977	986	663	230		32.0	62	14	112	7.5		217	7 J4	200	79	0.64	0.33
SEP-3	8/11/98			8.5	976		654	218		77.9	63	14	113	7		214	5 J4	195	84	0.64	0.34
SEP-3	5/12/99	5	7.77	9.4	1168 J3	1319	746	83		77.9	73	18	140	7.5		224 J3	5 J3	232	98	0.73	0.38 UJ1,J4
SEP-3	5/12/99	3.6	7.77	9.5	1175 J3	1265	709	90		77.2	74	19	140	7.6		227 J3	5 J3	230	101	0.7	1 J4
SEP-3	8/20/99	5.6	8.22	8.3	915	921	582	522		62.8	60	12	104	7.1		251	1 UJ4	197	76	0.64	0.57
SEP-3	11/1/99	6.2	8.19	8.4	1826	1889	1186	33	17.2	55.4	104	25	223	11		271	1 U	417	188	0.73	1.3 UJ1
SEP-3	1/31/00	7.5	8.29	8.3	1400	1356	853	64 J4	29.6	79.0	91	21	193	8.6		240	1 U	235	160	0.71	1.3 UJ1
SEP-3	5/9/00	6.4	8.5	8.3	1123	1096	722	103	25	83.7	85	18	168	9.5		226	1 U	225	115	0.73 UJ1	0.67
SEP-3	8/14/00	6	8.35	8.6	987	882	634	280	25	51.6	71	16	103	9.3		221	11	208	76	0.68 J3	0.57 J4
SEP-3	11/10/00	8.1	8.2	8.2	1784	923 R	1208	294	28	63.5	113	29	225	11		342	1 U	335	222 J4	0.7	2.2
SEP-3	2/23/01	7.3	8.53	8.5	1339	1393	830	98	40	71.4	73	16	158	8.6		224	7 J4	245	168	0.74	1.2

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Cummulative List of Surface Water Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
SEP-3	5/16/01	8.6	8.52	8.3	1001	916	638	228	51	81.3	67	16	124	9.7		211	1 U	226	106	0.69	0.53
SEP-3	8/1/01	7.9	8.21	8.2	1046	891	673	194	157	80.6	63	16	124	10		220	1 U	194	106	0.68	0.56 J4
SEP-3	8/1/01	7.9	8.2	8.2	1046	894	680	187	152	75.9	64	16	125	11		214	1 U	212	104	0.7	0.56 J4
SEP-4	8/15/97	6.37	8.54	8.4	858	855	571	321		50.0	62	14	104	8.1	178	212	2	149	74	0.66	0.39
SEP-4	11/10/97	6.75	8.39	7.9	1952	1595	1289	31		45.7	107	26	275	8		299	1 U	424	249	0.77	1.7
SEP-4	2/13/98		8.41	8.4	1388	197.7 A	878	106		78.3	86	19	203	8		235	7	246	160	0.73	1.3
SEP-4	5/19/98	7.37	8.86	8.4	1054	1060	640	82		78.3	72	17	120	8.7		192	8 J4	217	110	0.66	0.23
SEP-4	8/20/98	5.99	8.58	8.4	954	960	642	198		65.7	60	14	111	7.8		222	2	176	82	0.62	0.27
SEP-4	11/18/98	8	7.71	8.5	1893	1879	1272	25		58.1	105	25	282	12		266	5	418	234	0.72	1.9
SEP-4	2/19/99	10.2	8.28	8.3	2100	1643	1116	24		68.7	116	31	310	16		306	1 U	288	247	0.78	1.5
SEP-4	5/13/99	5.6	6.84	8.5	1194	1279	776	55		82.6	76	20	140	7.1		229	7	239	97	0.7	0.1 U,UJ4
SEP-4	8/20/99	6.1	8.14	8.6	898	896	588	475		68.2	59	12	98	7.1		218	16 J4	188	74	0.66	0.54
SEP-4	11/1/99	10.2	8.37	8.4	2120	2390	2069	33	50.5	50.0	96	29	263	12		246	1 U	450	217	0.8	0.81 UJ1
SEP-4	2/14/00	10.9	8.65	8.4	2440	2360	1574	61	15	67.1	112	32	334	13		270	7.2 J4	501	315	0.88	1.7
SEP-4	5/10/00	6.4	8.31	8.3	1122	1130	519	58	28	80.1	78	18	146	9.7		227	1 ,UJ4	223 J4	113	0.72 UJ1	0.24 J4
SEP-4	8/21/00	5.6	7.95	8.3	938	922	617	437	18	50.4	85	21	101	11		271 J3	1 ,UJ3	181	83	0.64	0.6
SEP-4	11/15/00	9.6	8.24	8.2	2160	2130	1448	55	40	50.5	113	28	287	11		320	1 U	492	247	0.81	1.3
SEP-4	2/28/01	9.3	8.34	7.9	1226	1210	777	95	56.8	66.0	63	16	132	7.3		220	1 U	243	141	0.76	0.67 J4
SEP-4	5/17/01	8	8.31	8.3	1106	943	705	80	29.3	88.3	71	17	136	9.9		220	1 U	245	116	0.75	0.54
SEP-4	7/31/01	10.1	8.5	8.1	1047	1102	652	176	114	32.0	61	16	128	7.5		220	1 U	217	110	0.72	0.15
SEP-6	8/18/97	5.33	8.28	8.4	961	943	643	178		76.3	65	15	121	8.3	174	207	2	176	85	0.66	0.76
SEP-6	8/20/99	5.4	8.24	8.2	915	914	566	521		76.8	59	12	102	7.2		250	1 ,UJ4	191	73	0.66	0.57
SEP-6	8/20/99	5.4	8.25	8.6	915	914	594	488		64.6	61	12	102	7.1		214	13 J4	188	70	0.66	0.57
SEP-6	11/1/99	6.7	8.25	8.4	1830	1871	833	33	16.8	54.7	107	27	235	11		271	1 U	416	215	0.73	1.3 UJ1
SEP-6	1/31/00	7.2	8.34	8.2	1412	1372	861	62 J4	27	79.9	88	21	193	8.4		228	1 U	242	192	0.7	1.4 UJ1
SEP-6	5/9/00	6.2	8.52	8.3	1122	1104	703	108	25	78.3	80	18	146	9.8		226	1 U	210	98	0.72 UJ1	0.59
SEP-6	5/9/00	6.3	8.51	8.3	1124	1106	700	104		82.2	78	18	140	9.1		228	1 U	218	118	0.72 UJ1	0.63
SEP-6	8/14/00	5.5	8.36	8.6	987	869	630	274	25	51.8	65	15	93	8.2		223	11	188	73	0.68 J3	0.63 J4
SEP-6	11/10/00	7.9	8.19	8.2	1880	1777	1275	296	29	60.8	106	27	221	10		334	1 U	360	204 J4	0.7	2.2
SEP-6	2/23/01	7.6	8.52	8.4	1338	1406	824	93	40	61.5	72	16	155	8.4		234	4.8 J4	236	158	0.74	1.2
SEP-6	2/23/01	7.8	8.6	8.4	1333	1400	837	94		71.8	73	16	155	8.4		234	2.4 J4	245	160	0.72	1.2
SEP-6	5/16/01	8.3	8.47	8.2	1000	916	638	191	56	80.4	71	17	125	9.9		207	1 U	218	108	0.67	0.64
SEP-6	8/1/01	7.7	8.16	8.2	1045	991	663	182	127	77.9	64	16	124	9.5		214	1 U	212	105	0.68	0.55 J4
SEP-7	8/18/97	4.97	8.35	8.4	896	896	594	257		61.3	66	15	115	8	176	210	2	157	75	0.66	0.37
SEP-7	11/10/97	6.96	8.16	8.3	1924	1796	1290	38		58.6	100	24	272	12		275	1 U	412	249	0.75	2.7
SEP-7	2/13/98		8.49	8.5	1479	249 A	959	47		78.8	83	18	232	7.9		204	11	285	178	0.71	3
SEP-7	5/20/98	6.3	8.79	8.2	1083	963	649	102		88.0	70	17	124	7		224	1 U	224	103	0.66	0.21
SEP-7	8/11/98	6.47	8.45	8.5	976	974	622	209		66.6	65	14	117	6		214	5 J4	195	85	0.64	0.32
SEP-7	11/18/98	8.4	8.35	8.4	1899	1892	1269	12		65.5	100	24	292	12		253	5	441	249	0.74	2.6
SEP-7	2/19/99	16.5	8.41	8.3	2100	1775	1351	17		77.2	112	27	315	14		289	1 U	325	241	0.83	1.5
SEP-7	5/12/99	5.2	7.54	8.3	1158 J3	1380	698	93		75.9	77	20	140	10		281 J3	1 ,UJ3	207	567	0.7	0.13 UJ1,J4
SEP-7	8/20/99	5.8	8.14	8.4	894	896	603	565		58.5	60	12	101	7.3		217	6 J4	166	64	0.64	0.52
SEP-7	11/1/99	7	8.15	8.3	1800	1836	1133	31	14.2	54.5	92	23	193	9.6		273	1 U	379	224	0.7	0.9 UJ1
SEP-7	1/31/00	7.7	8.36	8.3	1402	1366	849	67 J4	25.8	77.4	88	19	190	7.6		239	1 U	248	185	0.73	1.3 UJ1
SEP-7	5/9/00	7.4	7.76	8.4	1108	1093	697	106	25	83.8	86	19	162	9.6		215	7 UJ1	226	109	0.71 UJ1	0.41
SEP-7	8/14/00	5.7	8.41	8.6	956	892	603	286	24	51.6	72	17	100	9.1		229	4.8	187	78	0.69 J3	0.53 J4

A

Cummulative List of Surface Water Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field		TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
SEP-7	11/10/00	8.1	7.49	8.2	1771		1642		1202	311	28	61.7	114	27	218	12		342		1	U	292		205	J4	0.68		1.7	
SEP-7	2/23/01	7.3	8.56	8.4	1338		1386		835	88	40	70.2	74	17	161	8.5		237		4.8	J4	225		163		0.77		1.2	
SEP-7	5/16/01	8.7	8.53	8.2	996		899		629	214	54	70.2	69	16	126	10		210		1	U	231		117		0.71		0.59	
SEP-7	5/16/01	8.2	8.52	8.3	1000		898		637	223	49	91.6	68	16	123	9.7		203		1	U	235		103		0.69		0.62	
SEP-7	7/31/01	9.1	8.38	8.2	1045		1083		660	166	101	78.8	61	16	128	7.7		207		1	U	199		103		0.67		0.21	
SEP-8	8/18/97	5.26	7.49	8.3	958		969		677	11		80.1	65	15	121	8.2	178	217		1	U	190		85		0.67		0.62	
SEP-9	8/15/97	6.14	8.23	8.3	1133		1108		730	223		60.3	64	15	155	9.5	174	212		1	U	203		116		0.68		2.3	
SEP-9	11/10/97	6.6	8.14	8.3	1886		1771		1225	16		62.6	99	23	285	10		254		1	U	401		248		0.77		3.7	
SEP-9	2/13/98		8.18	8.2	1550		278	A	1030	44		81.0	71	15	272	8.9		200		1	U	286		206		0.7		6.5	
SEP-9	5/19/98	7.38	8.49	8.5	1273		1082		797	80		78.8	71	16	173	8.7		195		8	J4	262		150		0.7		2.4	
SEP-9	8/18/98	5.61	8.26	8.5	1142		1166		712	169		70.0	67	15	154	10		214		6		236		115		0.68		2.5	
SEP-9	11/18/98	7.8	8.35	8.3	1950				1298	7.5		64.9	85	19	310	12		224		1	U	442		272		0.77		5.5	
SEP-9	2/19/99	10.9	8.31	8.1	2050		1763		1342	14		78.6	86	20	323	14		226		1	U	331		261		0.8		5	
SEP-9	5/12/99	3.7	7.65	8.4	1156	J3	1267		639	70		79.3	74	19	140	6.6		227	J3	5	J3	221		97		0.72		0.1	U,UJ4
SEP-9	8/20/99	5.6	7.92	8.3	1303		1301		836	485		55.8	63	13	176	8.5		216		1	,UJ4	268		150		0.74		3.5	
SEP-9	11/1/99	7.6	7.8	8.3	1804		1846		1145	24	12.7	52.3	96	24	204	10		282		1	U	381		211		0.71		1.4	UJ1
SEP-9	2/14/00	6.1	8.03	8.3	2120		2050		1341	36	15	70.9	100	23	285	12		246		1	,UJ4	341		185		0.81		2.7	
SEP-9	5/10/00	5.5	7.19	8	1446		1465		918	58	19.8	83.1	74	16	224	10		220		1	,UJ4	237	J4	190		0.79	UJ1	3.5	J4
SEP-9	8/21/00	5.4	7.84	8.2	1264		1242		803	248	17	59.5	67	15	155	8.1		227	J3	1	,UJ3	236		145		0.75		3.8	
SEP-9	11/15/00	7.2	8.32	7.9	1960		1919		1275	29	11.8	54.0	87	19	268	9.8		259		1	U	348		245		0.8		3.4	
SEP-9	2/28/01	8.4	7.88	7.9	1375		1346		882	152	60.5	77.9	72	16	195	9.4		207		1	U	276		173		0.75		3.4	
SEP-9	5/17/01	8.5	8.15	8.1	1400		1479		901	78	28.6	88.7	71	17	203	12		217		1	U	290		206		0.81		3.2	
SEP-9	7/31/01	8.7	8.35	8.2	1143		1176		750	158	84.5	32.0	69	17	145	8.6		215		1	U	245		110		0.72		0.85	

Note:

J The associated numerical value is an estimated quantity because quality control criteria were not met

J2 calibration range exceeded or significant deviation from known values. Possible bias.

J3 Holding time not met. Indicates low bias.

J4 Other QC outside control limits

U Undetected. Below method detection limits.

UJ The material was analyzed for, but was not detected above the associated value

UJ1 Blank contamination. Indicates possible high bias and/or false positive.

UJ2 Calibration range exceeded or significant deviation from known value

UJ3 Holding times not met. Indicates low bias

UJ4 Other QC outside control limits

R Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification

A Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code)

APPENDIX C

CUMULATIVE LIST OF SURFACE WATER QUALITY RESULTS (METAL ANALYSIS)

APPENDIX C

CUMULATIVE LIST OF SURFACE WATER QUALITY RESULTS (METAL ANALYSIS)

Cummulative List of Surface Water Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
SEP-1	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-1	11/10/97	0.82		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.02 U	
SEP-1	2/13/98	0.62		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.02 U	
SEP-1	5/20/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.004 U		0.005 U		0.02 U	
SEP-1	8/11/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-1	2/19/99	0.008		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.025	
SEP-1	5/12/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-1	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-1	11/1/99		0.007		0.005 U		0.01 U		0.025 U		0.2		0.005		0.005 U		0.067 J2,J4
SEP-1	1/31/00		0.005 U		0.005 U		0.01 U		0.025 U		1.1		0.003 U		0.005 U		0.02 U
SEP-1	5/9/00		0.007		0.005 U		0.01 U		0.025 U		1.7		0.007		0.005 U		0.03 UJ1,J2
SEP-1	8/14/00		0.005 U		0.005 U		0.01 U		0.025 U		5.9		0.006		0.005 U		0.034
SEP-1	8/14/00		0.005 U		0.005 U		0.01 U		0.025 U		5.6		0.005		0.005 U		0.024
SEP-1	11/10/00		0.005 U		0.005 U		0.01 U		0.025 U		7.7		0.014		0.005 U		0.025
SEP-1	2/23/01		0.005 U		0.005 U		0.01 U		0.025 U		1.6		0.003 U		0.005 U		0.033 UJ1
SEP-1	5/16/01		0.005 U		0.005 U		0.01 U		0.025 U		3 J4		0.003 U		0.005 U		0.02 U
SEP-1	7/31/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.4	0.003 U	0.004	0.005 U	0.005 U	0.02 U,UJ4	0.024 J4
SEP-1	7/31/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.4	0.003 U	0.004	0.005 U	0.005 U	0.02 U,UJ4	0.028 J4
SEP-10	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	11/19/97	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	2/13/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	8/18/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	2/19/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-10	11/1/99		0.013		0.005 U		0.01 U		0.025 U		0.59		0.008		0.005 U		0.045 J2,J4
SEP-10	2/14/00		0.012		0.005 U		0.01 U		0.025 U		0.79 J4		0.003 U		0.005		0.02 U
SEP-10	5/10/00		0.009		0.005 U		0.01 U		0.025 U		1.4		0.005		0.005 U		0.026 UJ1,J2
SEP-10	5/10/00		0.01		0.005 U		0.01 U		0.025 U		1.2		0.006		0.005 U		0.03 UJ1,J2
SEP-10	8/21/00		0.005 U		0.005 U		0.01 U		0.025 U		8.1		0.008		0.005 U		0.039 UJ1
SEP-10	11/15/00		0.019		0.005 U		0.01 U		0.025 U		0.74		0.003 U		0.008		0.039
SEP-10	2/28/01		0.005		0.005 U		0.01 U		0.025 U		2.9		0.003		0.005 U		0.023
SEP-10	5/17/01		0.005 U		0.005 U		0.01 U		0.025 U		1.7		0.003 U		0.005 U		0.02 U
SEP-10	7/31/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.7	0.003 U	0.005	0.005 U	0.005 U	0.02 U	0.02 U
SEP-11	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.021	
SEP-11	2/13/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02	
SEP-11	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	8/18/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	2/19/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02	
SEP-11	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-11	11/2/99		0.01		0.005 U		0.01 U		0.025 U		0.73 J2		0.005		0.005 U		0.02 U
SEP-11	2/14/00		0.014		0.005 U		0.01 U		0.025 U		0.47 J4		0.013		0.005		0.029

Appe

Cummulative List of Surface Water Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
SEP-11	5/10/00		0.008		0.005 U		0.01 U		0.025 U		1.4		0.003		0.005 U		0.024 UJ1,J2
SEP-11	8/21/00		0.005 U		0.005 U		0.01 U		0.025 U		8.2		0.009		0.005 U		0.035 UJ1
SEP-11	11/15/00		0.013		0.005 U		0.01 U		0.025 U		0.67		0.003 U		0.007		0.035
SEP-11	11/15/00		0.013		0.005 U		0.01 U		0.025 U		0.66		0.003 U		0.007		0.04
SEP-11	2/28/01		0.005		0.005 U		0.01 U		0.025 U		2.9		0.004		0.005 U		0.023
SEP-11	5/17/01		0.005 U		0.005 U		0.01 U		0.025 U		2.1		0.003 U		0.005 U		0.02 U
SEP-11	7/31/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3	0.003 U	0.005	0.005 U	0.005 U	0.02 U	0.023
SEP-12	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	2/13/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	8/20/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	11/18/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	2/19/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-12	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.18 J4		0.003 U		0.005 U		0.02	
SEP-12	11/1/99		0.019		0.005 U		0.01 U		0.025 U		0.54		0.005		0.005 U		0.061 J2,J4
SEP-12	11/1/99		0.019		0.005 U		0.01 U		0.025 U		0.44		0.003		0.006		0.026 J2,J4
SEP-12	2/14/00		0.013		0.005 U		0.01 U		0.025 U		0.66 J4		0.003 U		0.005		0.02 U
SEP-12	5/10/00		0.008		0.005 U		0.01 U		0.025 U		1.2		0.004		0.005 U		0.027 UJ1,J2
SEP-12	8/21/00		0.005 U		0.005 U		0.01 U		0.025 U		10		0.013		0.005 U		0.04 UJ1
SEP-12	11/15/00		0.014		0.005 U		0.01 U		0.025 U		0.84		0.004		0.005 U		0.034
SEP-12	2/28/01		0.007		0.005 U		0.01 U		0.025 U		2.5		0.003		0.005 U		0.02 U
SEP-12	5/17/01		0.005		0.005 U		0.01 U		0.025 U		1.9		0.003 U		0.005 U		0.02 U
SEP-12	8/1/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3.1	0.003 U	0.004	0.005 U	0.005 U	0.02 U	0.026
SEP-13	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	2/13/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	8/20/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	8/20/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	2/19/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-13	11/1/99		0.02		0.005 U		0.01 U		0.025 U		0.53		0.006		0.006		0.079 J2,J4
SEP-13	2/14/00		0.014		0.005 U		0.01 U		0.025 U		0.46 J4		0.003		0.005		0.02 U
SEP-13	2/14/00		0.013		0.005 U		0.01 U		0.025 U		0.6 J4		0.003 U		0.005		0.02 U
SEP-13	5/10/00		0.008		0.005 U		0.01 U		0.025 U		1.2		0.003 U		0.005 U		0.023 UJ1,J2
SEP-13	8/21/00		0.005 U		0.005 U		0.01 U		0.025 U		9.7		0.008		0.005 U		0.04 UJ1
SEP-13	8/21/00		0.005 U		0.005 U		0.01 U		0.025 U		9.6		0.007		0.005 U		0.036 UJ1
SEP-13	11/15/00		0.015		0.005 U		0.01 U		0.025 U		1.3		0.009		0.005		0.043
SEP-13	2/28/01		0.008		0.005 U		0.01 U		0.025 U		2		0.003 U		0.005 U		0.02 U
SEP-13	2/28/01		0.008		0.005 U		0.01 U		0.025 U		2		0.003 U		0.005 U		0.02 U
SEP-13	5/17/01		0.005		0.005 U		0.01 U		0.025 U		1.7		0.003 U		0.005 U		0.02 U
SEP-13	8/1/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3.1	0.003 U	0.005	0.005 U	0.005 U	0.02 U	0.022
SEP-14	11/12/98	0.057		0.005 U		0.01 U		0.04		0.1 U		0.004		0.005 U		0.02 U	
SEP-14	8/11/99	0.045		0.005 U		0.01 U		0.065		0.14		0.011		0.005 U		0.025 UJ1	
SEP-14	8/21/00		0.058		0.005 U		0.01 U		0.25		2.3		0.073		0.006		0.14
SEP-14	11/14/00		0.038		0.005 U		0.01 U		0.39		2.8		0.087		0.005 U		0.23
SEP-14	11/14/00		0.035		0.005 U		0.01 U		0.32		2.3		0.076		0.005 U		0.19

Cummulative List of Surface Water Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
SEP-14	6/27/01		0.094		0.005		0.01 U		1.2		9.1		0.37		0.005 U		1.3
SEP-14	6/27/01		0.096		0.005		0.01 U		1.2		9.8		0.38		0.005 U		1.3
SEP-2	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	2/13/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	8/18/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	2/19/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.028	
SEP-2	2/19/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-2	11/1/99		0.024		0.005 U		0.01 U		0.025 U		0.74		0.012		0.008		0.056 J2,J4
SEP-2	2/14/00		0.013		0.005 U		0.01 U		0.025 U		0.48 J4		0.003 U		0.005		0.02 U
SEP-2	5/10/00		0.007		0.005 U		0.01 U		0.025 U		1.2		0.007		0.005 U		0.028 UJ1,J2
SEP-2	8/21/00		0.005		0.005 U		0.01 U		0.025 U		9		0.019		0.005 U		0.05 UJ1
SEP-2	11/15/00		0.014		0.005 U		0.01 U		0.025 U		1.4		0.004		0.006		0.043
SEP-2	2/28/01		0.007		0.005 U		0.01 U		0.025 U		2.8		0.003		0.005 U		0.023
SEP-2	5/17/01		0.005		0.005 U		0.01 U		0.025 U		2.1		0.003 U		0.005 U		0.026
SEP-2	5/17/01		0.005		0.005 U		0.01 U		0.025 U		2.1		0.003		0.005 U		0.02 U
SEP-2	7/31/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3.9	0.003 U	0.009	0.005 U	0.005 U	0.02 U,UJ4	0.024 J4
SEP-3	8/18/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.022	
SEP-3	11/19/97	0.81		0.008		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.02 U	
SEP-3	2/13/98	0.53		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.022	
SEP-3	5/20/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.004 U		0.005 U		0.02 U	
SEP-3	8/11/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-3	8/11/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-3	5/12/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-3	5/12/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-3	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-3	11/1/99		0.006		0.005 U		0.01 U		0.025 U		0.27 J2		0.005		0.005 U		0.067 J4
SEP-3	1/31/00		0.005 U		0.005 U		0.01 U		0.025 U		1.2		0.003 U		0.005 U		0.02 U
SEP-3	5/9/00		0.007		0.005 U		0.01 U		0.025 U		1.9		0.003		0.005 U		0.029 UJ1,J2
SEP-3	8/14/00		0.005 U		0.005 U		0.01 U		0.025 U		6		0.005		0.005 U		0.023
SEP-3	11/10/00		0.005 U		0.005 U		0.01 U		0.025 U		8.4		0.005		0.005 U		0.028
SEP-3	2/23/01		0.005 U		0.005 U		0.01 U		0.025 U		1.8		0.003 UJ1		0.005 U		0.028 UJ1
SEP-3	5/16/01		0.005 U		0.005 U		0.01 U		0.025 U		2.4 J4		0.003 U		0.005 U		0.02
SEP-3	8/1/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.8	0.003 U	0.004	0.005 U	0.005 U	0.02 U	0.021
SEP-3	8/1/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3.1	0.003 U	0.004	0.005 U	0.005 U	0.02 U	0.021
SEP-4	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	2/13/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	8/20/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	2/19/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	5/13/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-4	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.025	
SEP-4	11/1/99		0.018		0.005 U		0.01 U		0.025 U		0.54 J2		0.007		0.005 U		0.064 J4
SEP-4	2/14/00		0.016		0.005 U		0.01 U		0.025 U		0.34 J4		0.003 U		0.006		0.02 U
SEP-4	5/10/00		0.008		0.005 U		0.01 U		0.025 U		1.1		0.003 U		0.005 U		0.02 U

Appe

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SEP-4	8/21/00		0.005 U		0.005 U		0.013		0.025 U		12		0.009		0.005 U		0.046 UJ1
SEP-4	11/15/00		0.019		0.005 U		0.01 U		0.025 U		1.5		0.008		0.005		0.045
SEP-4	2/28/01		0.008		0.005 U		0.01 U		0.025 U		2.2		0.003 U		0.005 U		0.02 U
SEP-4	5/17/01		0.005		0.005 U		0.01 U		0.025 U		1.8		0.003 U		0.005 U		0.02 U
SEP-4	7/31/01	0.005	0.006	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.1	0.003 U	0.005	0.005 U	0.005 U	0.02 U,UJ4	0.02 U,UJ4
SEP-6	8/18/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-6	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.46 J4		0.003 U		0.005 U		0.02 U	
SEP-6	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.005 U		0.02 U	
SEP-6	11/1/99		0.006		0.005 U		0.01 U		0.025 U		0.2 J2		0.005		0.005 U		0.062 J4
SEP-6	1/31/00		0.005 U		0.005 U		0.01 U		0.025 U		1.2		0.005		0.005 U		0.02 U
SEP-6	5/9/00		0.007		0.005 U		0.01 U		0.025 U		2		0.004		0.005 U		0.027 UJ1,J2
SEP-6	5/9/00		0.007		0.005 U		0.01 U		0.025 U		1.9		0.003 U		0.005 U		0.022 UJ1,J2
SEP-6	8/14/00		0.005 U		0.005 U		0.01 U		0.025 U		5.8		0.006		0.005 U		0.026
SEP-6	11/10/00		0.005 U		0.005 U		0.01 U		0.025 U		7		0.005		0.005 U		0.03
SEP-6	2/23/01		0.005 U		0.005 U		0.01 U		0.025 U		1.7		0.003 U		0.005 U		0.041 UJ1
SEP-6	2/23/01		0.005 U		0.005 U		0.01 U		0.025 U		1.9		0.003 UJ1		0.005 U		0.035 UJ1
SEP-6	5/16/01		0.005 U		0.005 U		0.01 U		0.025 U		2.7 J4		0.003 U		0.005 U		0.02 U
SEP-6	8/1/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3.2	0.003 U	0.004	0.005 U	0.005 U	0.02 U	0.024
SEP-7	8/18/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02	
SEP-7	11/10/97	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-7	2/13/98	0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-7	5/20/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.004 U		0.005 U		0.02 U	
SEP-7	8/11/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-7	11/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.024	
SEP-7	2/19/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.022	
SEP-7	5/12/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-7	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-7	11/1/99		0.007		0.005 U		0.01 U		0.025 U		0.19		0.006		0.005 U		0.049 J2,J4
SEP-7	1/31/00		0.005 U		0.005 U		0.01 U		0.025 U		1		0.004		0.005 U		0.04
SEP-7	5/9/00		0.007		0.005 U		0.01 U		0.025 U		2		0.006		0.005 U		0.03 UJ1,J2
SEP-7	8/14/00		0.005 U		0.005 U		0.01 U		0.025 U		6.3		0.005		0.005 U		0.043
SEP-7	11/10/00		0.005 U		0.005 U		0.01 U		0.025 U		8.7		0.006		0.005 U		0.028
SEP-7	2/23/01		0.005 U		0.005 U		0.01 U		0.025 U		1.9		0.004 UJ1		0.005 U		0.037 UJ1
SEP-7	5/16/01		0.005 U		0.005 U		0.01 U		0.025 U		2.2 J4		0.003 U		0.005 U		0.02 U
SEP-7	5/16/01		0.005 U		0.005 U		0.01 U		0.025 U		3.4 J4		0.003 U		0.005 U		0.02 U
SEP-7	7/31/01	0.005 U	0.005 U	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.8	0.003 U	0.003	0.005 U	0.005 U	0.02 U,UJ4	0.02 U,UJ4
SEP-8	8/18/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-9	8/15/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.023	
SEP-9	11/10/97	0.011		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.025	
SEP-9	2/13/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.035	
SEP-9	5/19/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.035	
SEP-9	8/18/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.021	
SEP-9	11/18/98	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.034	
SEP-9	2/19/99	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.033	
SEP-9	5/12/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-9	8/20/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
SEP-9	11/1/99		0.006		0.005 U		0.01 U		0.025 U		0.17		0.006		0.005 U		0.02 U,UJ4
SEP-9	2/14/00		0.008		0.005 U		0.01 U		0.025 U		0.66 J4		0.003 U		0.005 U		0.023
SEP-9	5/10/00		0.011		0.005 U		0.01 U		0.025 U		0.92		0.026		0.005 U		0.036 UJ1,J2
SEP-9	8/21/00		0.007		0.005 U		0.01 U		0.025 U		4.6		0.007		0.005 U		0.046 UJ1
SEP-9	11/15/00		0.01		0.005 U		0.01 U		0.025 U		0.53		0.003 U		0.005 U		0.05

Cummulative List of Surface Water Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l		As T mg/l		Cd Dis mg/l		Cd T mg/l		Cr Dis mg/l		Cr T mg/l		Cu Dis mg/l		Cu T mg/l		Fe Dis mg/l		Fe T mg/l		Pb Dis mg/l		Pb T mg/l		Se Dis mg/l		Se T mg/l		Zn Dis mg/l		Zn T mg/l	
SEP-9	2/28/01			0.006				0.005	U			0.01	U			0.025	U			3				0.003	U			0.005	U			0.029	
SEP-9	5/17/01			0.007				0.005	U			0.01	U			0.025	U			1.4				0.003	U			0.005	U			0.025	
SEP-9	7/31/01	0.006		0.005		0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	1.3		0.1	U	0.003		0.003	U	0.005	U	0.005	U	0.02	U,UJ4	0.02	U,UJ4

Note:

J The associated numerical value is an estimated quantity because quality control criteria were not met

J2 calibration range exceeded or significant deviation from known values. Possible bias.

J3 Holding time not met. Indicates low bias.

J4 Other QC outside control limits

U Undetected. Below method detection limits.

UJ The material was analyzed for, but was not detected above the associated value.

UJ1 Blank contamination. Indicates possible high bias and/or false positive.

UJ2 Calibration range exceeded or significant deviation from known value.

UJ3 Holding times not met. Indicates low bias.

UJ4 Other QC outside control limits.

R Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.

A Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code).

Dis Dissolved Metals

T Total Metals

APPENDIX D

CUMULATIVE LIST OF GROUNDWATER QUALITY RESULTS (GENERAL CHEMISTRY)

APPENDIX D

CUMULATIVE LIST OF GROUNDWATER QUALITY RESULTS (GENERAL CHEMISTRY)

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field		TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EM-1	8/13/97	4.05		7.52	7.8	5200		5210		3948		58			71.2	184	100	900	32		184	224		1	U	1849		687		0.81		0.23	
EM-1	11/17/97	4.96		7.2	8	4020		6250		2899		6.6			66.2	173	95	857	30		148	181		1	U	1206		564		0.74		0.07	
EM-1	2/19/98	1.64		7.39	7.5	5480		6410		4192		50			75.7	209	122	1075	28			227		1	U	1695		720		0.73		0.05	
EM-1	5/18/98	3.15		7.43	7.6	5550		5480		3901		122			78.4	206	115	1008	28			227		1	U	1699		743		0.81		0.05	U
EM-1	8/20/98	1.57		7.38	7.8	5560		5600		4323		67			69.3	201	115	954	31			227		1	U	1808		779		0.78		0.05	U
EM-1	11/18/98	2.2		7.06	7.6	5580		5540		4258		59			74.5	220	121	983	30			234		1	U	1948		757		0.77		0.05	U
EM-1	2/24/99	2.2		7.46	7.6	5600		6860		4338		63			75.2	213	115	859	30			226		1	U	1542	J4	714		0.87		0.05	U
EM-1	5/12/99	2.3		6.94	7.9	5670	J3	5740		4225		6.9			78.1	226	158	950	46			222	J3	1	U,UJ3	1880		358		0.82		0.1	U,UJ4
EM-1	8/11/99	1.5		7.38	7.8	5610		5500		4175		7.6		8.5	70.2	221	127	839	28			220		1	U	1858		759		0.86		0.05	U
EM-1	10/30/99			7.16	7.8	5600		5050		4061		12	J4		70.9	210	122	801	27			216		1	U	1554		797		0.81		0.17	UJ1
EM-1	1/31/00	1.02		7.26	7.8	5580		5310		4038		14	J4	13	76.3	223	126	946	29			220		1	U	1846		762		0.77		0.37	UJ1
EM-1	5/4/00	2.4		7.9	8	5540		5390		4122		26	J4	9.65	78.3	213	125	791	26			220		1	U	1928		774		0.82	UJ1	0.12	UJ1
EM-1	8/16/00	1.3		7.49	7.9	5560		5540		3999		7.3		8.46	68.2	172	99	737	21			220	J3	1	U,UJ3	1845		1621		0.82	J3	0.09	UJ1
EM-1	11/14/00	3.6		7.65	7.9	5600		5380		4153		6.8		4.51	74.1	180	104	814	23			226		1	U	1791		806		0.8		0.11	
EM-1	2/22/01	3.8		7.72	7.8	5560		5320		4028		2.4		5	73.8	169	96	730	23			237		1	U	1918		656		0.81		0.1	U
EM-1	2/22/01	3.6		7.68	7.9	5560		5310		4095		9.9			73.0	183	105	752	24			232		1	U	1749		667		0.78		0.13	
EM-1	5/16/01	2		7.62	7.8	5580		5170		4161		31		7.42	79.9	215	123	930	32			214		1	U	1856		880		0.82		0.19	
EM-1	7/31/01	2.7	J4	7.25	7.8	5600		5860		4154		15		3.93	75.2	208	121	914	29			221		1	U	2043		781		0.8		0.27	
EM-1	7/31/01	1.9	J4	7.26	7.8	5620		5940		4188		17			76.8	212	123	902	30			214		1	U	2027		726		0.82		0.31	
EM-2	8/11/97	6.28		7.08				4630							80.1																		
EM-2	8/26/97			7.4	7.9	4550		871	R	3589		68			72.9	204	74	831	16		280	342		1	U	1448		497		1.4		28	
EM-2	11/17/97	1.41		7	7.7	3960		5150		2952		7.5			74.1	176	65	704	11		250	305		1	U	1185		456		1.3		17	
EM-2	2/17/98	1.26		6.9	7.7	4150		5450		3159		20			78.1	179	72	791	15			322		1	U	1247		436		1.4		20	
EM-2	5/18/98	4.29		7.14	7.5	4190		4180		2917		9.2			76.8	173	68	785	17			321		1	U	1197		428		1.5		19	
EM-2	8/13/98	1.06		7.02	7.8	4210		4240		3115		15			72.1	187	71	896	16			344		1	U	1375		400		1.4	J4	19	
EM-2	11/11/98	3.5		7.23	7.5	4260		4190		3150		7.6	J4		74.3	185	71	773	15			332		1	U	1375		457		1.4		19	
EM-2	2/22/99	2.4		7.12	7.6	4510		5330		3338		16			77.7	196	77	835	23			336		1	U	929		442		1.4		18	J4
EM-2	5/10/99	1.3		6.71	7.4	6050		6480		4816		19			76.1	362	146	971	26			342		1	U	2124		405	J4	1.3		99	
EM-2	8/6/99	1.6		6.81	7.5	5740		6320		4758		76		2.8	77.9	382	123	919	20			290		1	U	2107		366		1.5		102	
EM-2	10/29/99	1.1		6.6	7.7	6040		5360		4494	J4	3.3	J4	3.46	72.9	351	126	788	18			348		1	U	2354		554		1.3		72	
EM-2	1/25/00	3.3		7.05	7.7	5330		5160		4038		64		28	76.1	236	86	813	16			364		1	U	1931		491		1.3		42	
EM-2	4/26/00	1.4	J4	7.08	7.7	5070		5070		3856		8.8		7.13	79.9	236	89	705	14			346		1	U	1958		544		1.3	UJ1	43	
EM-2	8/3/00	1.4		6.96	7.9	4430		4560		3230		5.1		6.9	73.2	183	67	667	14			329		1	U	1548		436		1.3		26	
EM-2	11/1/00	1.4		6.98	7.6	3980		4160		2934		24		5.1	70.2	173	63	632	14	J4		296		1	U	1144		347		1.3		24	
EM-2	2/9/01	2.5		7.1	8	4150		4020		3002		18		9.95	75.2	177	70	676	12			312		1	U	1353		412		1.2		28	
EM-2	5/8/01	2.7		6.97	7.7	4760		4710		3606		4.9		6.63	75.4	223	81	807	17			345		1	U	1662		501		1.5		33	
EM-2	5/8/01	2.3		6.98	7.6	4840		4690		3670		3.1			77.5	230	87	868	18			362		1	U	1862		411		1.5		35	
EM-2	7/18/01	2.4		6.93	7.7	4140		3870		3061		3.6		1.26	76.8	173	55	615	11			273		1	U	1581		389		1.5		29	
EM-4	8/11/97	2.72		7.28				10570							82.2																		
EM-4	8/26/97			7.5	7.9	10410		2090	R	7094		15	J4		72.0	441	198	1684	38		127	155		1	U	450		3507		1.3		0.3	
EM-4	11/17/97	2.57		7.1	7.7	11300		14110		7198		7.7			72.5	469	211	1959	42		126	154		1	U	547		3423		1.3		0.19	
EM-4	2/17/98	1.14		6.97	7.4	11150		14370		7157		1	U		74.7	451	220	1950	40			156		1	U	503		3358		1.3		0.25	
EM-4	5/18/98	1.49		7.23	7.7	9420		10150		5744		1	U		76.8	383	168	1618	37			142		1	U	376		2798		1.3		0.23	
EM-4	8/13/98	1.06		7.02	7.8	9560		4240	R	6339		5.6			70.0	417	183	1640	33			156		1	U	466		2862		1.2	J4	0.22	
EM-4	11/11/98	1.9		6.95	7.4	10460		10370		6473		1	U,UJ4		72.5	440	196	1551	34			168		1	U	500		3268		1.2		0.24	
EM-4	2/22/99	8.3		7.27	7.5	9940		11540		5990		3.2			73.8	391	175	1572	49			146		1	U	1618		3200		1.3		0.15	J4
EM-4	5/10/99	0.9		7.01	7.6	10270		10850		6081		3.6			73.9	425	198	1487	40			143		1	U	411		3348	J4	1.3		0.43	
EM-4	5/10/99	1		7.01	7.7	10270		10780		6091		5			72.5	425	199	1526	40			154		1	U	446		2718	J4	1.3		0.35	
EM-4	8/6/99	0.8		7.21	7.9	10440		10600		6683		3		0.5	74.5	403	188	1443	35			151		1	U	463		3029		1.3		0.16	

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EM-4	10/29/99	2.1		6.96	7.8	9400	8720		5290	J4	1	U,UJ4		72.1	357	159	1188	27		146	1	U	386	2341		1.2		0.23	UJ1,J4
EM-4	1/25/00	1.5		7.28	7.8	9240	9300		5473		6		0.7	73.4	299	141	1287	26		156	1	U	433	3020		1.2		0.2	UJ1,J4
EM-4	4/26/00	0.6	J4	7.32	7	8600	8560		5159		1	U	0.92	73.4	309	137	1088	22		143	1	U	510	2488		1.2	UJ1	0.29	
EM-4	4/26/00	3	J4	7.34	7.1	8550	8220		4912		1	U		77.0	283	127	982	21		146	1	U	497	2640		1.1	UJ1	0.26	
EM-4	8/3/00	3		7.26	8	9640	9570		6014		1	U	0.95	73.6	314	138	1215	26		154	1	U	430	2937		1.2		0.2	
EM-4	11/1/00	0.7		7.24	7.7	11220	10840		6920		1	U	2.4	70.5	390	174	1378	28		163	1	U	531	3521		1.3		0.18	UJ1
EM-4	2/9/01	2.6		7.23	7.7	10210	9900		6362		2.6		2.7	77.2	368	168	1343	27		159	1	U	530	3527		1.2		0.22	
EM-4	5/7/01	3.3	J4	7.26	8	9930	9780		6269		1	U	2.66	75.0	410	183	1498	35		146	1	U	419	2896		1.2		0.66	
EM-4	7/18/01	2.8		7.23	7.5	9210	9370		5925		1.7		0.67	76.6	367	162	1356	28		122	1	U	400	3162		1.1		0.65	
EM-5	8/11/97	0.96		7.65			5970							78.4															
EM-5	8/26/97			7.64	8	6160	1187	R	4700		36	J4		77.0	197	46	1238	79	162	198	1	U	1943	742		6.1		0.15	
EM-5	11/17/97	0.79		7.3	7.7	6700	8790		5176		7.4			75.9	249	60	1445	83	174	212	1	U	2224	806		6.4		0.05	U
EM-5	2/17/98	1.84		7.17	7.7	6990	9310		5485		8.6			73.8	277	68	1528	87		195	1	U	2477	794		8		0.28	
EM-5	5/18/98	1.21		7.59	7.9	4920	4950		3432		3.4			74.3	142	33	1084	54		156	1	U	1599	485		9.5		0.16	
EM-5	8/17/98	0.18		7.5	7.8	4970	5010		3613		3.7			74.7	159	34	1071	60		188	1	U	1787	536		9		0.19	
EM-5	11/11/98	3.5		7.43	7.6	5090	5030		3771		4.7	J4		75.0	195	42	1056	55		203	1	U	1718	586		7.1		0.1	U
EM-5	2/11/99	0.9		7.47	7.8	4740	4800		3460		5			75.2	173	39	770	50		194	1	U	1472	565		7.1		0.05	U
EM-5	2/11/99	0.9		7.48	7.8	4770	4800		3471		5.1			74.1	171	38	780	55		194	1	U	1563	571		7.1		0.05	U
EM-5	5/10/99	0.7		7.35	7.7	3700	3800		2554		5			74.5	111	27	692	31		137	1	U	1111	410	J4	5.8		0.1	U
EM-5	8/6/99	0.7		7.46	7.8	2660	2630		1786		1.4		0.75	73.0	78	16	479	27		159	1	U	715	296		4.8		0.36	
EM-5	11/2/99	4.1		7.38	7.9	3010	3210		1980		1.5		1.46	73.9	79	18	495	29		199	1	U	827	146		6.4		0.17	
EM-5	11/2/99	4		7.39	8	3020	3190		1976		1.1		1.38	74.5	75	17	482	28		198	1	U	835	309		6.5		0.11	
EM-5	1/25/00	0.3		7.51	8	2100	2050		1320		1	U	0.81	75.9	51	12	351	21		172	1	U	503	224		5.3		0.11	UJ1,J4
EM-5	4/26/00	0.5	J4	7.59	8.1	2130	2120		1367		1	U	0.9	85.6	41	9.7	341	19		171	1	U	597	271		6.1		0.18	
EM-5	8/4/00	1.4		7.47	8.1	2910	2880		1894		2.4		2.25	76.1	61	14	500	23		177	1	U	736	343		6.3	J3	0.1	U
EM-5	11/3/00	0.7		7.56	8	3030	3360		1998		3	J4	3.4	66.6	75	18	550	34		171	1	U	839	335		4.7		0.07	
EM-5	2/14/01	5.7		7.59	7.8	3100	3150		2169		6.8		3.5	76.3	100	24	508	34		162	1	U	1088	307		4.5		0.1	U
EM-5	5/9/01	0.5		7.53	7.9	2960	2890		2073		5.1	J4	5.2	78.3	106	26	469	38		138	1	U	2141	315		3.9		0.36	J4
EM-5	7/19/01	2.5		7.44	7.9	3200	3120		2250		4.4	J4	3.33	78.4	123	30	539	35		143	1	U	1335	353		4.1		0.24	UJ1,J4
EM-6	8/11/97	4.48		7.25	7.9	4520	4480		3400		3.1			32.0	127	80	897	14	322	393	1	U	1707	422		2.2		10	
EM-6	8/11/97				7.8	4500			3498		3.4			74.7	135	83	879	15	330	403	1	U	1653	442		2.2		8.2	
EM-6	11/17/97	0.98		7.15	7.6	4500	5750		3372		2.2			74.8	124	78	902	14	318	388	1	U	1470	451		2		6.9	
EM-6	2/17/98	0.91		7.04	7.8	4330	5810		3160		1	U		80.6	120	77	877	14		372	1	U	1280	419		1.9		9	
EM-6	5/18/98	1.57		7.21	7.6	4090	4310		2874		1	U		32.0	117	71	865	11		355	1	U	1223	390		2		6.6	
EM-6	5/18/98				7.5	4120			2846		1	U		77.4	116	71	861	12		360	1	U	1245	420		1.9		6.9	
EM-6	8/17/98	0.32		7.17	7.6	4600	4610		3324		2.6			74.5	124	77	912	22		415	1	U	1539	454		2.1		7.5	
EM-6	11/11/98	1.4		7.45	7.8	3550	3590		2462		2.5	J4		73.9	108	60	688	13		317	1	U	1167	345		1.7		5.9	
EM-6	2/11/99	3.6		7.3	7.8	4290	4390		3129		1.7			78.1	124	75	710	15		387	1	U	903	414		2.1		6.2	
EM-6	5/10/99	0.6		7.06	7.7	3810	4290		2682		2.5			76.6	112	70	716	16		351	1	U	989	318	J4	1.8		5.3	
EM-6	8/6/99	0.5		7.3	8	3640	3840		2567		2.4		1.6	76.6	102	60	697	12		311	1	U	1121	321		1.8		4.7	
EM-6	8/6/99	0.4		7.3	8	3640	3850		2608		2.6			71.2	100	60	675	12		310	1	U	1221	322		1.8		5.7	
EM-6	11/2/99	2.2		7.3	8	3300	3660		2281		4.1		1.37	32.0	91	51	539	9.6		304	1	U	1058	342		1.7		4.7	
EM-6	1/25/00	1.2		7.26	8	4330	4240		3042		1	U	1.41	77.5	109	67	738	13		389	1	U	1210	438		2		7.2	J4
EM-6	4/26/00	0.7	J4	7.25	8	4060	4130		2877		1	U	0.9	77.9	102	61	637	9.9		376	1	U	1466	412		1.8	UJ1	6.8	
EM-6	8/4/00	2.1		7.16	8	4350	4360		3086		2.6		2.65	75.2	105	61	750	9.7		398	1	U	1531	386		2		7.5	
EM-6	11/3/00	0.6		7.23	7.8	4280	4680		2937		1.6	J4	2	72.7	106	62	731	16		403	1	U	1198	443		2		6.5	
EM-6	2/14/01	0.6		7.28	7.9	4130	4100		2896		1	U	2.2	72.5	92	57	630	9.4		390	1	U	1360	405		1.9		6.1	
EM-6	2/14/01	0.6		7.27	7.7	4110	4080		2911		1			75.2	96	59	638	9.3		407	1	U	1374	412		1.8		6.1	
EM-6	5/9/01	0.7		7.26	8.1	4130	4070		2958		1	U,UJ4	4.83	76.8	89	57	712	11		381	1	U	1572	408		1.8		6	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	Dissolved Ca mg/l	Dissolved Mg mg/l	Dissolved Na mg/l	Dissolved K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EM-6	7/19/01	3	7.17	8.2	4200	4080	2943	1 J4	0.69	71.2	109	67	767	12		390	1 U	1578	474	1.9	7.5 J4
EM-7	11/17/97	1.78	7.56	8.4	5700	7070	4264	54		64.6	215	42	1216	51	362	442	1 U	1864	714	4.9	1.5
EM-7	2/19/98	2.33	7.77	7.8	6020	6810	4588	9.2		73.4	234	48	1349	39		305	1 U	2064	679	6.1	0.32
EM-7	5/7/98	1.3	7.24	7.8	5560	6960	4029	37		84.2	216	43	1199	48		271	1 U	1755	614	6.7	0.41
EM-7	8/20/98	1.95	7.38	7.7	5220	5240	3967	116		77.9	174	33	1037	44		295	1 U	1667	570	7.1	0.18
EM-7	11/11/98	2.3	7.54	7.6	5310	5190	3952	294 J4		74.5	198	36	1139	43		348	1 U	1731	546	6.6	0.1 U
EM-7	2/24/99	2	7.69	7.8	5110	6320	3836	125		75.4	195	36	957	41		342	1 U	1111 J4	530	6.5	0.54
EM-7	5/12/99	3.6	7.66	7.4	4540 J3	4560	3133	347		80.2	147	34	850	49		246 J3	1 U,UJ3	1419	241	6.8	0.1 U,UJ4
EM-7	8/6/99	3.9	7.54	7.7	4410	4420	3121	139	200 >	73.0	142	27	834	37		287	1 U	1419	446	6.7	0.23
EM-7	10/30/99		7.41	7.8	2520	2410	1565	97 J4		67.8	61	11	370	20		275	1 U	486	322	6.3	0.16 UJ1
EM-7	1/31/00	1.2	7.59	7.8	2260	1980	1440	506	200 >	32.0	77	14	364	18		262	1 U	474	236	5.2	0.37 UJ1
EM-7	2/14/01									32.0											
EM-7	5/9/01									76.8											
EP-100	10/20/99	3.7	6.63	8	8830	9410	6895	162		76.1	548	286	1116	42		344	1 U	2588	1601	1.3	142
EP-100	1/26/00	1	6.75	7.5	9870	9230	7385	204	155	81.0	658	332	1334	41		346	1 U	2545	1746	1.2	250 J3
EP-100	4/28/00	1	6.68	7.3	10340	9730	8285	87	45	79.0	590	317	1345	33		344	1 U	3084	1742	1 UJ1	247
EP-100	8/7/00	0.5	6.69	7.4	10160	9960	7987	79	50	75.0	576	293	1200	29		336	1 U	2879	1499	1.2	241
EP-100	11/7/00	0.6	6.77	7.4	10660	12190	8418	34	27.1	76.3	654	338	1445	36		342	1 U	2747	1546	1	0.09
EP-100	2/20/01	0.5	6.69	7.7	10660	9980	8533	76 J4	65	81.5	605	320	1131	27		325	1 U	2885	1707	0.9	272
EP-100	5/9/01	1.5	6.72	7.4	10160	9590	8345	76 J4	41.6	78.8	664	330	1249	45		334	1 U	2879	1569	1	228
EP-100	7/20/01	0	6.7	7.6	10610	10120	8575	25	38	75.9	677	364	1379	36		322	1 U	2916	1750	0.96	265
EP-101	10/21/99	2.7	6.99	7.7	7220	7270	5334	4245		72.1	132	40	1387	66		483	1 U	2856	670	1.8	64
EP-101	1/25/00	2.1	7.26	7.8	8680	8860	6462	21	65.7	79.2	162	54	1893	49		311	1 U	3062	1463	1.5	77
EP-101	4/26/00	5.1 J4	7.14	7.7	8770	8880	6554	14	10.3	84.0	186	61	1902	55		317	1 U	3608	827	1.5 UJ1	90
EP-101	8/4/00	1.6	6.94	7.3	9460	9480	6935	53	24	74.7	185	56	1800	61		249	1 U	3552	832	1.6	102
EP-101	11/2/00	2.9	7.05	7.6	9470	10700	7030	63	11	66.7	178	56	2052	59		289	1 U	3262	898	1.5	100
EP-101	2/9/01	6.3	7.06	7.6	7420	6820	5405	6.7	9.47	78.3	149	51	1377	52		261	1 U	2476	764	1.3	82
EP-101	5/8/01	7.1	7	6.8	6340	6730	4815	14	7.5	86.7	131	47	1044	49		117	1 U	2340	650	1.3	81
EP-101	7/18/01	1	6.85	6.9	6540	6320	4805	76	11.4	70.0	164	56	1248	51		115	1 U	2033	703	1.3	72
EP-102	10/21/99	3.2	7.05	7.8	2760	2860	1936	21		74.8	128	28	360	107		366	1 U	949	197	1.6	10
EP-102	1/25/00	0.6	7.24	7.9	2870	2810	1954	7.4	6.4	79.3	125	22	359	130		337	1 U	888	216	1.9	5.6 J4
EP-102	4/26/00	2.2 J4	7.2	7.7	2790	2680	1879	6.1	2.44	81.7	116	25	343	120		332	1 U	925	213	1.4 UJ1	9
EP-102	8/4/00	0.5	7.02	7.2	2530	2610	1738	11	4	77.5	89	16	280	103		228	1 U	642	171	1.5	9.1
EP-102	11/3/00	1	7.14	7.7	2370	2690	1556	14 J4	6.6	73.8	93	17	306	127		317	1 U	597	111	2.2	5.2
EP-102	2/9/01	1.4	7.24	7.7	2300	2200	1459	14	7.5	79.7	79	17	277	108		305	1 U	551	151	1.5	8.6
EP-102	5/8/01	1.7	7.17	7.3	2480	2490	1726	14	4.02	81.3	96	20	328	108		233	1 U	812	207	1.4	9.4
EP-102	7/18/01	4	7.07	7.2	2630	2570	1866	26	2.8	74.5	110	24	350	112		238	1 U	811	210	1.3	10
EP-103	10/21/99	4.6	7.21	8	1590	1618	1057	46		73.0	81	24	211	8.2		223	1 U	397	181	0.6	3.4
EP-103	1/24/00	3.9	7.34	8.3	1498	1465	928	7	4.56	81.1	56	17	213	5		182	1 U	312	154	0.65	1.1
EP-103	4/26/00	3.8 J4	7.31	7.9	1540	1519	980	20	9.7	86.7	62	20	198	5.6		189	1 U	411	190	0.61 UJ1	2.1
EP-103	8/4/00	3.2	7.09	8	1552	1534	964	4.2	8.1	70.5	59	18	200	4		165	1 U	412	169	0.63	2.5
EP-103	11/2/00	5.6	7.3	7.8	1564	1666	1016	6.2	7.8	72.1	62	20	218	3.4		162	1 U	338	186	0.64	3.4
EP-103	2/12/01	3.6	7.34	7.8	5620 ^	1518	965	1.2	3.25	81.0	63	20	206	3.9		149	1 U	371	171	0.51	4.7
EP-103	5/8/01	5.2	7.31	8.3	1510	1489	1007	1 U	3.7	79.7	69	22	219	5.7		132	1 U	356	185	0.53	3.7
EP-103	7/19/01	6.6	7.49	8	1638	1566	1054	1 U,J4	1.98	71.1	72	23	221	4.8		139	1 U	442	216	0.52	5.6 J4
EP-104	10/21/99	2.1	7.11	7.8	4600	4650	2449	154		76.1	139	76	782	28		407	1 U	1671	503	2.1	10
EP-104	1/24/00	1.5	7.28	8.1	4640	4510	3203	20	15	79.0	124	72	768	21		408	1 U	1463	498	2.1	10
EP-104	4/26/00	2.2 J4	7.21	8.1	4620	4550	3303	78	16.3	78.4	146	79	744	19		403	1 U	1615	468	2 UJ1	13
EP-104	8/3/00	1.2	7.14	8.1	4410	4420	3038	27	16.3	75.0	111	65	788	20		395	1 U	1386	468	2.2	11

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l	F mg/l		N mg/l	
EP-104	11/1/00	1.4		7.22	7.8	4440	4740	3155		61		28	74.8	114	63	695	22			403		1	U	1230	451	2.2		7.7	
EP-104	2/12/01	1.8		7.25	8	4570	4360	3195		11		9.72	75.0	122	76	798	19			400		1	U	1488	490	2.1		11	
EP-104	2/12/01	1.9		7.25	8	4560	4350	3131		5.9			77.2	115	72	772	19			407		1	U	1439	490	2.1		11	
EP-104	5/8/01	2.2		7.26	8	4560	4570	3266		24		9.8	77.7	128	77	822	23			439		1	U	1712	557	2		11	
EP-104	7/18/01	2.3		7.18	8.1	4530	4460	3258		8.1		22.6	79.5	123	75	826	20			393		1	U	1645	584	2.1		11	
EP-105	10/21/99	4		7.15	8	4460	4600	3410		216			71.1	196	80	692	28			344		1	U	1896	479	2.2		4.5	
EP-105	1/25/00	3.1		7.43	8	3780	3590	2704		246		12	83.8	147	53	610	18			268		1	U	1293	398	3.1		2.7	J4
EP-105	4/26/00	2.1	J4	8.12	8.2	3440	3410	2361		10		9.8	89.8	125	43	588	17			104		1	U	1230	468	5.2		0.17	
EP-105	8/4/00	5		7.72	8.3	3720	3210	2641		9.6		8.8	71.4	156	57	500	15			232		1	U	1382	393	3		4	
EP-105	11/1/00	2.2		7.64	8.1	3410	3400	2455		3.6		9.8	71.6	127	46	472	16	J4		134		1	U	1075	340	3.4		0.72	
EP-105	2/14/01	3.6		7.31	7.7	3940	3880	2842		5.6		5.5	72.9	139	60	548	16			312		1	U	1441	375	2.7		5.3	
EP-105	5/9/01	4.1		6.85	8	3790	3720	2769		225	J4	130	78.8	190	72	566	19			227		1	U	1415	458	2.7		1.4	J4
EP-105	7/19/01	4.5		7.23	8.1	4080	3970	2982		3.9	J4	5.71	79.5	165	74	656	18			317		1	U	1390	488	2.5		8.5	J4
EP-106	10/21/99	5.6		7.14	7.7	4180	4300	3328		130			76.8	232	99	595	19			309		1	U	1893	355	1.2		6.6	
EP-106	1/25/00	1.4		7.08	7.7	4950	4860	3837		17		17.3	80.8	234	109	777	14			298		1	U	1960	423	0.88		9.2	J4
EP-106	4/26/00	1.6	J4	7.04	7.8	4960	4960	3951		18		8.43	82.9	252	115	681	13			307		1	U	2301	474	0.89	UJ1	9.4	
EP-106	8/2/00	2.2		7.04	8.1	4700	4670	3647		6.8		4.6	76.3	210	96	650	14			293		1	U	1780	355	0.85		10	
EP-106	11/2/00	2.3		7	7.6	4710	5420	3683		24		9.66	75.6	219	96	653	17			298		1	U	1871	354	0.89		12	
EP-106	2/12/01	3.4		7.07	7.6	4910	4690	3900		26		29	78.6	230	108	700	12			309		1	U	2071	417	0.79		9	
EP-106	5/9/01	2.3		7.05	7.7	4900	4810	3804		17	J4	16	81.7	263	119	708	17			293		1	U	2353	455	0.88		9.9	
EP-106	7/18/01	3.5		7.08	7.8	6070	5730	4825		1	U	1.41	76.3	391	174	780	17			181		1	U	1983	931	1.1		68	
EP-107	10/21/99	5.2		6.99	7.8	6450	6500	4821		22			78.3	436	211	733	26			195		1	U	1912	1085	0.89		90	
EP-107	1/24/00	2.1		7.17	7.7	6450	6270	4749		2.4		2.39	80.2	335	169	757	16			183		1	U	1925	1046	0.92		88	
EP-107	4/25/00	2.1		7.2	7.6	5770	5590	4482		3.4		3.07	81.3	345	162	673	16			193		1	U	2041	695	1.1	UJ1	64	
EP-107	8/3/00	3.2		7	7.9	6190	6100	4730		1	U	0.41	78.1	364	171	784	18			200		1	U	1752	898	1		86	
EP-107	11/3/00	3.4		7.02	7.8	6440	7220	4874		1	U,UJ4	2	76.3	340	156	855	22			189		1	U	1870	949	0.99		69	
EP-107	2/12/01	3.2		7.1	7.7	5980	5710	4607		1	U	2	79.5	366	177	725	16			183		1	U	1890	819	0.99		84	
EP-107	5/8/01	3.5		7.11	7.7	5840	5710	4513		1	U	2.76	82.6	353	164	689	17			177		1	U	1970	905	0.99		64	
EP-107	7/17/01	1.9		7.02	7.8	4610	4550	3648		9.5	J4	5.11	79.7	248	112	745	16			284		1	U	1802	400	0.78		11	
EP-108	10/26/99			6.64	8.3	2810	2850	1835		29	J4		74.8	59	40	507	15			359	J3,J4	1	U,UJ3	686	244	2.5		4.2	
EP-108	1/28/00	1.5		7.52	8.2	3500	3360	2309		7.7			77.7	51	50	739	5.5			411		1	U	1022	361	2.5		6.3	J3
EP-108	5/2/00	2.7		7.5	7.9	3500	3500	1950		8.7		4.3	77.7	44	43	595	4.8			425		1	U	999	345	2.4	UJ1,J3	6.8	
EP-108	8/9/00	2.7		7.51	8.3	2520	3450	1657		1.3		2.2	75.0	35	28	326	38			307		1	U	693	218	2.4		5.1	J3
EP-108	11/9/00	2.2		7.54	8.1	3360	4330	2331		1.4		2.4	74.3	44	42	610	10			411		1	U	943	263	2.5		5.6	J4
EP-108	2/15/01	2.6		7.45	7.9	3370	3330	2257		22		9.72	75.6	43	41	564	5.3			418		1	U	1041	288	2.4		7.1	
EP-108	5/14/01	3.8		7.56	8.5	3460	3350	2412		16		9.45	78.1	52	49	626	6.5			384		12	J4	957	381	2.3		7	J4
EP-108	7/25/01	6.4		7.56	8	3410	3360	2353		12		7.5	77.5	50	49	657	6.7			459		1	U	1043	323	2.4		8	
EP-109	10/26/99			6.53	8.3	3470	3330	2269		64	J4		72.3	115	68	563	32			361	J3,J4	1	U,UJ3	1006	337	2.2		5.2	
EP-109	1/28/00	3.1		7.4	7.9	4000	3850	2714		30			76.8	101	74	726	15			387		1	U	1297	432	2.5		5.8	J3
EP-109	5/2/00	3.5		7.28	7.7	3930	3910	2782		32		15.7	77.7	95	67	624	15			384		1	U	1219	385	2.4	UJ1,J3	6.5	
EP-109	8/9/00	4		7.29	8.1	3930	4400	2726		5.9		3.45	74.8	84	63	587	20			383		1	U	1308	369	2.4	J3	8.9	J3
EP-109	11/9/00	3		7.31	7.8	4000	5100	2822		9.4		6.7	73.6	83	65	653	15			394		1	U	1246	356	2.4		7.5	J4
EP-109	2/15/01	3.2		7.31	7.7	3840	3780	2716		26		30	74.8	86	65	629	15			400		1	U	1273	360	2.3		8	
EP-109	5/14/01	4.1		7.49	8.1	3900	3810	2756		8.2		17	77.2	96	75	649	17			390		1	U	1337	426	2.4		9	J4
EP-109	7/25/01	6.9		7.37	7.8	3890	3810	2732		14		4.7	69.3	88	69	708	18			387		1	U	1316	366	2.4		8.5	
EP-110	10/29/99	4		6.99	8.4	2780	2510	1790	J4	149	J4	32.4	72.5	158	65	334	19			281		1	U	805	327	0.74		7.1	
EP-110	1/24/00	3.4		7.23	7.8	2750	2700	1921		18		25.1	75.7	137	58	400	18			268		1	U	782	286	0.76		8.8	
EP-110	4/25/00	3.2		7.29	7.7	2780	2750	1957		17		18.6	78.3	134	58	333	17			273		1	U	877	293	0.79	UJ1	7.9	
EP-110	8/2/00	2.4		7.19	8.1	2900	2860	1985		1.4		2	77.0	135	57	350	19			288		1	U	805	354	0.78		7.7	

App

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l	TSS mg/l		Turb. NTU		Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-110	10/31/00	3		7.11	8.1	2920	2810		2003	5.2		4.7		72.5	147	J4	61	414	18		279	1	U	900	333		0.77		8.9	
EP-110	2/8/01	5.4		7.09	7.9	2860	2770		1973	7.2		8.12		75.4	145		62	377	17		278	1	U	871	336		0.72		7.9	
EP-110	5/7/01	4.9	J4	7.23	8.2	2850	2800		1993	3.1		5.25		78.8	157		65	385	21		273	1	U	839	356		0.8		7.7	
EP-110	7/17/01	2.6		7.16	8	2900	2840		2071	2.2		1.43		75.2	158		66	377	21		276	1	U	876	377		0.77		8.7	
EP-111	10/28/99	3.5		7.11	7.7	5450	5410		3963	303				71.4	285		79	836	66		436	1	U	1800	562		2.4		0.2	UJ
EP-111	1/29/00	0.1		7.21	7.8	5390	5110		3820	29		4.5		72.3	237		69	908	62		373	1	U	1932	509	J4	2.4		0.25	J3
EP-111	5/2/00	0.2		7.25	7.6	5100	5120		3767	5.4		2.75		77.0	197		61	749	51		361	1	U	1749	543		2.6	UJ,J3	0.07	UJ
EP-111	8/14/00	0.2		7.1	7.8	5160	5220		3814	13		7.82		75.6	221		64	813	59		354	1	U	2041	491		2.6	J3	0.07	J4
EP-111	11/10/00	0.2		7.06	7.5	5190	6620		3889	8.9		5.25		75.6	212		62	898	62		364	1	U	1518	521	J4	2.9		0.11	J4
EP-111	11/10/00	0.2		7.06	7.6	5190	6620		3939	7.8				72.3	187		54	781	53		360	1	U	1669	412	J4	2.9		0.21	J4
EP-111	2/21/01	0.2		7.17	7.6	5630	5460		4229	7.4		9.5		72.5	205		61	772	55		423	1	U	2304	645		2.6		0.1	U
EP-111	5/15/01	0.4	J4	7.36	7.5	5400	5000		3997	3.5		4.5		76.3	228		71	915	76		293	1	U	2395	643		2.8		0.16	
EP-111	7/31/01	0.1	J4	7.1	7.7	5320	5690		3796	5.2		3.81		73.2	220		68	897	73		373	1	U	1832	543		2.9		0.17	
EP-112	10/28/99	8.5		7.32	7.8	5250	5090		3209	296				68.5	137		71	639	69		515	1	U	1570	562		1.5		0.1	UJ
EP-112	1/29/00	0.1		7.11	8	7520	7130		5026	1.6		3		70.0	242		133	1067	101		671	1	U	2846	551	J4	1.4		0.27	J3
EP-112	5/2/00	0.5		7.02	7.5	7280	7220		5043	1.1		2.75		74.3	253		141	948	87		693	1	U	2732	684		1.5	UJ,J3	0.05	U
EP-112	8/14/00	0.2		6.97	7.6	7290	7430		5212	5.7		5.44		74.5	237		119	996	88		695	1	U	2890	543		1.7	J3	0.1	J4
EP-112	8/14/00	0.2		6.97	7.9	7260	7430		5156	5.1				72.3	240		122	908	88		695	1	U	2908	507		1.7	J3	0.11	
EP-112	11/10/00	0.1		7	7.8	7280	8820		5169	2.4		1.89		68.7	193		98	893	80		722	1	U	2495	662		2		0.21	J4
EP-112	2/21/01	0.3		7.11	7.7	7300	7080		5102	2.8		3.1		70.2	226		116	914	89		710	1	U	2761	615		1.7		0.1	
EP-112	5/15/01	3.2	J4	7.17	7.5	7200	6490		5158	1	U	3.45		73.6	257		133	1106	115		595	1	U	2300	506		1.8		0.19	
EP-112	7/31/01	0.3		6.93	7.4	6900	7380		4878	1	U	1.1		72.3	237		122	1075	104		644	1	U	2737	632		1.9		0.21	
EP-113	10/28/99	7.5		7.41	8	4060	4080		2624	203				70.9	158		69	613	42		411	1	U	1358	408		2.8		0.22	UJ
EP-113	1/29/00	0.1		7.3	7.6	4180	4050		2930	21		8.3		71.6	151		65	701	42		375	1	U	1399	364	J4	2.9		0.28	J3
EP-113	5/2/00	0.2		7.33	7.7	3890	3900		2680	6.4		3.74		74.5	121		56	594	36		405	1	U	1271	372		3	UJ,J3	0.05	U
EP-113	8/14/00	0.1		7.3	7.8	3560	3630		2494	1.7		3.25		73.6	106		47	518	34		393	1	U	1221	246		3.1	J3	0.09	J4
EP-113	11/10/00	0.2		7.22	7.7	3620	4510		2603	4.1		2.65		70.9	109		50	583	36		393	1	U	1048	205	J4	3		0.14	J4
EP-113	2/21/01	0.2		7.35	7.9	3480	3410		2393	2.7		4.15		71.6	93		40	467	32		420	1	U	1220	318		3.1		0.1	
EP-113	5/15/01	1.9	J4	7.51	7.7	3420	3150		2373	1	U	4.45		73.6	107		50	577	42		325	1	U	1293	369		3		0.16	
EP-113	7/31/01	0.1		7.24	7.6	3580	3870		2464	1	U	1.37		76.1	119		55	599	42		350	1	U	1179	342		3		0.15	
EP-114	11/18/99	4.4		6.19	6.7	9800	10820		8176	730				68.4	547		243	1400	231		969	1	U	4272	937		13		0.19	
EP-114	1/31/00	0.3		6.35	6.6	8480	9070		7317	8392		200	>	73.4	960		355	1244	269		1708	1	U	3440	930		12		18	
EP-114	5/4/00	0.9		6.3	6.6	8000	2200	R	7066	7664		200	>	79.3	845		322	954	226		1501	1	U	4487	1000		11		0.08	UJ
EP-114	8/14/00	0.5		6.5	6.6	7730	6480		6743	3973		200	>	71.4	732		285	944	203		1171	1	U	3840	620		10	J3	0.08	J4
EP-114	11/10/00	0.7		6.37	6.7	7800	8810		6842	9284		200	U	72.1	706		252	876	182		1318	1	U	3270	703		9.9		0.19	J4
EP-114	5/4/01	1.8		6.78	6.5	7690	7870		6746	13382		200	>	81.7	1280		414	1133	347		2616	1	U	3190	821		8.5		0.21	UJ
EP-114	7/16/01	0.3		6.6	6.6	7660	8510		6831	12441		200	>	73.4	535		240	1042	228		1691	1	U	2991	705		8.5		0.05	U
EP-115	11/22/99	3.3		7.08	7.7	17800	1842	R	13965	8.2				64.0	711		449	3200	126		601	1	U	4440	3600		4.6		60	
EP-115	1/31/00	1.8		6.81	7.7	11440	10470		9032	100	J4	26		75.2	560		276	1824	102		763	1	U	4112	1502		3.3		35	
EP-115	5/4/00	1.9		6.84	8.1	9850	9490		8166	44	J4	16		85.1	559		270	1326	92		793	1	U	4346	1455		3.2	UJ	22	
EP-115	8/14/00	1.5		6.84	7.6	9410	8160		7750	8.5		5.03		72.9	489		212	1263	81		822	1	U	4050	762		3.3	J3	52	
EP-115	11/10/00	2.2		6.79	7.7	7520	9330		6445	42		19.5		32.0	366		77	1327	47		490	1	U	3191	358	J4	4.8		92	
EP-115	2/23/01													32.0																
EP-115	5/4/01											21.5		81.3																
EP-115	7/16/01	2.8		6.9	7.9	7660	6930		6595	35		9.9		81.1	530		189	1227	80		839	1	U	3762	503		3.2		20	
EP-116	11/18/99	2.4		6.56	7.3	6280	6460		4652	1529				75.6	406		92	800	65		569	1	U	2515	534		5.4		9.6	
EP-116	1/31/00	2.1		6.92	7.6	6480	6020		4700	1993		200	>	82.4	531		118	1052	80		1000	1	U	2202	489		5.6		8.9	UJ
EP-116	5/4/00	1.5		7.11	7.4	6400	6190		4550	1440		200	>	82.2	342		90	980	60		795	1	U	2350	563		5.8		11	
EP-116	8/14/00	2		7.08	7.7	6180	5510		4396	442		200	>	76.8	257		73	849	49		558	1	U	2458	481		4.9	J3	11	

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Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field	TDS mg/l		TSS mg/l		Turb. NTU		Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-116	11/10/00	1.5		6.74	7.6	5400		6770	4104		423		200	U	75.7	309	64	795	40		451		1	U	1838	373	J4	4.2		13	
EP-116	2/22/01	3		6.96	7.3	6230		6030	4455		2965		200	U	78.3	408	106	941	67		1049		1	U	2114	470		4.5		17	
EP-116	5/4/01	3		7.28	7.7	6210		6130	4504		2430		200	>	81.9	451	116	1058	75		1049		1	U	1130	275		4.2		16	
EP-116	7/16/01	2.6		7.01	7.5	5940		5410	4296		6661		200	>	74.3	254	76	970	49		1879		1	U	1988	517		4.5		16	
EP-117	11/18/99	1.4		7.23	7.8	2580		2810	1916		236				70.9	165	28	400	60		229		1	U	930	187		6		7.8	
EP-117	1/31/00	1.3		7.35	7.5	2640		2590	1914		11156		200	>	88.5	780	122	371	120		1903		1	U	843	245		6		6	UJ1
EP-117	5/4/00	1.3		6.67	7.7	3120		3210	2256		4608		200	>	78.3	405	68	351	92		866		1	U	1057	359		4.8		10	
EP-117	8/14/00	3.1		7.52	7.9	3720		3380	2832		5468		30.6		72.5	330	51	375	83		599		1	U	1350	353		4.5	J3	11	
EP-117	11/10/00	1.3		7.25	7.9	3660		4420	2864		4334		200	U	65.3	362	57	458	88		598		1	U	1260	334	J4	4.1		12	
EP-117	2/22/01	1.5		7.33	7.8	3920		3870	2971		5918		200	U	74.8	476	71	447	100		1065		1	U	1431	379		3.7		11	
EP-117	5/4/01	3.9		7.56	7.7	3740		3690	2872		7858		200	>	81.3	674	104	540	146		1391		1	U	1317	329		3.5		14	
EP-117	7/16/01	2		7.37	7.3	3950		3730	2972		2440		200	>	79.7	276	39	557	99		1220		1	U	1360	414		3.5		13	
EP-118	11/18/99	3.6		7.46	8	3460		3780	2405		5852				73.2	179	93	600	49		581		1	U	1080	341		1.8		13	
EP-118	1/31/00	1.6		7.74	8	3080		2950	2146		14581		200	>	76.8	556	325	659	122		1293		1	U	899	376		1.9		13	
EP-118	5/4/00	1.6		7.79	8.1	3200		3120	2126		6477		200	>	79.3	175	103	503	39		598		1	U	891	284		1.5	UJ1	13	
EP-118	8/14/00	2.1		7.95	8.3	3280		2910	2243		1139		200	>	72.9	96	49	480	16		265		1	U	1060	251		1.5	J3	15	
EP-118	11/10/00	3.5		7.58	8.2	2780		3400	2179		2384		200	U	71.1	194	71	435	35		377		1	U	997	129	J4	2.5		19	
EP-118	2/22/01	7.4		7.74	8	3380		3260	2433		33309		200	U	74.7	586	301	535	123		2086		1	U	1112	370		1.6		17	
EP-118	5/4/01	3.9		7.84	8.7	3520		3510	2486		4441		200	>	77.2	243	141	675	60		527		23		1234	396		1.5		17	
EP-118	7/17/01	2		7.52	8.1	3670		3670	2633		10133		200	>	73.9	111	52	644	14		1098		1	U	1299	473		1.5		16	
EP-119	5/15/01	0.4	J4	7.39	7.7	3560		3350	2576		17		7.8		73.9	128	51	603	61		388		1	U	1225	303		3.6		5.3	
EP-119	7/27/01	0.2		7.12	7.7	3510		3780	2520		1.7		2.36		73.9	129	52	596	57		390		1	U	1166	296		3.6		3.9	J4
EP-119	7/27/01	0.2		7.12	7.8	3520		3780	2589		1	U			75.6	125	51	596	57		398		1	U	1223	304		3.4		6.2	J4
EP-12	11/3/97	1.44		6.8	7.3	5840		7490	4846		7.9				70.2	370	121	995	17		764		1	U	1925	539		1		21	
EP-12	2/3/98	1.55		6.76	7.4	6580		7870	5491		8.3				71.8	437	148	1093	21		612		1	U	2603	666		0.92		32	
EP-12	5/20/98	2.38		7.05	7.6	5280		4820	3938		88				76.8	321	113	959	27		886		1	U	1566	524		1.1		18	
EP-12	8/27/98	1.12		6.79	7.3	6360		5650	5362		174				71.1	428	147	1172	12		727		1	U	2229	597		1		33	
EP-12	11/16/98	1.7		6.88	7.5	5580		5710	4367		329				65.7	334	115	1024	18		883		1	U	1731	547		1		16	
EP-12	2/25/99	2.6		7.08	7.4	4890		4980	3854		16	J4			79.3	288	86	775	15		775		1	U	1412	323		1		13	
EP-12	5/14/99	1.3		6.86	7.7	6020	J3	5910	4936		41	J4			76.6	340	134	1096	27		2013	J4	1	U	2121	372		0.8		10	
EP-12	5/14/99	2.1		7	7.7	5900	J3	5950	4840		66	J4			74.3	328	134	1063	26		1037	J4	1	U	2093	376		0.76		14	
EP-12	8/11/99	0.1		7.31	7.6	6110		6070	4756		36				71.1	360	126	945	15		1147		1	U	1900	425		0.78		12	
EP-12	10/29/99	2.5		8	8.3	4400		4180	1881	J4	47	J4			32.0	138	68	809	10		1557		1	U	740	375		0.51		0.86	J4
EP-12	2/8/00				7.5	5520			3880		46	J4			32.0	221	94	924	11		1214		1	U	1433	439		0.9		3.2	J4
EP-12	2/8/00				7.6	5420			3928		68	J4			74.3	191	86	898	9.8		1263		1	U	1350	417		0.87		2.1	J4
EP-12	5/9/00	0.3		6.98	7.5	5620		5780	4147		91		7200		77.9	277	112	1158	15		1159		1	U	1631	498		0.87	UJ1	5.9	
EP-12	8/16/00	0.6		7.11	7.5	5030		5180	3780		506		200	>	66.6	178	92	853	10		1427	J3	1	U,UJ3	1156	537		0.77	J3	4	
EP-12	11/14/00	2		7.12	7.8	5760		5540	4446		302		200	U	73.2	243	96	875	12		1074		1	U	1786	565		0.99		5.4	
EP-12	2/26/01	1.6		7.19	7.8	5380		5770	4054		55		200	U	73.8	204	90	838	12		1220		1	U	1574	552	J4	0.88		9.1	
EP-12	5/17/01	0.2		7.12	8	5960		5320	4791		55		20.1		78.8	281	111	925	16		695		1	U	2393	633		1.1		9.5	
EP-12	7/30/01	0.9	J4	6.9	7.6	5810		4790	4490		154		100	>	75.6	310	115	989	16		793		1	U	2085	562		1.2		16	
EP-120	5/7/01			8.1	8	3720		3330	2670		6.2		10	U	76.6	115	81	642	29		390		1	U	1350	404		2.2		8.5	
EP-120	8/1/01	4.5		7.45	8	3420		2900	2460		38		51.1		77.2	89	62	599	27		470		1	U	1043	252		2.5		3.3	J4
EP-120	8/1/01	4.5		7.49	7.9	3430		2900	2850		37				75.4	89	63	601	29		472		1	U	1141	256		2.5		7.3	J4
EP-121	5/7/01			8.13	8.1	3620		3480	2559		35		10	U	80.6	89	78	656	7.9		410		1	U	1229	380		1.8		7.9	
EP-121	8/1/01	5		7.38	7.7	3300		2790	2258		60		46.6		75.9	81	64	562	11		403		1	U	1149	354		1.7		6.7	J4
EP-122	5/14/01	4		7.45	8	3200		3140	2294		25		15.4		76.8	109	49	470	41		378		1	U	989	277		3.5		6.7	J4
EP-122	7/27/01	6.4		7.14	7.8	3410		3310	2423		2.6		4.73		70.0	124	57	568	47		370		1	U	1120	295		3.5		6.4	J4
EP-123	5/8/01			7.64	8.2	3260		3570	2230		129		10	U	81.3	72	33	597	19		427		1	U	983	244		2.7		6.4	

App

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU		Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-123	7/25/01	0.4		7.69	8.1	3080	3020	2105	37		84.7		74.8	50	27	616	15			338		1	U	976		282		2.7		5.2	
EP-124	5/16/01	2.7		7.78	7.9	3950	3820	2738	851				77.7	342	133	757	39			533		1	U	1139		559		4.5		0.29	
EP-124	7/27/01	2.5		7.25	8	4200	883	2887	277		0		79.5	76	43	834	31			416		1	U	1292		475		5		0.56	J4
EP-125	5/7/01			6.97	7.5	10320	12310	9112	517		10	U	77.9	436	297	1980	67			891		1	U	5134		534		0.9		58	
EP-125	7/19/01	1		6.83	7.7	10120	9640	9168	5458		200	>	64.9	420	261	1976	60			2830		1	U	5195		390		3.5		9.5	J4
EP-126	5/8/01			7.15	7.8	6560	7100	5331	33		10	U	84.4	372	160	948	39			293		1	U	2977		599		0.88		29	
EP-126	7/19/01	3		7.18	7.6	6200	5850	5323	31		60.4		72.1	419	204	822	29			214		1	U	3084		519		1.1		35	J4
EP-127	5/8/01			7.05	7.7	5780	5710	4343	13		10	U	75.9	292	75	859	69			460		1	U	2174		651		4.8		0.35	
EP-127	7/31/01	0.8	J4	6.85	7.5	6260	5940	4563	17		9.6		71.2	292	77	1002	79			515		1	U	2430		566		1.1		0.12	
EP-128	5/8/01			7.09	7.4	5480	5070	3380	11		10	U	75.0	116	40	790	42			271		1	U	1865		657		1.8		0.43	
EP-128	7/31/01	8.7	J4	7.61	7.5	5700	6080	3556	4.3		6.15		71.4	123	44	929	42			340		1	U	1862		649		1.9		0.36	
EP-129	5/11/01	1.3		7.09	7.9	3820	3400	2857	384		200	>	72.5	205	109	491	15			464		1	U	1329		525		0.66		13	
EP-129	7/24/01	1.3		7.09	7.9	3800	3670	2802	81		217		84.4	182	108	522	11			412		1	U	1368		362	J4	0.66		11	
EP-13	8/7/97	5.56		7.35	7.7	12500	12410	11243	52				81.9	434	73	3087	110		352	429		1	U	5745		673		1.5		104	
EP-13	11/6/97	4.01		7.11	7.8	12210	14320	10653	14				72.3	371	70	3043	91			422		1	U	5541		724		1.4		105	
EP-13	2/17/98	0.18		6.95	7.7	11910	14100	10540	23				79.2	348	59	2992	102			417		1	U	5364		634		1.4		103	
EP-13	5/7/98	2.79		6.96	7.7	11440	10900	9394	3.4				84.2	363	70	2776	97			399		1	U	5265		759		1.5		82	
EP-13	8/6/98	2.8		6.98	7.7	11220	11320	9829	7.3				77.2	359	70	2468	83			415		1	U	5322		814		1.4		83	
EP-13	11/4/98	7.2		7.12	7.4	11420	12670	9662	147				79.7	359	65	2684	85			428		1	U	4881		812		1.4		73	
EP-13	2/8/99	5.6		7.16	7.6	11200	11070	9447	12	J4			78.3	354	65	2040	90			394		1	U	4565		680		1.6		82	
EP-13	5/6/99	5.9		7.08	7.7	10640	11480	8889	6.8				78.1	309	61	2555	76	J4		411		1	U	4552	J3	644	J4	1.5		119	
EP-13	8/3/99	2.6		7.19	7.5	11200	11300	9509	4.3	J4	3.14		72.0	354	62	2000	77			407		1	U	4734		770		1.5		96	
EP-13	10/28/99	3.7		7.03	8	8960	8160	6935	3.9		4.02		72.1	265	42	1797	63			327	J3	1	U,UJ3	4164		596		1.4		81	
EP-13	1/25/00	4.7		7.27	7.8	10170	9840	8099	12		8.3		79.5	256	47	1986	67			372		1	U	3497		700		1.5		96	
EP-13	4/26/00	3.1	J4	7.23	7.8	9150	8430	7339	6.1		5.77		83.1	294	54	2108	64			390		1	U	4291		659		1.3	UJ1	88	
EP-13	8/4/00	0.3		7.06	7.5	7580	8210	5755	8.3		5.45		75.4	195	36	1300	39			288		1	U	2878		617		1.3		71	
EP-13	11/2/00	1.8		7.1	7.7	9700	9980	7754	5.4		7		74.3	281	47	2292	61			367		1	U	4033		630		1.5		91	
EP-13	2/9/01	6.3		7.09	7.6	7390	6820	5503	11		9.47		80.6	363	93	744	49			246		1	U	2739		821		1		78	
EP-13	5/8/01	2.8		7.17	7.5	9520	9090	7658	3.2		6.02		87.6	325	67	1937	76			306		1	U	4132		856		1.3		105	
EP-13	7/18/01	2.8		7.05	7.7	10000	9760	8082	4.4		4.49		80.4	323	66	2093	70			323		1	U	4051		720		1.3		122	
EP-130	6/8/01	1.6		6.48	7.3	11080	11380	9332	60		30.1		82.0	732	355	1279	37			782		1	U	3393		1857		0.82		299	
EP-130	7/26/01	4.1		6.26	7.4	10410	10250	9022	213		491		82.0	754	343	1465	36			763		1	U	2980		1220		0.68		270	
EP-130	7/26/01	3.7		6.26	7	10450	10260	9086	175				77.2	751	336	1459	37			749		1	U	3142		1360		0.62		235	
EP-131	6/8/01	4.7		7.32	7.8	4750	4790	3590	26		8.88		78.3	180	66	695	20			393		1	U	1888		632		2.3		9.7	
EP-131	7/26/01	3.1		7.02	7.8	4420	4310	3248	132		130		77.9	165	54	790	23			410		1	U	1538		437		2.4		8.8	
EP-132	6/8/01	3.5		7.55	7.8	4160	4200	3146	28		9.94		77.9	217	48	542	40			322		1	U	1488		449		3.4		9	
EP-132	6/8/01	2.9		7.45	7.8	4190	4250	3146	35				80.8	221	51	547	42			338		1	U	1475		539		3.5		9.1	
EP-132	7/27/01	5.4		7.06	7.9	4000	780	2937	59		124		77.7	217	48	620	47			283		1	U	1460		398		4.1		13	J4
EP-14	11/5/97	0.4		6.91	7.5	4430	5020	3686	3.6				76.8	364	92	623	53			332		1	U	1876		347		1.5		19	
EP-14	2/17/98	0.35		6.76	7.5	4520	6090	3852	2.6				76.3	383	97	671	51			323		1	U	1707		350		1.5		17	
EP-14	5/7/98	1.6		6.86	7.4	4660	5500	3754	1.1				80.2	388	97	730	63			425		1	U	1989		344		1.6		13	
EP-14	8/6/98	0.5		6.9	7.7	3590	3890	2867	3.9				77.4	211	54	645	35			467		1	U	1326		222		2		4.3	
EP-14	11/4/98	1		6.92	7.2	4230	4600	3253	32				79.3	248	62	640	46			432		1	U	1542		294		2		10	
EP-14	2/8/99	0.7		6.95	7.6	5070	4950	4178	6.8	J4			76.3	383	98	670	60			381		1	U	1537		307		2		18	
EP-14	5/6/99	6		6.85	7.4	4900	5240	3939	5.6				78.1	339	91	730	55	J4		443		1	U	1906	J3	295	J4	1.9		29	
EP-14	8/3/99	0.4		7.11	7.5	4300	4340	3349	16	J4	19		76.3	244	67	550	44			621		1	U	1229		358	J3	2		31	
EP-14	10/28/99	0.2		6.87	8.1	4750	5400	3667	4.2		3.08		77.2	336	86	688	55			394	J3	1	U,UJ3	1537		405		1.7		39	
EP-14	1/25/00	0.1		6.92	7.5	5130	4970	4011	5.9		0.71		78.1	303	78	721	50			321		1	U	2150		338		1.6		23	J4
EP-14	4/26/00	0.4	J4	6.9	7.6	5080	5070	4008	1	U	1.8		78.4	349	91	704	49			376		1	U	2223		509		1.6	UJ1	18	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	Ca mg/l (DISSOLVED)		Mg mg/l (DISSOLVED)	Na mg/l (DISSOLVED)	K mg/l (DISSOLVED)	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l	F mg/l		N mg/l	
EP-14	8/4/00	0.4		6.75	7.8	5030	4980		3791	1.7		7.8	78.3	314		78	665	44		368		1	U	1767		457	1.5		16	
EP-14	8/4/00	0.3		6.76	7.6	5030	4980		3915	2.2			77.9	299		75	614	42		370		1	U	2061		425	1.6		14	
EP-14	11/2/00	0.5		6.93	7.5	5040	5890		3979	4		6.7	75.9	300		76	644	43		390		1	U	1800		413	1.6		16	
EP-14	2/9/01	0.2		6.94	7.8	5620	5390		4527	1.8		2.65	77.5	224		50	1502	46		378		1	U	2680		475	1.5		25	
EP-14	5/8/01	0.7		6.91	7.6	5720	5640		4666	2.6		5.32	77.9	387		99	797	57		378		1	U	2723		496	1.5		25	
EP-14	7/18/01	0.1		6.87	7.8	5530	5420		4470	1.4		2.7	85.5	395		101	832	57		377		1	U	2600		400	1.5		26	
EP-15	8/7/97	2.84		7.2	7.8	3150	2830		2263	220			75.7	125		44	525	13	266	325		1	U	889		315	0.93		23	
EP-15	11/6/97	2.37		7.3	7.9	3060	3180		2189	165			73.6	116		42	529	10		290		1	U	974		333	0.89		12	
EP-15	2/17/98	2.45		7.12	7.7	3100	3980		2299	86			72.1	122		43	557	11		262		1	U	885		329	0.84		17	
EP-15	5/7/98	2.47		7.35	7.8	2960	3320		2018	124			76.3	110		39	538	17		279		1	U	875		311	0.91		18	
EP-15	8/10/98	1.77		7.34	7.9	2810	2750		1987	282			72.0	99		34	535	8.4		386		1	U	715		272	0.94		13	
EP-15	11/5/98	1.5		7.21	7.6	3090	3040		2150	110			74.5	121		41	510	11		283		1	U	869		308	0.93		18	
EP-15	2/8/99	2.5		7.27	7.8	3620	3560		2579	94	J4		74.5	166		59	520	13		268		1	U	958		367	0.88		18	
EP-15	2/8/99	2.5		7.27	8	3600	3560		2593	117	J4		78.3	161		58	520	13		268		1	U	967		372	0.87		17	
EP-15	5/5/99	7.3		7.12	7.7	4170	8580	R	3083	75			75.7	197		77	710	11		299		1	U	1212	J3	381	0.8		21	
EP-15	8/3/99	2		7.19	7.5	4460	4500		3400	83	J4	68.9	75.7	217		76	600	12		295		1	U	1233		452	0.73		32	
EP-15	8/3/99	2		7.19	7.6	4460	4520		3408	49	J4		75.2	220		78	600	12		298		1	U	1363		432	0.74		30	
EP-15	10/28/99	1.3		6.85	8.1	4400	3960		3250	60		34.6	73.9	230		81	671	13		266	J3	1	U,UJ3	1356		509	0.71		20	
EP-15	1/24/00	1.6		7.14	7.8	4560	4470		2916	176		114	76.8	223		76	766	13		366		1	U	1509		387	0.71		26	
EP-15	4/26/00	2.1	J4	7.08	7.7	4560	4540		3342	135		17.6	77.4	209		73	671	11		378		1	U	1765		554	0.75	UJ1	21	
EP-15	8/3/00	1.2		7.01	8	4650	4670		3377	110		18	73.6	190		66	725	11		359		1	U	1546		478	0.81		27	
EP-15	11/2/00	1.1		7.11	7.7	4460	4950		3351	61		58.1	73.4	195		68	702	9.2		361		1	U	1323		373	0.87		38	
EP-15	11/2/00	1.1		7.1	7.6	4480	4940		3342	59			74.8	182		66	680	8.8		351		1	U	1354		377	0.85		41	
EP-15	2/12/01	1.3		7.15	8	4520	4320		3298	91		29	76.6	184		67	712	10		356		1	U	1373		424	0.87		34	
EP-15	5/8/01	2.2		7.13	7.8	4500	4480		3362	106		45.5	75.2	206		72	816	13		344		1	U	1583		492	0.99		30	
EP-15	7/19/01	2.6		7.07	7.8	4520	4380		3284	65	J4	28.2	73.0	190		69	791	12		366		1	U	1576		438	0.95		28	J4
EP-20	8/7/97	1.98		6.72	7.4	11160	11270		10541	161			74.3	584		323	2070	71	328	400		1	U	4582		817	2.3		235	
EP-20	11/3/97	2.56		7.05	7.3	10760	12760		10175	78			71.1	520		310	2253	56		403		1	U	4608		786	2.4		107	
EP-20	2/3/98	2.36		7.06	7.4	10800	13110		9914	74			32.0	536		320	1919	63		349		1	U	5063		890	1.9		201	
EP-20	5/6/98	3.49		7.22	7.5	10510	10580		9230	50			71.4	530		315	2289	63		381		1	U	4635		780	2		183	
EP-20	8/6/98	2.39		6.88	7.6	10210	10440		9259	129			73.4	520		292	1664	57		376		1	U	4783		765	2		163	
EP-20	11/4/98	1.6		6.92	7.1	10370	10130		8932	90			70.2	493		274	1816	57		361		1	U	4376		739	2.5		148	
EP-20	2/4/99	2.4		6.96	7.4	9910	10010		8707	45	J4		69.8	447		260	1801	76		359		1	U	3750		621	2.3		107	
EP-20	5/4/99	2.3		6.95	7.4	10320	10220		9135	53	J4		73.8	474		302	2014	56		351		1	U	4861	J3	773	2.1	J3	172	
EP-20	8/2/99	1.6		6.89	7.2	9930	10090		8709	35	J4	22.8	72.3	498		287	1600	53		372		1	U	4935		754	2.1		143	
EP-20	10/26/99	2.2		6.73	7.2	9800	9770		8197	106	J4		68.2	483		266	1596	48		250	J3,J4	1	U,UJ3	4216		686	2.2		143	
EP-20	1/31/00	2.1		6.86	7.5	9530	9120		8062	104	J4	38	69.8	456		255	1747	48		355		1	U	4280		660	1.9		84	
EP-20	1/31/00	1.1		6.8	7.5	9500	9050		7844	50	J4		71.4	481		268	1769	48		343		1	U	4288		689	1.8		84	
EP-20	5/4/00	2.5		6.99	7.8	9260	9170		7998	17	J4	9.52	71.6	457		262	1351	44		354		1	U	4516		626	1.8	UJ1	89	
EP-20	5/4/00	2.3		6.99	7.9	9360	9130		8012	32	J4		73.0	454		264	1352	46		353		1	U	4405		583	2	UJ1	98	
EP-20	8/2/00	2.1		6.95	7.7	9570	9540		8056	42		34.1	74.8	421		232	1600	48		336		1	U	4796		735	1.9		116	
EP-20	10/30/00	1.9		6.91	7.7	9260	8870		7826	32		19.5	71.8	443	J4	238	1454	46		349		1	U	3870		471	1.9		100	
EP-20	2/22/01	3.7		7.02	7.5	8570	8250		7297	185		120	67.6	403		199	1188	43		338		1	U	3919		524	1.8		77	
EP-20	5/16/01	3.7		6.99	7.3	8920	7890		7798	107		52.9	67.5	461		233	1457	54		311		1	U	4517		612	2.1		118	
EP-20	5/16/01	3.7		6.98	7.4	8870	7890		7760	94			72.7	479		244	1543	59		329		1	U	4454		705	1.9		116	
EP-20	7/17/01	2.6		7.09	7.2	9190	8800		7921	336	J4	151	72.0	462		230	1606	51		268		1	U	4218		675	2.6		118	
EP-20	7/17/01	2.9		7.12	7.3	9160	8810		7868	267	J4		32.0	455		235	1646	54		238		1	U	3999		656	2.5		122	
EP-21	11/18/97				7.8	6260			3282	320			73.2	85	UJ1	49	1032	450		1510		1	U	1258		826	5.4		0.05	U
EP-21	2/18/98	0.65		7.3	8	5980	8000		3770	27	J4		77.7	65		51	1108	466		1935		1	U	511		697	4.8		0.05	U

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-21	5/21/98	0.41	7.26	7.8	5740	1096 R	3237	269		82.8	56	44	959	416		2001	1 U	372	695	5.7	0.1 U
EP-21	8/24/98	0.31	7.41	8	5680	5670	3351	47		77.0	52	46	1033	46		2064	1 U	321	653	5.5	0.05 U
EP-21	11/16/98	0.2	7.57	8	5690	5630	3497	34		72.7	60	46	1022	450		2084	1 U	404	675	5.5	0.05 U
EP-21	2/24/99	0.4	7.56	8.1	5670	5740	3486	23		80.2	44	40	919	347		2142	1 U	405 J4	570	6	0.27
EP-21	8/10/99	0.8	7.66	8	5140	5160	2974	19		75.0	32	39	805	282		2111	1 U	88	608	6.3 J4	0.05 J4
EP-21	11/3/99	1.3	7.28	7.9	5240	5760	2963 J4	177 J4		72.0	35	40	768	294		1940 J4	1 U	114 J4	586 J4	6.8	0.12
EP-21	2/1/00	0.7	7.54	8.1	4880	1101 R	2942 J3	3499 J3	200 >	80.2	25	36	714	322		2135	1 U	104	638 J4	6.6	1.2 J3
EP-21	5/8/00	0.2	7.48	8.1	4960	4890	2873	34	24.8	76.8	27	34	942	301		1915	1 U	191	685	7.2	0.06
EP-21	8/16/00	1.4	7.4	8	4920	4860	2734	41	25.3	77.0	22 J4	26	684	245		1826 J3	1 U,UJ3	114	628	6.9 J3	0.13 UJ1
EP-21	8/16/00	0.8	7.35	8	4930	4880	2734	39		68.2	28 J4	30	696	238		1871 J3	1 U,UJ3	114	624	7 J3	0.13 UJ1
EP-21	11/14/00	4	7.22	7.8	5200	5160	2916	78	21.2	68.0	36	31	714	195		1696	1 U	186	727	5.5	0.15
EP-21	11/14/00	3.8	7.23	7.8	5200	5170	2938	64		65.7	40	32	711	183		1745	1 U	198	745	5.5	0.17
EP-21	2/26/01	3	7.39	7.7	5080	4950	2874	348	70.1	65.5	34	32	739	248		1818	1 U	231	605 J4	6.4	0.39 J4
EP-21	2/26/01	2.9	7.4	7.7	5020	4950	2958	378		80.1	33	32	756	248		1823	1 U	269	759 J4	6.5	0.93
EP-21	5/16/01	0.7	7.42	7.8	4740	4610	2756	32	48.4	77.7	19	27	711	285		2040	1 U	138	782	7	0.3
EP-21	7/30/01	1.8 J4	7.06	8	4860	4520	2769	135	109	80.2	58	42	868	186		1806	1 U	131	699	5.1	0.13
EP-22	8/15/97	2.92	7.46	7.9	8540	8510	5188	14		73.8	106	91	1168	180	1078	1315	1 U	1866	711	5.1	100
EP-22	11/18/97	1.01	7.16	7.4	9980	12900	7299	9 J4,UJ1		64.9	350	164	1942	116		399	1 U	3341	1368	4.2	158
EP-22	2/18/98	3.75	7.49	7.6	9900	11910	6247	45 J4		74.5	253	155	1664	281		889	1 U	2219	903	4.5	294
EP-22	6/10/98	2.26	7.63	7.7	9520	9560	6203	30410		83.8	289	148	1477	245		2684	1 U	2334	971	5.2	210
EP-22	8/24/98	0.17	7.36	7.8	6840	6850	3958	1162		74.7	101	81	1226	104		1161	1 U	1571	691	3.9	29
EP-22	11/16/98	0.9	7.51	8	7480	7480	4045	441		74.1	54	78	1292	126		1742	1 U	1407	777	5.2	13
EP-22	1/26/00	2.8	7.19	7.9	7500	6930	5829	438	193	77.0	448	161	1262	113		476	1 U	3940	499	2.2	11 J3
EP-22	4/28/00	0.8	7.1	8	8290	7660	7001	144	15.9	84.0	361	157	1398	95		537	1 U	3799	649	2.4 UJ1	3.5
EP-22	8/7/00	0.9	7.12	8.2	8940	8820	7388	27	25.5	77.9	377	167	1400	88		569	1 U	3741	600	2.6	15
EP-22	11/3/00	2.1	7.12	7.7	10850	10620	7323	101 J4	3.9	75.2	441	198	1632	106		609	1 U	4130	534	2.5	32
EP-22	2/14/01	2.4	7.07	7.7	9670	9410	8216	2.8	4.3	79.5	412	201	1504	107		647	1 U	4682	543	2.4	74
EP-22	5/9/01	0.8	7.07	7.6	10370	10140	9125	14 J4	7.5	82.2	488	250	1843	147		586	1 U	5250	610	2.3	115
EP-22	7/19/01	2	6.94	7.5	11000	10670	9683	41 J4	17	79.2	504	262	1951	143		611	1 U	5515	660	2.5	99
EP-23	8/11/97	1.17	7.36	7.5	6790	6640	5028	124		75.6	218	115	930	80	212	259	1 U	3239	494	3.1	0.3
EP-23	11/4/97	0.73	7.51	7.7	6130	6810	4089	61		73.4	181	96	876	76		322	1 U	2236	541	3.2	0.16
EP-23	2/4/98	1.45	7.42	7.7	6190	7190	4183	45		78.1	192	99	854	76		307	1 U	2484	493	2.6	0.14
EP-23	5/11/98	0.88	7.13	7.6	5500	5790	3492	99		75.7	131	71	821	70		403	1 U	1902	420	3.3	0.05 U
EP-23	8/12/98	0.99	7.47	7.7	5620	5010	3423	204		72.7	168	89	874	62		436	1 U	1790	429	3.2 J4	0.06
EP-23	11/5/98	0.6	7.5	7.5	5790	4650	3517	176		32.0	115	64	829	52		414	1 U	1925	484	2.9	0.05 U
EP-23	2/11/99			7.8	5470		3346	150		73.4	152	80	640	65		443	1 U	1144	462	3.2	0.05 U
EP-23	5/7/99	0.9	7.41	7.8	4310	4420	2374	87		78.3	74	44	580	57		676	1 U	901	330	3.8	0.14 J4
EP-23	5/14/99	1.9	7.29	7.8	4190 J3	4200	2388	47 J4		76.3	69	49	599	97		717 J4	1 U	1403	290	2	0.1 U
EP-23	8/4/99		7.49	7.8	3750	3840	2130	23	13	71.8	49	31	618	37		766	1 U	838	257	4.2	0.1
EP-23	10/30/99		7.35	7.9	3340	3320	1706	18 J4		66.0	37	23	491	32		938	1 U	540	267	4.6	0.32 UJ1
EP-23	2/1/00	1	7.49	7.8	4770	951 R	2695	20		75.6	106	56	654	52		479	1 U	1386	383 J4	3.3	0.19 UJ1
EP-23	5/3/00	1.1	7.51	7.6	5230	5160	3198	24	13.9	75.2	117	63	586	50		477	1 U	1629	488 J4	2.9 UJ1,J3	0.18
EP-23	8/16/00	2.9	7.61	7.9	4870	4710	2867	34	27.4	72.5	94	52	627	45		549 J3	1 U,UJ3	1423	485	3.1 J3	0.42
EP-23	11/13/00	1.8	7.61	7.9	5200	4730	2740	14	7.65	67.6	84	49	637	45		622	1 U	1286	398	3	0.1 J4, UJ1
EP-23	2/21/01	2	7.78	8	5020	4490	2964	55	35	74.7	68	41	649	39		609	1 U	2788	481	3	0.55
EP-23	5/10/01	3.8	7.5	7.9	5320	5040	3238	280	47	74.8	114	69	663	51		537	1 U	1706	585	2.8	0.2
EP-23	7/20/01	0	7.18	7.9	5580	5240	3411	58	31	78.8	132	77	709	59		411	1 U	2149	553	2.6	0.26
EP-24	8/15/97	1.13	6.7	8	5150	4660	3451	17		32.0	174	55	910	25	800	976	1 U	765	831	1.6	0.05 U
EP-24	11/18/97			7.7	5940		4168	8 J4,UJ1		73.6	393	56	1030	53		1037	1 U	1338	1003	3.1 UJ1	0.05 U

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Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field		TDS mg/l		TSS mg/l		Turb. NTU		Temp oF	Dissolved Ca mg/l	Dissolved Mg mg/l	Dissolved Na mg/l	Dissolved K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-24	2/18/98	1.26		6.74	8.1	5130		5820		3259		16	J4			79.0	213	47	1033	29			1200		1	U	305		1027		2.6		0.05	U
EP-24	5/21/98	0.8		6.95	7.5	5380		999	R	3208		143				81.7	196	59	980	34			1135		1	U	577		1024		2.5		0.1	U
EP-24	8/24/98	0.5		6.79	7.3	5200		5000		3172		17				74.5	180	56	1064	28			1288		1	U	264		970		2.5		0.05	U
EP-24	11/16/98	0.6		6.93	7.7	5390		5220		3328		12				32.0	179	53	1051	29			1305		1	U	298		1087		2.4		0.05	U
EP-24	2/11/99				7.8	5800				3336		79				32.0	206	80	920	35			1576		1	U	206		1021		2.5		0.2	
EP-24	5/14/99				7.4	6410	J3			4137		31	J4			81.3	212	92	1096	50			1642	J4	1	U	1132		1195		2.2		0.1	U
EP-24	8/10/99	0.6		7.05	7.8	5680		5640		3538		23				74.5	213	55	894	30			1379		1	U	273		1044		2.4	J4	0.08	J4
EP-24	11/3/99	1		6.96	7.7	5200		5990		3092	J4	73	J4			70.7	174	42	853	28			1425	J4	1	U	266	J4	1006	J4	2.5		0.13	
EP-24	2/1/00	0.3		6.93	7.5	5120		1072	R	2742		26		14.8		77.9	159	40	940	29			1301		1	U	111		1175	J3	2.6		0.16	UJ1
EP-24	5/8/00	0.9		7.06	7.6	5080		4990		3025		13		9.96		76.1	150	45	1062	27			1301		1	U	199		1086		2.4	UJ1	0.11	
EP-24	8/16/00	1		7	7.9	5880		5520		3502		15		8.46		71.8	144	74	978	23			1318	J3	1	U,UJ3	538		1228		2.1	J3	0.13	UJ1
EP-24	11/14/00	1.6		7.05	7.7	5300		5200		3412		14		6.8		73.6	138	44	843	20			1122		1	U	536		1038		2.3		0.3	
EP-24	2/26/01	8		7.04	7.9	4300		4600		2740		42		12		83.7	110	29	756	23			1440		1	U	268		806	J4	2.6		0.36	J4
EP-24	5/16/01	0.6		7.16	7.5	4500		4350		2760		20		12.1		79.3	103	30	776	25			1386		1	U	204		1005		2.6		0.59	
EP-24	7/30/01	1.6	J4	6.87	7.6	4430		3940		2699		13		9		77.4	112	34	867	26			1366		1	U	220		696		2.5		0.24	
EP-25	8/15/97	1.32		7.13	7.4	5990		5730		3995		84				32.0	113	40	1040	78		990	1208		1	U	695		1127		1.6		0.94	
EP-25	11/19/97				7.8	5470				3213	J3	43				32.0	74	33	1136	59			1556		1	U	304		965		1.7		0.05	U
EP-25	2/18/98				7.6	5420				3218		500	J4			32.0	78	39	1232	53			1588		1	U	147		937		1.6		0.05	U
EP-25	5/21/98				7.5	5760				3194						32.0	125	34	1098	166			1281		1	U	572		971		1.9		0.1	U
EP-25	8/24/98				7.2	5420				3362		3199				32.0	114	48	1084	70			1354		1	U	522		853		1.4		0.05	U
EP-25	11/16/98				7.5	5470				3422		166				32.0	113	35	1134	120			1440		1	U	515		852		1.9		0.06	
EP-25	5/14/99				7	7880	J3			6245		12081	A			32.0	675	50	700	738			771	J4	1	U	2996		885		5		0.67	
EP-25	8/11/99				7.1	7210				5465		378				72.3	584	68	706	555			677		1	U	1860		955		1.9		1	
EP-25	11/3/99	3.3		6.87	7.3	6580		5750		4373	J4	169	J4			73.0	202	32	757	290			1080	J4	1	U	1507	J4	893	J4	1.9		0.12	
EP-25	11/3/99	3.3		6.82	7.5	5640		5970		3270	J4	126	J4			32.0	198	31	757	287			1599	J4	1	U	554	J4	683	J4	2.1		0.12	
EP-25	2/8/00				7.6	5200				3118		460				76.6	103	20	862	214			1586		1	U	198		775		2.2		0.36	UJ1,J4
EP-25	5/8/00	0.3		7.03	7.6	6060		5500		3706		855		200	>	79.5	137	30	1079	277			1818		1	U	350		969		2.2	UJ1	0.17	
EP-25	8/16/00	0.1		7.02	7.7	5840		5490		3441		84		200	>	69.6	104	26	855	195			1708	J3	1	U,UJ3	202		1053		1.9	J3	0.1	UJ1
EP-25	11/14/00	1.2		7.04	7.5	6020		5450		3496		146		200	U	71.4	96	25	899	172			1743		1	U	221		1100		1.8		0.27	
EP-25	2/26/01	2.3		7.3	7.7	5680		5870		3395		727		200	U	80.2	80	22	895	154			1793		1	U	144		961	J4	1.9		0.13	J4
EP-25	5/16/01	2.5		7.11	7.6	5620		5530		3315		164		200	>	80.4	84	23	919	168			1867		1	U	182		1102		1.9		0.53	
EP-25	7/30/01	1	J4	6.84	7.7	5550		5060		3243		242		86.4		73.9	88	26	1015	170			1818		1	U	125		741		1.8		0.23	
EP-26	8/11/97	5.26		7.69	7.2	544		568		395		163				77.9	23	3.7	88	6.9		37	45		1	U	157		43		0.86		2.3	
EP-26	11/4/97	5.05		7.15	7.3	1700		1900		1191		99				71.2	62	13	244	20			44		1	U	561		163		1.4		3.9	
EP-26	2/4/98	5.74		7.58	7.4	202		239		145		100				73.9	9.1	2	26	13			26		1	U	46		12		0.78		1.4	
EP-26	5/7/98	6.3		7.64	7	141		170		102		70				72.9	9.9	1.5	14	15			21		1	U	26		5.3		0.58		1.8	
EP-26	8/12/98	5.59		7.21	7.4	188		190		130		85				71.8	13	2.1	18	5	U		44		1	U	35		10		0.56	J4	2.1	
EP-26	11/4/98	5.7		7.99	6.4	412		448		282		146				73.4	21	3.1	44	7.3			24		1	U	104		19		0.77		3.8	
EP-26	2/4/99	6.9		7.26	7.4	133		170		78		51	J4			82.2	8.3	1.1	14	5	U		20		1	U	29		7.6		0.56		1.4	
EP-26	5/5/99	2.1		7.02	7.3	362		4440	R	239		244				73.9	30	4.1	25	5			41		1	U	89	J3	18		0.5		3	
EP-26	8/4/99			7.07	7.4	2000		2200		1466		29		9.7		76.5	176	24	204	21			56		1	U	738		147		0.66		14	
EP-26	1/26/00	0.5		7.16	7.9	4440		4210		3169		450		200	>	76.5	231	71	753	42			322		1	U	1537		451		1.9		4.9	J3
EP-26	4/28/00	0.3		7.04	7.3	4540		4370		3393		44		31.4		79.0	170	54	749	50			327		1	U	1638		436		2	UJ1	20	
EP-26	8/7/00	0.6		7.07	7.9	4600		4620		3348		28		16		74.8	175	51	700	54			305		1	U	1527		437		2		28	
EP-26	11/7/00	0.4		7.03	7.7	4640		5360		3341		40		16		77.0	196	58	793	53			320		1	U	1466		410		1.9		13	
EP-26	2/20/01	0.4		7.07	7.8	4740		4560		3520		18	J4	15		76.8	200	63	755	43			295		1	U	1913		467		1.8		16	
EP-26	5/10/01	0.6		7.03	7.8	4900		4820		3732		23		19.5		76.8	229	74	782	63			298		1	U	1834		583		1.8		28	
EP-26	5/10/01	0.5		7.03	7.8	4880		4810		3754		21				77.5	225	73	754	58			290		1	U	1782		585		1.8		29	
EP-26	7/26/01	1.4		6.91	8.1	5090		4980		3740		5.1		8.34		73.8	218	71	894	72			299		1	U	1740		568		1.8		35	

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-29	8/7/97	2.77	7.41	8	3090	3110	2085	1.1		76.3	79	27	567	29	312	381	1 U	742	289	3	7.6
EP-29	11/3/97	0.52	7.09	7.9	2960	3610	2096	56		73.4	50	18	576	24		395	1 U	706	305	3	6.3
EP-29	2/3/98	0.68	7.47	8	3100	3890	2073	13		32.0	52	20	677	27		285	1 U	973	317	2.7	8.1
EP-29	5/6/98	4.14	7.59	8	3180	3470	2159	23		71.4	69	26	654	31		417	1 U	793	315	2.6	7.5
EP-29	8/6/98	5.67	8.68	8.7	3070	3140	2129	23		70.3	39	21	681	19		177	9	939	339	2.9	14
EP-29	11/4/98	5.2	8.42	8.5	3350	3150	2185	89		70.9	40	23	646	22		217	10	981	372	2.8	8.9
EP-29	2/3/99	4.1	8.06	8.1	3130	3410	2121	211		72.0	49	21	660	22		337	1 U	743	307	2.9	8.7
EP-29	5/4/99	2.3	7.68	8.2	3160	3120	2079	170 J4		72.0	49	22	732	16		317	1 U	1049 J3,J4	326	3 J3	4.4
EP-29	5/4/99	2.3	7.69	8.1	3140	3130	1771	280 J4		75.6	49	22	714	15		294	1 U	812 J3,J4	289	3.2 J3	4.5
EP-29	8/2/99	3.5	7.59	7.8	3180	3220	2143	1160	200 >	76.1	57	22	500	18		464	1 U	741	302	3.3	3.3
EP-29	10/26/99	2.4	7.42	8.2	3160	3130	2052	572 J4		70.2	76	23	597	22		364 J3,J4	1 U,UJ3	829	313	3.1	3.8
EP-29	1/31/00	1.6	7.62	8.1	3190	3040	2063	542	200 >	72.5	66	21	686	18		292	1 U	897	344	3	4.3 UJ1
EP-29	5/4/00	2.7	7.73	7.9	3150	3150	2095	5093	200 >	75.2	169	33	550	30		1186	1 U	876	292	2.9 UJ1	5.7
EP-29	8/2/00	2.7	7.64	8.3	3180	3170	2115	905	200 >	76.3	66	19	600	19		445	1 U	993	310	3.1	3.9
EP-29	10/30/00	4.1	7.58	8	3250	3260	2100	754	200	73.2	51 J4	18	566	16		342	1 U	912	303	3.2	5.6
EP-29	2/22/01	3.3	7.84	7.8	3250	3140	2211	2144	200 U	72.0	87	26	615	24		598	1 U	956	306	2.8	7.2
EP-29	5/16/01	4.9	7.89	8.1	3260	3100	2223	188	200 >	75.0	49	20	618	20		293	1 U	1044	361	2.9	8.2
EP-29	7/17/01	1.7	7.77	8.1	3270	3190	2185	1144	0	68.7	47	20	680	16		439	1 U	960	364	2.8	7
EP-35	8/7/97	5.98	7.55	8	6530	6150	5678	4.8		72.5	395	176	1124	26	196	239	1 U	2558	575	0.95	67
EP-35	11/3/97	1.75	6.92	7.5	6340	7420	5731	73		70.0	408	165	1116	19		493	1 U	2396	527	1.1	86
EP-35	2/3/98	2.11	6.99	7.6	6760	7940	5859	14		32.0	443	170	1108	19		490	1 U	2654	545	0.99	82
EP-35	5/6/98	2.47	7.15	7.2	6530	6950	5225	928		71.8	436	152	1192	29		600	1 U	2357	552	1.1	69
EP-35	8/6/98	1.89	6.91	7.6	6300	5300	5359	212		74.3	417	163	1154	22		483	1 U	2426	555	1	79
EP-35	11/4/98	1.9	7.11	7.2	6220	6100	5032	307		68.5	374	125	986	21		498	1 U	2357	539	1	58
EP-35	2/4/99	3.8	7.03	7.4	6410	6140	5282	93 J4		71.4	402	145	1039	22		539	1 U	2158	455	1	66
EP-35	5/4/99	1.9	6.98	7.4	6810	6730	5702	266 J4		74.1	426	166	1119	18		567	1 U	2822 J3	561	1.1 J3	82
EP-35	8/2/99	2.9	6.92	7.1	6920	7000	6040	398 J4	137	76.3	476	160	900	19		610	1 U	2620	1086	1	88
EP-35	10/26/99	1.7	6.71	7.8	6770	6740	5791	454 J4		66.2	441	148	1018	18		630 J3,J4	1 U,UJ3	3387	475	1	67
EP-35	1/31/00	1.7	6.91	7.7	6660	6350	5452	522	200 >	69.6	502	160	1071	20		609	1 U	2414	466	1	39
EP-35	5/4/00	2.2	7.01	7.4	6710	6680	5606	75 J4	40.8	74.8	430	158	910	17		594	1 U	2715	521	0.99 UJ1	59
EP-35	8/2/00	2	6.98	7.8	6540	6490	5323	136	85.8	75.9	379	130	900	17		601	1 U	2796	497	0.98	59
EP-35	10/30/00	2.9	6.99	7.8	6320	6140	5176	57	24.2	70.7	361 J4	123	892	14		617	1 U	2525	440	1.1	45
EP-35	2/22/01	4	7.07	7.4	6480	6170	5283	937	130	69.4	354	122	843	16		756	1 U	2565	523	1	43
EP-35	5/16/01	5.6	7.14	7.5	6460	5830	5335	96	5.2	73.6	414	138	1053	19		606	1 U	2895	524	1	61
EP-35	7/17/01	2	7.01	7.9	6330	6110	5219	191 J4	66	84.2	394	136	1064	17		605	1 U	2642	465	0.98	36
EP-4	8/6/97	1.51	7.06	7.7	2350	2230	1557	14		68.4	135	36	356	17	318	388	1 U	454	356	1.2	0.05 U
EP-4	11/4/97	1	7.46	7.8	1656	1906	1102	22		56.8	56	15	251	12		346	1 U	287	196	1.4	0.05 U
EP-4	2/4/98	1.91	7.58	8	1595	1563	1076	54		32.0	74	20	257	12		300	1 U	346	190	1.1	0.05 U
EP-4	5/5/98	3.2	7.95	7.9	1831	1670	1211	58		79.9	99	27	270	21		326	1 U	377	213	0.97	0.09
EP-4	8/5/98	1.34	7.36	7.8	1970	2190	1345	29		63.7	105	27	303	12		331	1 U	437	242	1	0.05 U
EP-4	2/3/99	1.2	8.08	8.1	1965	1620	1295	3434		65.3	101	27	321	13		778	1 U	364	222	0.93	0.21
EP-4	5/5/99	2.1	7.6	7.9	2170	2050	1423	696		78.4	113	31	282	14		439	1 U	418 J3	206	0.88	0.1 U
EP-4	8/2/99	1.3	7.61	7.8	2440	2490	1650	358 J4	72.3	77.4	117	30	350	16		401	1 U	603	273	1.1	0.08 UJ1
EP-4	10/25/99		7.28	8.3	2660	2650	1767	257		59.7	129	36	390	20		338 J3	1 U,UJ3	654	272	1.1	0.11
EP-4	1/29/00	1	7.64	8	2310	2290	1470	448	119	68.5	127	33	332	15		338	1 U	524	308 J4	0.95	0.18 J3
EP-4	4/24/00	2.1	7.53	8	2300	2250	1531	290	188	79.3	107	30	307	14		592	1 U	615	258	0.98 UJ1	0.11
EP-4	8/1/00	1	7.24	8.2	2220	2220	1422 J4	77	44	74.1	104	29	337	15		310	1 U	457	295	0.94	0.1 U
EP-4	10/30/00	1.6	7.7	8.3	1552	1451	953	96	16.2	74.1	53 J4	14	205	9.9		417	1 U	232	128	1.1	0.09
EP-4	10/30/00	1.6	7.7	8.3	1549	1451	941	85	16.2	62.2	56 J4	15	209	11		409	1 U	241	145	1.1	0.09

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-4	2/5/01	2.7	7.72	8	1597	1547	1018	94	38	63.3	92	25	215	10		287	1 U	347	154	0.72	0.1 U
EP-4	5/4/01	3.6	7.48	8.6	1720	1944	1131	761	200 >	74.1	123	34	255	18		325	14	352	203	0.76	0.1 U
EP-4	7/16/01	2.2	7.45	7.9	1868	1819	1245	294	164	73.8	116	31	243	14		305	1 U	377	248	0.68	0.05 U
EP-43	11/3/97	0.52	7.31	7.6	4950	5830	3361	14		72.7	118	55	974	60		656	1 U	987	806	2.6	0.05 U
EP-43	2/3/98	0.03	7.09	7.5	9590	11980	6434	35		81.7	261	145	1692	58		720	1 U	1425	2405	2.1	0.05 U
EP-43	5/20/98	1.5	7.07	7.5	4930	4480	3151	14		80.2	188	66	922	44		634	1 U	1073	785	2.4	8
EP-43	8/27/98	1.01	6.94	7.3	4720	4780	3357	40		32.0	213	69	892	32		631	1 U	1242	615	2	13
EP-43	11/16/98			7.2	5650		3105	753		32.0	218	74	1118	36		848	1 U	897	1022	2.1	0.14
EP-43	2/25/99			7.8	7140		4905	190 J4		32.0	248	108	1187	37		683	1 U	1156	1269	2.2	3.6
EP-43	2/25/99			7.7	7090		4876	242 J4		32.0	252	108	1220	36		670	1 U	1066	1302	2.2	3.6
EP-43	5/14/99			7.4	8600 J3		6257	52 J4		78.4	385	133	1374	77		854 J4	1 U	1484	1535	2	2.9
EP-43	8/11/99	2	7.57	7.5	8070	6880	5598	15		78.4	354	125	1246	47		804	1 U	1790	1601	2.3	6.2
EP-43	8/11/99	1.3	7.61	7.5	8060	6890	5560	14		75.6	371	129	1266	47		800	1 U	1774	1528	2.3	6.9
EP-43	10/29/99	7.7	7.72	7.8	8130	7320	4692 J4	30 J4		32.0	294	123	1206	36		683	1 U	1183	1628	1.9	0.18 UJ1,J4
EP-43	2/8/00			7.3	3900		2540	230		82.0	144	46	742	33		1054	1 U	449	478	2.5	0.61 UJ1,J4
EP-43	8/16/00	0.1	7.04	7.4	3790	3550	2448	244	200 >	69.1	119	28	571	29		1171 J3	1 U,UJ3	466	508	2.6 J3	0.11 UJ1
EP-43	11/14/00	0.7	7.02	7.5	3600	3550	2325	51	13.8	70.9	107	27	612	31		1118	1 U	407	459	2.4	0.51
EP-43	2/26/01	0.8	7.05	7.5	7780	6840	5116	31	16	79.9	224	94	1108	34		756	1 U	1265	1647	2.1	0.13 J4
EP-43	5/17/01	7.9	7.14	7.8	3660	3470	2424	36	14	78.3	130	37	683	36		871	1 U	557	564	2.6	1.2
EP-43	7/30/01	0.7 J4	6.87	7.4	8110	5710	5344	88	100 >	77.9	248	116	1326	39		733	1 U	1509	1927	2.2	0.13
EP-44	10/26/99	1.4	7.02	8	5740	5710	4586	848 J4		32.0	413	165	735	65		406 J3,J4	1 U,UJ3	2466	368	3	56
EP-49	11/19/97			3.5	11740		17185	465		32.0	493	303	869	182		1 U	1 U	9515	867	33	0.2 U
EP-49	2/19/98			4	11440		17442	430		32.0	466	305	614	207		1 U	1 U	7869	782	25	0.05 U
EP-49	5/21/98			3.6	10920		14614	315		32.0	468	291	930	209		1 U	1 U	8599	689	30	0.1 U
EP-49	8/27/98		5.3	3.8	11000		16111	254		32.0	515	270	1045	205		1 U	1 U	8448	822	27	0.25 U
EP-49	11/16/98			3.7	10800		15347	515		32.0	470	258	1549	240		1 U	1 U	8976	750	27	0.05 U
EP-49	2/25/99			4.5	12320		13384	545 J4		32.0	472	237	794	240		1 U	1 U	5907	684	24	0.13
EP-49	5/14/99			4.2	10570 J3		14083	804		32.0	493	288	819	342		1 U,UJ4	1 U	7140	727	23	0.72
EP-49	11/2/99			5.4	10440		10031	329		79.0	462	231	1070	265		41.5	1 U	4941	840	15	0.85
EP-49	1/29/00	0.1	6.62	7.4	9960	9530	7543	13	200 >	81.5	481	138	1752	267		927	1 U	4359	748	6.8	6 J3
EP-49	4/28/00	0.6	6.72	7.2	9860	9400	7808	189	39	81.7	448	128	1467	226		978	1 U	3921	648	7.3	8.8
EP-49	8/7/00	0.2	6.81	7.8	9830	9720	7534	218	17.6	77.9	485	131	1400	231		956	1 U	4132	663	7.2 J3	11
EP-49	11/7/00	0.2	6.76	7.3	9800	11620	7400	114	16.5	80.4	398	116	1528	244		869	1 U	3961	607	7.4	10
EP-49	2/20/01	0.3	6.83	7.7	9900	9430	7694	89 J4	45	80.2	454	125	1343	217		717	1 U	4451	600	6.7	22
EP-49	2/20/01	0.3	6.85	7.6	9880	9440	7746	277 J4		79.9	439	122	1333	212		717	1 U	4463	628	6.6	20
EP-49	5/10/01	0.5	6.81	7.4	9820	9630	7947	16	16	87.4	498	143	1394	269		766	1 U	3964	815	5.6	33
EP-49	7/26/01	2.5	6.59	7.3	10180	9980	8050	8.3	5.85	84.6	505	143	1622	286		992	1 U	4310	847	7.3	19
EP-5	8/6/97	1.29	7.47	7.7	3350		2342	199		71.1	96	39	650	16	766	935	1 U	544	424	2.8	0.05 U
EP-5	11/4/97	2.52	7.58	8	3100	3700	2141	186		58.3	80	35	623	11		910	1 U	434	343	2.8	0.05 U
EP-5	2/4/98	0.68	7.58	8.1	3070	3060	2106	30		32.0	78	33	671	10		895	1 U	519	361	2.3	0.14
EP-5	5/5/98	5.22	7.81	8	2980	2560	2116	169		84.9	85	34	629	18		786	1 U	410	336	2.6	0.06
EP-5	8/5/98	1.14	7.36	7.8	2900	3360	1991	12		77.5	76	30	594	9.2		843	1 U	396	353	2.6	0.05 U
EP-5	11/3/98	1	7.04	7.6	3010	2890	1909 J3	71		67.6	77	30	577	11		932	1 U	331	328	2.7	0.05 U
EP-5	2/3/99	1.7	7.87	8	2820	2800	1818	16		64.6	74	30	570	5.8		869	1 U	318	302	2.4	0.28
EP-5	5/5/99	2.2	7.52	8.1	2780	2600	1804	14		82.4	71	30	585	7.5		805	1 U	444 J3	285	2.6	0.1 U
EP-5	8/2/99	1.8	7.44	7.9	3300	3550	2288	149 J4	10.7	77.4	87	36	550	11		743	1 U	577	352	2.9	0.05 U
EP-5	10/25/99		7.18	8.1	8230	8380	5867	39		73.9	323	124	1497	25		532 J3	1 U,UJ3	2066	1337	2.2	0.36
EP-5	4/24/00	1.8	7.52	7.9	5250	5160	3659	13	10.2	83.5	167	64	856	12		753	1 U	1288	729	2.2 UJ1	0.18
EP-5	8/1/00	1.4	7.2	8	4690	4710	3171 J4	9	6.42	70.5	114	47	800	12		914	1 U	973	581	2.4	0.16

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Appe

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-5	10/31/00	2.6	7.49	8.2	4410	4290	2833	95	6.69	65.1	106 J4	42	881	12		1030	1 U	720	592	2.7	0.75
EP-5	2/5/01	3.2	8.04	8	4830	4710	3119	18	8.3	68.2	108	46	748	9.1		849	1 U	933	681	2.2	0.19
EP-5	5/4/01	3.1	7.55	8.5	5240	5830	3566	121	45.7	82.2	118	59	1106	15		1039	14	1177	1013	2.7	0.1 U
EP-5	7/16/01	2.5	7.34	7.9	4300	4690	2924	60	18.6	79.5	100	46	903	13		854	1 U	808	575	2.6	0.05
EP-51	8/11/97	0.7	6.73			10400				77.2											
EP-51	8/26/97	9.4	7.25	7.3	11800	10630	9539	35 J4		77.5	655	478	1416	54	214	261	1 U	2125	2649	0.78	115
EP-51	11/6/97	2.35	6.58	7.3	11670	12140	9116	41		32.0	658	469	1437	47		268	1 U	2401	2609	1.5	138
EP-51	11/6/97			7.2	11440		8894	45		76.3	645	461	1409	46		270	1 U	2432	2746	1.6	134
EP-51	2/12/98	0.03	5.85	6.9	11070	13050	8591	36 J3		73.4	690	412	1322	51		256	1 U	2550	2369	7.3	133
EP-51	5/11/98	1.42	6.29	8.2	11800	9890	8933	31		81.3	653	471	1501	63		307	1 U	2475	2627	2.1	146
EP-51	8/12/98	3.59	6.71	7.2	10080	9720	8072	12		75.6	628	413	1304	42		250	1 U	2160	1983	1.4 J4	146
EP-51	11/5/98	1	6.67	6.8	9840	8180	7364	22		32.0	535	355	1133	43		242	1 U	1855	1956	1.2	136
EP-51	11/5/98			6.9	9820		7079	21		79.3	543	354	1145	42		249	1 U	1966	1953	1.2	134
EP-51	2/9/99	2.1	6.86	7.4	9060	8760	6783	24		79.3	584	366	880	45		231	1 U	1848 J4	1671	1.4	144
EP-51	2/9/99	2.1	6.87	7.4	9140	8780	7050	22		75.7	561	363	870	45		224	1 U	1340 J4	1641	1.3	141
EP-51	5/6/99	1.2	6.63	7.3	9870	9760	7314	27		78.6	547	409	1158	41 J4		244	1 U	1940 J3	2024	1.2	158
EP-51	8/4/99		6.87	7.2	11040	9560	8470	22		78.6	590	400	1028	39		228	1 U	2458	2357	1.8	192
EP-51	8/4/99		6.88	7.2	11020	9570	8498	25		74.3	600	400	1068	40		218	1 U	2598	2327	1.8	227
EP-51	11/2/99	1.6	6.71	7.3	9920	9840	6873	31	25.3	75.9	582	378	958	34		221	1 U	2133	1759	1.9	202
EP-51	1/26/00	6.86	6.86	7.5	9820	9000	6849	38	58.6	77.7	588	378	1028	39		256	1 U	2147	2154	1.2	169 J3
EP-51	4/28/00	1.9	6.84	7.6	9660	9160	7123	26	20	77.0	483	324	1106	32		238	1 U	2356	1820	0.97 UJ1	190
EP-51	8/7/00	0.6	6.75	7.4	10620	10250	7689	48	52	77.0	551	357	1100	34		223	1 U	2295	2235	0.89	192
EP-51	8/7/00	0.6	6.74	7.4	10710	10380	7775	49		75.4	526	343	1100	34		222	1 U	2046	2398	0.95	207
EP-51	11/7/00	0.8	6.71	7.4	12030	13490	8473	39	35	75.0	639	434	1296	41		222	1 U	2130	2879	0.92	173
EP-51	11/7/00	0.7	6.73	6.73	12390	13850	8687	36		73.9	580	400	1271	40		231	1 U	1984	3031	0.91	173
EP-51	2/16/01	1.2	6.73	7.5	11900	11240	8433	38	18.2	77.5	655	470	1263	43		220	1 U	2108	2970	0.8	167
EP-51	5/10/01	1.1	6.74	7.3	12220	11790	9283	28	16.6	78.8	721	536	1260	50		215	1 U	2318	3759	0.8	170
EP-51	7/20/01	0	6.69	7.6	13980	13100	10032	24	21.2	78.8	796	587	1509	50		171	1 U	2244	3832	0.84	165
EP-52	11/6/97	6.54	6.1	7.1	9750	11000	8243	57		74.7	537	211	1893	23		571	1 U	2953	1330	6.3	157
EP-52	2/12/98	2	6.03	6.9	10870	13320	9266	86 J3		82.9	581	252	2276	23		642	1 U	3538	1468	6.3	130
EP-52	8/12/98	3.33	6.17	7	10580	10850	9183	14		32.0	587	258	1936	33		700	1 U	3566	1297	6.4 J4	113
EP-52	8/12/98			7.1	10560		9096	12		74.3	593	266	2099	35		698	1 U	3546	1238	4.8 J4	116
EP-52	11/5/98	2.3	6.28	6.6	11100	9710	9241	51		77.4	563	253	1931	26		728	1 U	3593	1308	6.4	99
EP-52	2/9/99	4.9	6.38	7.1	11150	11040	9559	51		76.8	552	275	1730	26		706	1 U	3665 J4	1342	6.9	112
EP-52	5/6/99	1.7	6.2	7.3	11250	11880	9489	30		81.3	522	276	2170	25 J4		716	1 U	4484 J3	1290 J4	6.6	144
EP-52	8/5/99	0.7	6.21	7.2	11190	12290	9637	15	21	78.8	512	267	1823	21		683	1 U	4606	1269	6.3	130
EP-52	10/29/99	1.5	6.07	7	11250	9900	8587	12 J4	22.9	77.5	454	243	1709	19		736	1 U	3893	1308	6	103
EP-52	1/26/00	0.4	6.38	8.6	11940	11220	9533	12	14.8	78.6	536	285	2209	21		622	64.8 J4	3910	1429	6.3	114 J3
EP-52	4/28/00	0.9	6.35	7.8	11860	11280	10140	23	16.4	79.0	485	282	2166	19		817	1 U	4361	1425	6.3	101
EP-52	8/7/00	0.5	6.34	7.5	11640	11420	9649	26	36	72.1	440	239	1800	15		754	1 U	4650	1255	6.1 J3	106
EP-52	11/7/00	1	6.38	7	11640	12890	9888	29	72.9	72.5	433	244	2126	25		732	1 U	4254	1018	6	95
EP-52	2/20/01	1	6.61	7.6	12090	11580	10271	37 J4	77	79.9	429	251	1943	15		666	1 U	4393	1080	5.8	109
EP-52	5/10/01	1.6	6.26	7.3	11720	11340	10251	28	122	81.3	502	311	2097	20		739	1 U	4815	1559	5.1	83
EP-52	7/20/01	0	6.28	7.4	11920	11610	10493	13	55	88.9	477	292	2207	21		744	1 U	4690	1193	5.8	121
EP-53	8/11/97	7.74	6.58	7.2	7790	7300	6739	239		73.8	394	89	1450	147	252	307	1 U	3200	494	4.9	122
EP-53	2/4/98	1.43	6.43	7	7590	9580	6775	277		78.3	527	101	1264	124		256	1 U	3266	515	5.9	97
EP-53	6/10/98	2.17	6.68	6.9	7470	7780	6269	275		75.7	475	82	1365	118		298	1 U	2825	520	6.3	125
EP-53	8/12/98	0.99	6.66	7.2	7550	5010	6182	644		77.5	469	86	1270	120		348	1 U	2723	463	5.9 J4	156
EP-53	11/5/98	1.1	7.08	6.8	7980	6540	6819	177		77.4	516	90	1333	108		262	1 U	2915	444	5	183

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-53	2/4/99	1.8	6.44	7.1	7040	7780	6023	2356 J4		80.1	509	83	1140	127		342	1 U	2665	424	6.2	93
EP-53	5/5/99	1.6	6.63	7.3	7120	15650 R	5804	238		83.1	443	86	1245	92		311	1 U	3166 J3	421	6.2	112
EP-53	8/4/99		6.85	7.1	7190	7240	5354	428	163	79.2	330	96	937	76		315	1 U	2905	447	5.6	31
EP-53	10/26/99	1	6.38	6.8	7380	7350	6050	440 J4		67.1	534	95	1093	92		157 J3,J4	1 U,UJ3	3108	472	6.3	104
EP-53	2/1/00	2	6.75	7.6	7520	1594 R	5620	818		79.5	473	101	1337	80		354	1 U	2786	403 J4	5.3	113
EP-53	5/3/00	1.4	7.09	7.4	7530	7440	5557	649	200 >	80.4	278	98	1110	61		498	1 U	2972	483 J4	6.1 J3	15
EP-53	8/16/00	1.7	6.76	6.8	8020	8070	6717	510	157	76.3	402	81	1004	62		221 J3	1 U,UJ3	3473	501	5.9 J3	130
EP-53	11/13/00	2	6.83	7.2	7610	8570	6538	471	162	75.9	412	89	1170	71		329	1 U	2872	441	6.2	82 J4
EP-53	2/21/01	2.4	6.99	7.6	7430	7150	5938	298	176	78.3	330	80	1037	64		403	1 U	3093	518	5.9	58
EP-53	5/10/01	3.9	7.1	7.3	7090	6990	5280	1432	200 >	78.3	336	104	1108	67		549	1 U	2778	581	5	14
EP-53	7/30/01	4.2 J4	7.03	7.7	6950	6640	4942	768	200 >	84.2	221	86	1205	62		575	1 U	3135	451	4.6	7.3
EP-54	8/11/97	1.64	6.06			10470				82.6											
EP-54	8/26/97		6.6	6.9	11340	1980 R	10210	386		62.1	432	276	1842	345	360	439	1 U	5049	891	16	0.24
EP-54	11/6/97	2.51	6.14	6.8	10750	12010	9568	222		78.4	455	307	1984	375		497	1 U	5255	791	13	0.3
EP-54	2/12/98	1.94	5.98	7.4	10100	11060	8548	43 J3		79.2	414	255	1788	342		566	1 U	4900	790	5.7	3.1
EP-54	5/11/98	1.93	6.2	7.1	9780	11910	8370	33		83.7	469	286	1576	378		543	1 U	4548	751	13	2.8
EP-54	8/12/98	3.35	6.31	7.2	10200	11320	8465	25		71.1	515	320	1881	320		776	1 U	4762	708	12 J4	1.5
EP-54	11/5/98	5.8	6.48	6.7	10680	9280	8932	127		77.9	448	272	1811	300		842	1 U	4911	754	11	8.1
EP-54	2/9/99	5.7	6.6	7.4	10500	10150	8843	60		77.9	455	284	1410	320		904	1 U	3504 J4	756	11	7.6
EP-54	5/6/99	5.9	6.35	7.1	9540	11490	7806	57		72.5	432	286	1484	367		908	1 U	4250 J3	704 J4	9.4	6.6 J4
EP-54	5/7/99	2.6	6.43	7.7	8980	9300	7303	58		84.2	395	226	1411	261		847	1 U	4217	648	9.2	3.6 J4
EP-54	8/4/99		6.37	7	11000	11260	9098	17	88	80.6	497	295	1884	330		996	1 U	4971	727	11	8.6
EP-54	10/29/99	7.4	6.57	7.4	10500	8290	7671	60 J4		71.8	430	230	1441	258		1110	1 U	3713	769	12	5.3
EP-54	1/26/00	7.9	6.51	7	7940	9910	5711	31	200 >	83.1	488	239	1269	290		871	1 U	3228	625	7.7	10 J3
EP-54	4/28/00	2	6.49	7.4	10100	9940	7984	61	69	84.7	404	213	1769	249		966	1 U	4045	723	8.6	11
EP-54	8/7/00	2.1	6.55	7.7	10250	9930	8003	78	70	66.6	398	186	1400	224		1183	1 U	4153	711	9.9 J3	14
EP-54	11/7/00	2.8	6.58	7.3	10110	11040	7939	60	35	78.8	418	198	1652	269		1188	1 U	3916	760	8.8	10
EP-54	2/20/01	2.1	6.5	7.6	10000	9580	7735	16 J4	42.5	80.1	385	181	1316	222		1110	1 U	4108	723	9.1	10
EP-54	5/10/01	1.9	6.52	7.3	8620	8750	6878	26	33	95.0	401	191	1260	262		952	1 U	4700	970	8.8	16
EP-54	7/26/01	1.4	6.47	7.3	9330	9260	7315	34	133	78.8	447	209	1485	278		1137	1 U	3757	789	9.4	12
EP-55	8/15/97	1.85	6.17	7	10550	10700	9746	947		70.2	569	373	1602	227	460	561	1 U	4747	945	17	0.05 U
EP-55	11/19/97	2.12	6.25	6.9	10480	12860	7450	516		79.0	521	334	1830	211		1098	1 U	5186	998	24	0.05 U
EP-55	2/12/98	1.21	5.95	6.9	10510	14030	9283	2141 J3		80.8	522	324	1794	229		878	1 U	4863	922	22	0.05 U
EP-55	5/20/98	1.93	6.06	6.7	10280	10320	8056	466		78.4	501	305	1619	217		671	1 U	4672	813	21	0.1 U
EP-55	8/27/98	0.94	6.15	6.4	9980	10020	8648	413		75.0	523	318	1100	192		732	1 U	4465	755	20	0.05 U
EP-55	11/16/98	1.7	6.24	6.5	9940	9850	8458	1820		71.4	523	314	1559	201		854	1 U	4598	842	20	0.05 U
EP-55	2/11/99	0.9	6.31	6.7	10240	10350	8827	303		79.0	527	362	1350	175		703	1 U	3941	819	19	0.09
EP-55	5/14/99	1	6.25	7.1	10510 J3	10850	8951	447		82.2	541	374	1654	192		854 J4	1 U	3651	909	14	0.13
EP-55	8/10/99	0.5	6.33	6.9	10470	10550	8634	362		75.2	502	332	1441	119		867	1 U	4066	931	16	0.09 J4
EP-55	10/29/99	1.6	6.2	8.1	10240	10290	7364	567 J4		67.3	493	315	1347	115		903	1 U	4550	890	15	0.23 UJ1,J4
EP-55	2/7/00	1.3	6.38	6.9	10000	9420	8335	234	200 >	72.7	494	306	1342	117		805	1 U	4791	780	15	1.3 UJ1
EP-55	5/4/00	0.9	6.36	6.5	9600	9300	7937	5379	200 >	83.1	573	324	1185	126		1403	1 U	4301	831	14	0.05 UJ1
EP-55	8/16/00	1	6.44	7.1	9300	8550	7357	701	200 >	69.3	487	260	1162	122		908 J3	1 U,UJ3	3887	942	14 J3	0.13 UJ1
EP-55	11/14/00	1.9	6.53	6.8	8900	8300	7258	638	200 U	73.9	457	232	989	111		903	1 U	3402	755	14	0.21
EP-55	2/22/01	1	6.6	6.9	9110	8780	7272	2125	200 U	75.9	507	238	994	132		1122	1 U	3638	602	14	0.13
EP-55	5/11/01	1.6	6.49	7.3	9520	8820	7696	178	200 U	82.9	652	290	1266	184		1086	1 U	3543	1085	13	0.27
EP-55	7/26/01	0.4	6.41	7	9350	9240	7422	8010	1000 >	74.1	557	230	1390	162		2501	1 U	4186	973	12	0.23
EP-56	8/11/97	2.51	7.34			5470				77.2											
EP-56	8/26/97		7.25	7.6	5600	1063 R	4474	243		75.0	255	63	1026	27	262	320	1 U	1864	666	2.1	0.77

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l		TSS mg/l		Turb. NTU		Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-56	11/4/97	0.77		7.12	7.6	5520	5930	4378		565				73.0	265	65	1080	26		354		1	U	1863		646		2.4		2	
EP-56	2/4/98	1.81		7.14	7.8	5520	6620	4260		448				78.3	256	63	1043	29		344		1	U	2125		681		2.1		2.5	
EP-56	5/7/98	1.08		7.03	7.6	5500	7170	3956		358				77.0	253	64	1091	34		303		1	U	1793		616		1.9		3.2	
EP-56	8/12/98	0.98		7.15	7.6	5520	5600	3870		4150				74.3	269	68	1125	26		732		1	U	1804		618		2	J4	1.5	
EP-56	11/4/98	1.2		6.38	7.3	5600	7230	4055		4339				76.8	246	63	989	28		781		1	U	1762		624		2		0.42	
EP-56	2/4/99	1		7.23	7.6	5600	6130	4291		1107	J4			77.0	254	67	1073	31		793		1	U	1731		597		1.9		0.38	
EP-56	2/4/99	1		7.24	8.2	5640	6140	4173		5485	J4			75.6	260	67	1073	35		898		1	U	1751		717		2		0.39	
EP-56	5/4/99	1.9		7.13	7.6	5580	5850	4141		1607				75.4	241	68	1051	23		561		1	U	2085	J3	565		2.1	J3	0.1	U
EP-56	8/4/99			7.17	7.5	5390	5460	3978		224		200	>	77.0	227	55	928	28		289		1	U	2310		546		2.5		0.91	
EP-56	10/26/99	1.9		7.04	8.1	5290	5320	3862		2079	J4	19.8		32.0	259	63	927	25		525	J3,J4	1	U,UJ3	1915		592		2.3		0.63	
EP-56	10/26/99				8.2	5300		3835		1395	J4			64.9	301	69	952	28		427	J3,J4	1	U,UJ3	1960		592		2.2		0.63	
EP-56	2/1/00	1		7.03	7.8	5120	4810	3627		849		200	>	66.9	299	59	993	30		345		1	U	1779		455	J4	2.4		0.45	
EP-56	2/1/00	0.7		7.1	7.8	5080	4850	3421		855				76.1	292	54	994	26		354		1	U	1602		639	J4	2.4		0.45	
EP-56	5/3/00	1.3		7.35	8	4800	4850	3613		2654		200	>	75.2	266	60	855	27		466		1	U	1639		506	J4	2.5	UJ1,J3	0.86	
EP-56	8/16/00	1		7.22	8	4510	4500	3262		2224		200	>	73.2	361	65	801	33		817	J3	1	U,UJ3	1568		477		2.6	J3	0.71	
EP-56	11/13/00	2		7.4	7.9	4140	4520	2937		1292		200	U	74.1	182	39	707	22		551		1	U	1280		404		2.8		0.73	J4
EP-56	2/22/01	3.2		7.52	7.8	3890	3720	2735		3528		200	U	75.7	329	50	636	31		1110		1	U	1206		338		2.9		0.62	
EP-56	5/10/01	3.9		7.42	7.8	3790	3700	2669		12775		200	>	77.0	772	107	647	55		2140		1	U	1061		477		3.1		1	
EP-56	7/26/01	1.6		7.24	7.8	3750	3650	2584		2782		100	>	74.8	114	31	732	19		1384.7		1	U	1229		417		3.3		1	
EP-57	8/16/97	1		7.3	7.9	3330	3370	2510		452				74.1	129	87	587	23	1032	1259		1	U	521		284		1.2		3.8	
EP-57	11/14/97	1.72		7.01	7.4	3070	3500	2159		14				71.4	104	79	525	25		1143		1	U	466		278		1		1.5	
EP-57	2/18/98	0.78		7.01	7.5	2900	3530	1978		42	J4			79.3	89	76	500	18		1176		1	U	298		261		0.94		0.2	
EP-57	5/18/98	1.01		7.18	7.5	2610	2440	1475		1076				80.6	71	64	455	18		1344		1	U	172		258		0.95		0.16	
EP-57	8/24/98	0.23		7.01	7.7	3250	2840	2176		1172				78.4	152	95	614	15		1293		1	U	548		269		0.99		1.8	
EP-57	11/16/98	0.3		7.07	7.6	2070	1913	1323		72				79.0	41	53	346	20		1049		1	U	64		174		0.89		0.05	
EP-57	2/24/99	0.2		7.15	7.7	3020	3460	2078		529				78.4	101	71	476	17		1247		1	U	259	J4	238		1		0.8	
EP-57	5/13/99	0.6		7.11	7.8	2340	2120	1459		20				78.8	62	63	335	17		1282		1	U	56		142		0.94		0.45	J4
EP-57	8/10/99	0.3		7.07	7.6	2670	2560	1745		39				73.6	85	79	391	20		1293		1	U	168		206		0.92	J4	0.14	J4
EP-57	11/3/99	1.3		6.87	7.5	3230	3210	2124	J4	2811				75.6	116	94	413	21		1714	J4	1	U	426	J4	244	J4	1		0.11	
EP-57	2/7/00	0.04		7.01	7.7	3080	2700	2074		233		16.4		78.3	84	100	385	19		1469		1	U	254		219		0.89		1.2	UJ1
EP-57	5/8/00	1		7.07	7.6	3000	2790	1977		31		14.1		80.2	108	99	518	19		1503		1	U	228		198		0.84	UJ1	0.07	
EP-57	8/15/00	1		6.95	7.6	4180	3810	2882		17		13.4		75.9	162	108	570	17		1720		1	U	693		269		0.94	J3	0.17	
EP-57	11/13/00	0.3		7.22	7.5	4820	5310	3607		272		15.5		74.1	213	130	757	18		1391		1	U	858		379		1.1		0.15	J4, UJ1
EP-57	2/23/01	0.2		7.15	7.8	4860	5110	3503		52		12.4		81.1	185	127	705	17		1854		1	U	965		401		0.87		0.14	
EP-57	5/16/01	2.2		7.16	7.5	5160	5180	3711		27		8.05		86.9	209	141	782	20		1781		1	U	1348		600		0.99		1.6	
EP-57	7/30/01	1	J4	6.89	7.7	5090	4800	3715		59		12.7		79.5	203	152	858	21		1852		1	U	935		495		1		0.19	
EP-58	8/16/97	0.24		6.54	6.9	11230	11340	9153		7753				74.3	463	161	2098	220	1900	2318		1	U	4586		989		4.9		0.05	U
EP-58	11/14/97	0.84		6.54	6.9	11480	14130	9286		28				64.8	487	178	2396	260		1274		1	U	4699		930		4.7		0.05	U
EP-58	2/18/98	0.79		6.38	6.8	11510	13740	9349		72	J4			81.3	497	198	2510	263		1288		1	U	4006		851		4.7		0.05	U
EP-58	5/18/98	0.43		6.35	6.8	11500	11490	8740		172				78.8	489	189	2245	252		1362		1	U	4372		789		5		0.05	U
EP-58	8/24/98	0.8		6.4	7	11600	11680	9442		17				77.0	486	193	1700	247		1349		1	U	4867		922		5		0.05	U
EP-58	11/16/98	1.3		6.39	7.2	11580	11290	9281		81				73.6	520	210	2085	299		1376		1	U	4912		922		5		0.05	U
EP-58	2/24/99	1		6.53	7.8	11510	13950	9294		58				80.6	510	203	1913	224		1359		1	U	4560	J4	830		5.2		0.06	
EP-58	5/13/99	0.9		6.38	7.2	11660	10090	9162		83				76.5	499	244	2100	250		1220		1	U	3585		709		4.8		0.1	U,UJ4
EP-58	8/10/99	0.5		6.49	8	11590	11610	9236		39				76.1	531	226	1832	203		1313		1	U	4036		990		5.7	J4	0.06	J4
EP-58	11/3/99	1.1		6.36	7	11310	12590	8727		3932				75.7	518	215	1678	192		2054	J4	1	U	4936	J4	960	J4	5.2		0.07	
EP-58	2/7/00	0.04		6.42	7.2	11700	10800	9358		424		24		80.1	502	228	1801	196		1313		1	U	5590		894		5.3		1.3	UJ1
EP-58	5/8/00	0.4		6.46	7	11460	11180	8965		244		38		80.1	517	230	1800	217		1322		1	U	4587		950		5.6		0.07	
EP-58	5/8/00	0.4		6.45	7	11420	11160	9096		223				81.3	531	236	1800	222		1305		1	U	4678		803		5.5		0.12	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-58	8/15/00	0.5	6.4	7.3	11390	11230	8897	126	24	81.5	436	197	1606	188		1342	1 U	4978	573	5.3 J3	0.12
EP-58	8/15/00	0.4	6.4	7.4	11410	11230	8759	141		75.0	436	199	1541	183		1296	1 U	5107	683	5.3 J3	0.12
EP-58	11/13/00	1	6.54	7.2	11380	13680	9180	64	28.5	73.2	451	208	1773	200		1303	1 U	11643	2509	4.8	0.19 J4, UJ1
EP-58	2/23/01	1.6	6.53	7.7	11300	13200	8828	6.2	4.5	73.8	433	196	1483	193		1274	1 U	5454	852	5	0.1 U
EP-58	2/23/01	1.4	6.54	8	11300	13150	8851	19		81.3	450	205	1550	197		1269	1 U	4884	874	5	0.1 U
EP-58	5/16/01	2.6	6.58	7.2	11080	11260	8775	5.5	5.4	81.3	477	215	1645	244		1244	1 U	5489	1020	4.9	0.28
EP-58	7/30/01	1.3 J4	6.43	7.3	11080	10220	8652	162	37	80.2	492	229	1764	244		1221	1 U	4275	974	5	0.13
EP-59	8/9/97	2.08	6.98	7.7	4780	4750	3693	1 U		78.4	191	93	876	105	432	527	1 U	1632	419	4.9	7.7
EP-59	11/5/97	0.2	7.23	7.6	4660	5340	3629	6		73.6	169	84	818	95		512	1 U	1555	421	4.8	8.8
EP-59	2/5/98	1.06	7.09	7.3	4640	5630	3594	2.7		74.3	168	83	807	95		503	1 U	1551	450	4.8	10
EP-59	5/8/98	1.33	7.13	7.7	4800	5600	3743	1.7		79.2	181	90	868	100		444	1 U	1586	369	4.8	13
EP-59	8/10/98	1.75	7.09	7.4	4850	4750	3678	1 U		32.0	193	92	920	107		427	1 U	1643	410	4.6	12
EP-59	8/10/98			7.4	4850		3717	1 U		77.9	187	91	859	104		428	1 U	1560	427	4.6	13
EP-59	11/9/98	2.7	7.04	7.4	4980	4980	3831	5		73.2	189	93	914	91		448	1 U	1762	441	4.7	12
EP-59	2/10/99	0.7	7.13	7.6	5260	5320	4083	13		73.0	203	104	720	100		406	1 U	1593	446	5	15
EP-59	2/10/99	0.7	7.14	8.3	5270	5230	4065	14		76.1	214	105	700	100		407	1 U	1725	453	5.1	15
EP-59	5/6/99	0.8	7.01	7.4	5060	5400	3749	8.2		78.1	190	103	825	91 J4		434	1 U	1724	515 J4	5.6	14
EP-59	8/3/99	0.4	7.18	7.4	4920	4950	3779	4.6 J4	5.11	78.8	189	96	809	95		368	1 U	1871	422	5.2	12
EP-59	10/27/99	3.9	6.99	8.1	4740	4780	3474	9.8	15	76.3	182	91	779	92		390 J3	1 U,UJ3	1498	438	5	11
EP-59	1/28/00	0.6	7.12	7.9	5160	4900	3721	6.7	4.6	75.6	204	101	840	95		427	1 U	1874	522	4.8	8.6 J3
EP-59	5/3/00	0.6	7.16	7.5	5050	5060	3775	7.7	8.39	78.1	178	89	733	77		468	1 U	1742	492 J4	5.3 J3	5.8
EP-59	8/10/00	0.2	7.08	7.7	4960	4920	3632	7.2	8.95	78.1	166	81	706	86		422	1 U	1665	459	5.1	4.1 J3
EP-59	8/10/00	0.2	7.08	7.8	4990	4920	3579	6.2		78.1	165	80	675	83		427	1 U	1796	461	5.1	4.2 J3
EP-59	10/31/00	6.2	7	8	5320	5060	3894	7.7	11.8	74.5	180 J4	91	915	89		488	1 U	1768	449	4.8	3.6
EP-59	2/21/01	1	7.13	7.5	5660	5460	4282	7.2	6.5	74.7	194	101	900	94		537	1 U	2060	671	4.8	5.1
EP-59	2/21/01	0.9	7.12	7.5	5650	5400	4272	5.9		75.4	177	91	793	82		525	1 U	2012	566	4.8	4.4
EP-59	5/15/01	0.8 J4	7.24	7.7	5060	4850	3834	1 U	3.33	76.8	164	88	846	93		454	1 U	2030	577	5.1	5.2
EP-59	7/27/01	5.3	6.97	7.7	4650	5040	3412	3.1	8.27	85.3	160	82	794	87		460	1 U	1607	451	4.7	3.7
EP-6	8/6/97	1.47	7.34	7.9	7320	7240	6029	1.9		73.6	411	128	1409	36	324	395	1 U	2632	914	1.5	11
EP-6	11/4/97	1.03	7.44	7.9	7010	7440	5909	7.5		59.2	365	118	1409	25		425	1 U	2332	827	1.6	17
EP-6	2/4/98	3.1	7.53	8	6060	997 A	4491	10		32.0	246	76	1167	25		581	1 U	1852	954	1.3	0.05 U
EP-6	5/5/98	3	7.62	8	5810	4950	4263	7.2		81.1	225	72	1215	28		468	1 U	1664	760	1.5	0.35
EP-6	8/5/98	1.24	7.3	8	6720	7440	5241	4.4		75.4	328	100	1414	31		464	1 U	2258	897	1.4	3.2
EP-6	11/3/98	1.5	7.33	7.7	7120	7030	5710	7.5		66.9	364	110	1348	30		454	1 U	2205	860	1.5	4.3
EP-6	2/3/99	2.5	7.51	7.9	7270	6960	5643	7		66.4	415	137	1282	34		448	1 U	2348	844	1.5	0.38
EP-6	5/5/99	1.4	7.39	8.1	7400	7100	5803	5.1		62.8	387	141	1462	26		455	1 U	2807 J3	882	1.5	0.19
EP-6	5/5/99	1.6	7.43	7.9	7400	6810	5894	3.8		80.4	380	139	1440	24		454	1 U	3168 J3	879	1.5	0.1 U
EP-6	8/2/99	1.6	7.37	8.4	7760	7630	6252	6 J4	4	77.2	409	143	1100	27		360	20	2975	1013	1.6	6.6
EP-6	10/25/99		7.15	8	8070	8090	6040	43		60.1	411	140	1383	27		464 J3	1 U,UJ3	3357	912	1.3	3.5
EP-6	1/29/00	3.1	7.46	7.9	7860	7430	6144	23	6.2	73.4	408	133	1288	22		477	1 U	2964	912	1.2	1.2 J3
EP-6	4/24/00	5	7.53	7.8	6920	6780	5399	6.4	2.67	83.5	320	114	1124	20		477	1 U	2872	852	1.4 UJ1	3.4
EP-6	8/1/00	1.5	7.36	8.1	6060	6060	4481 J4	3.2	2.2	76.3	227	76	1000	20		449	1 U	2408	593	1.9	2.5
EP-6	10/30/00	2.7	7.5	8.1	3730	3660	2531	9.3	3.03	63.7	112 J4	38	612	13		511	1 U	878	264	2.6	0.52 J3
EP-6	2/5/01	1.9	7.91	8	3170	3060	2080	9.9	8.53	66.7	82	30	562	9.7		476	1 U	900	272	2.6	0.64
EP-6	5/4/01	3.4	7.78	8.6	3620	4030	2574	12	8.9	82.0	129	45	646	15		340	17	900	284	2.2	8.4
EP-6	7/16/01	240	7.59	7.9	4100	4400	2924	6.1	7.13	78.6	182	65	686	17		422	1 U	1260	365	2	3.4
EP-60	8/8/97	2.44	6.98	7.5	9140	8840	8015	8.9		78.4	360	152	857	14	240	293	1 U	3055	1345	1.7	90
EP-60	11/5/97	0.16	6.99	7.5	8560	9660	7339	27		72.3	571	229	1417	17		290	1 U	3090	1227	1.6	90
EP-60	2/5/98	1.7	6.95	7.3	8780	10210	7495	6.3		73.2	584	237	1366	14		317	1 U	3000	1278	1.4	109

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		Mg mg/l	Na mg/l	K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-60	5/8/98	1.23		7.24	7.6	8880	9880	4857	7			82.9	575		231	1370	27			305		1	U	3180		1254		1.6		76	
EP-60	8/10/98	3.77		7.06	7.7	8700	8310	6865	1.2			75.6	561		215	1427	18			298		1	U	2931		1171		1.6		57	
EP-60	11/9/98	3.6		7.21	7.7	8480	8240	6907	6.7			72.3	506		191	1403	17			288		1	U	3090		1149		1.6		40	
EP-60	2/10/99	1.9		7	7.8	8670	8650	7317	38.			75.0	570		226	1130	17			305		1	U	2540		1135		1.7		57	
EP-60	5/6/99	0.7		6.8	7.4	8670	9010	7149	11			78.4	551		250	1311	14	J4		312		1	U	2802		1366	J4	1.7		83	
EP-60	8/3/99	3		7.18	7.6	8570	8410	7299	2.5	J4		79.0	545		222	1233	15			299		1	U	3184		1073		1.7		68	
EP-60	10/27/99	0.7		6.82	8.1	8280	8130	6884	9.2		20.3	73.4	560		224	1160	15			316	J3	1	U,UJ3	3085		1003		1.6		63	
EP-60	1/28/00	0.3		7.05	7.9	8320	7890	6583	9.8		9.8	75.4	520		205	1187	12			318		1	U	3101		1047		1.6		41	J3
EP-60	5/3/00	0.3		7.09	7.5	8440	8220	7037	6.1		16.8	79.7	493		214	1175	11			321		1	U	3085		1127	J4	1.6	UJ1,J3	52	
EP-60	8/10/00	0.3		7.03	7.8	8300	8200	6745	14		16.1	78.1	505		192	1064	14			321		1	U	3542		914		1.7		52	J3
EP-60	10/31/00	1.1		7.07	7.6	8400	7850	6772	19		44.4	72.0	472	J4	182	1189	11			357		1	U	3061		934		1.7		55	
EP-60	2/21/01	0.3		7.13	7.5	8090	7730	6773	12		28.8	76.3	490		178	1092	12			344		1	U	3529		1013		1.5		44	
EP-60	5/15/01	2.8	J4	7.17	7.7	8120	7820	6853	4.4		13.5	79.9	518		204	1272	15			317		1	U	3716		1018		1.6		38	
EP-60	7/27/01	0.9		6.91	7.6	8120	7720	6921	10		31.5	80.4	540		206	1275	14			331		1	U	3287		1006		1.6		25	
EP-61	8/16/97	2.3		7.15	7.9	9290	9210	8194	562			73.9	455		185	1723	22		300	366		1	U	3189		891		1.7		154	
EP-61	11/14/97	1.71		6.93	7.2	9080	11290	7684	38			65.3	436		182	1962	28			439		1	U	3446		941		1.7		164	
EP-61	2/18/98	1.68		6.85	7.3	9200	10350	8017	104	J4		65.3	477		201	2082	23			388		1	U	3213		857		1.6		207	
EP-61	2/18/98	1.68		6.85	7.4	9190	10350	7997	44	J4		79.0	477		210	2118	24			398		1	U	3375		826		1.6		210	
EP-61	5/18/98	0.51		6.95	7.3	8860	8810	7116	27			76.5	454		189	1684	24			434		1	U	3315		836		1.6		156	
EP-61	8/24/98	0.74		7.03	7.5	8620	8710	7198	99			71.2	460		193	1300	12			447		1	U	3524		732		1.6		117	
EP-61	11/16/98	1.1		7.02	7.6	8530	8320	7453	66			70.5	455		192	1496	23			415		1	U	3377		747		1.6		131	
EP-61	2/24/99	0.6		7.17	7.6	8320	9720	6893	75			79.2	386		164	1313	22			608		1	U	2761	J4	688		1.7		91	
EP-61	5/13/99	0.9		6.78	8	8240	7360	6722	12			75.7	399		197	1600	23			529		1	U	2824		619		1.7		166	
EP-61	8/10/99	1.1		7.15	7.7	8070	8060	6549	65			74.7	368		167	1357	17			472		1	U	2802		780		1.6	J4	82	J4
EP-61	11/3/99	1.8		6.96	7.8	8180	8990	6418	1608			72.5	397		176	1367	20			484	J4	1	U	3023	J4	708	J4	1.8		100	
EP-61	2/7/00	0.9		7.09	7.7	8360	7780	6950	14		18	76.3	375		168	1423	16			427		1	U	3860		623		1.7		93	
EP-61	5/8/00	1		7.06	7.4	8920	8840	7360	104		38.1	78.8	465		194	1400	20			512		1	U	3060		811		1.9	UJ1	129	
EP-61	8/15/00	0.5		7.04	7.8	8890	8860	7074	39		16	73.4	339		149	1186	15			854		1	U	3101		762		1.5	J3	127	
EP-61	11/13/00	1.1		7.15	7.8	8660	10460	7324	2.9		1.7	73.4	369		161	1461	17			422		1	U	5608		802		1.7		108	J4
EP-61	11/13/00	0.9		7.15	7.7	8680	10420	7232	2.7			71.4	342		150	1385	15			403		1	U	5747		774		1.7		133	J4
EP-61	2/23/01	1.7		7.22	7.7	8150	8640	6710	59		20	79.0	319		139	1182	14			467		1	U	3821		727		1.6		120	
EP-61	5/16/01	4.3		7.29	7.5	8000	7730	6558	3		4.4	80.6	341		149	1364	18			520		1	U	7281		877		1.6		113	
EP-61	7/30/01	2.8	J4	6.81	7.5	7790	7200	6216	5.8		7.21	77.2	337		154	1390	18			505		1	U	2974		748		1.7		67	
EP-62	8/9/97	1.45		7.1	7.7	5050	5030	3954	3.4			75.6	228		97	904	72		328	400		1	U	1760		434		3		9.8	
EP-62	11/5/97	1.16		7.09	7.7	5050	5580	3897	8.2			67.6	216		96	906	64			400		1	U	1919		497		2.9		7.3	
EP-62	2/5/98	3.07		7.16	7.4	5460	5980	4317	20			69.1	253		114	935	69			393		1	U	2183		473		2.7		17	
EP-62	5/8/98	2.87		7.21	7.7	4820	5480	3725	5.1			80.4	199		85	882	63			393		1	U	1785		405		3		11	
EP-62	8/10/98	4.33		7.16	7.7	4840	4770	3665	1	U		72.7	204		84	881	66			418		1	U	1708		405		3		8.6	
EP-62	11/9/98	1.6		7.3	7.5	4680	4710	3500	1.9			63.7	191		79	858	52			411		1	U	1646		432		2.8		6.4	
EP-62	2/10/99	4.8		7.41	8.5	4500	4600	3379	17			72.9	197		80	660	55			351		19		1074		399		2.9		4.8	
EP-62	5/6/99	3.8		7.1	7.6	4420	4600	3220	6.3			84.2	169		82	776	48	J4		439		1	U	1328		431	J4	3.2		5.8	J4
EP-62	8/3/99	2.1		7.29	7.4	4410	4470	3315	2.2	J4	1	76.6	161		80	690	54			361		1	U	1519		382		3.2		5.5	
EP-62	10/27/99	4.3		7.04	8.2	4000	3830	2801	6.2			66.9	146		64	599	38			339	J3	1	U,UJ3	1278		359		2.9		4.7	
EP-62	1/28/00	6.2		7.3	7.1	4460	4310	3169	5.6		3.6	73.6	192		81	786	45			483		1	U	1510		450		2.9		3.8	J3
EP-62	5/3/00	6.1		7.32	7.6	4400	4380	3201	2.2		5.3	84.0	157		66	647	38			438		1	U	1407		408	J4	2.9	UJ1,J3	4.6	
EP-62	8/10/00	4		7.15	7.8	4170	4160	3025	1.7		3.7	70.9	149		57	558	43			405		1	U	1371		357		3.4		2.6	J3
EP-62	10/31/00	3.3		7.24	7.9	4260	4030	3030	3		4.85	63.9	155	J4	63	763	42			393		1	U	1339		345		3.1		3.7	
EP-62	2/21/01	4.1		7.31	7.7	4060	3910	2970	6		5.77	77.7	147		59	598	39			390		1	U	1537		396		2.7		5.1	
EP-62	5/15/01	5.6		7.41	7.6	4400	4360	3271	3.1		6.9	92.8	178		73	771	59			384		1	U	1665		502		3.1		5.3	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-62	7/27/01	5		7.1	7.9	4220	5240		3043	3.1		3.09	77.9	166		68	716	56			429		1	U	1482		429		3		3.2	
EP-63	8/9/97	2.83		7.13	7.8	8100	880	R	6442	52			77.0	293		153	1638	33		390	476		1	U	2643		1045		2.3		25	
EP-63	11/5/97	0.33		7.16	7.8	8260	9220		6381	32			71.1	260		152	1747	35			479		1	U	2779		1018		2.3		21	
EP-63	2/5/98	2.23		7.08	7.4	8210	9590		6412	102			70.7	266		157	1579	39			532		1	U	2893		1067		2.1		18	
EP-63	5/8/98	1.58		7.15	7.6	8390	9360		6532	18			81.0	273		166	1604	43			501		1	U	2941		973		2.2		14	
EP-63	8/10/98	1.86		7.16	7.7	8470	8270		6466	6.1			73.6	251		151	1740	39			551		1	U	2759		928		2.2		13	
EP-63	11/9/98	1.4		7.28	7.6	8480	8430		6424	4.6			70.0	237		146	1695	35			593		1	U	2941		1038		2.2		6.4	
EP-63	2/10/99	1.3		7.27	7.8	8440	8590		6515	20			72.9	251		161	1450	45			531		1	U	2829		1029		2.2		7.3	
EP-63	5/6/99	1		7.04	7.6	8300	8450		6237	19			73.0	253		176	1570	37	J4		594		1	U	2544		1163	J4	2.2		6.4	J4
EP-63	5/6/99	0.9		7.04	7.7	8210	8450		6255	16			76.6	243		156	1519	46	J4		628		1	U	2927	J3	870	J4	2		7.9	J4
EP-63	8/3/99	1.2		7.18	7.1	8140	8240		6267	8.3	J4		77.5	261		172	1420	35			439		1	U	3102		893		2.1		7.6	
EP-63	10/27/99	1		6.95	7.7	7680	7710		5687	11		14	72.0	244		150	1265	32			420	J3	1	U,UJ3	2488		879		2		4.3	
EP-63	1/28/00	0.3		7.22	7.8	7400	7010		5287	3.4		1.8	73.0	215		128	1306	29			570		1	U	2544		901		2.1		2.5	J3
EP-63	5/3/00	2.6		7.23	7.5	7340	7230		5508	7.6		7.55	73.2	220		140	1228	27			590		1	U	2428		726	J4	2	UJ1,J3	1.4	
EP-63	5/3/00	2.5		7.23	7.5	7360	7250		5516	5.7			76.8	201		127	1086	24			625		1	U	2627		906	J4	1.9	UJ1,J3	1.4	
EP-63	8/10/00	0.3		7.15	7.8	7600	7480		5714	17		17	76.3	224		137	1102	31			627		1	U	2832		852		2		1.1	J3
EP-63	10/31/00	1.2		7.18	7.8	7490	7150		5442	23		16.4	70.2	221	J4	134	1434	28			637		1	U	2505		844		2.2		0.67	
EP-63	2/21/01	0.2		7.22	7.5	7140	6940		5319	50		44.5	73.0	186		111	1041	26			658		1	U	2922		818		2		0.56	
EP-63	5/15/01	3.2	J4	7.27	7.5	7110	6670		5420	49		51.5	73.0	240		146	1332	36			586		1	U	2789		926		1.9		0.29	
EP-63	5/15/01	4.2	J4	7.27	7.4	7110	6670		5477	53			75.7	243		149	1302	37			605		1	U	2856		951		1.9		0.31	
EP-63	7/27/01	5		6.95	7.7	7130	1393		5328	1.8		6.3	82.2	243		154	1333	34			670		1	U	2611		793		1.8		0.09	
EP-64	8/9/97	3.96		7.39	7.8	8590	9700		7433	84			78.6	360		115	1713	25		266	325		1	U	3359		744		1.9		77	
EP-64	11/5/97	0.19		7.25	7.8	11000	13050		9787	65			65.3	482		155	2601	23			389		1	U	4379		916		2		114	
EP-64	2/5/98	3.76		7.98	7.9	10420	10800		9250	22			72.3	399		141	2200	26			256		1	U	4564		869		1.9		136	
EP-64	5/8/98	2.6		6.82	8	10000	10940		8604	6.3			81.9	378		131	2185	34			261		1	U	4063		755		1.9		120	
EP-64	8/10/98	3		7.4	7.9	9540	9410		8077	6.7			74.3	383		124	2135	25			322		1	U	3826		687		1.8		71	
EP-64	11/9/98	4		7.55	7.7	9490	9450		7863	4.2			68.5	376		115	2055	23			292		1	U	3966		733		1.9		66	
EP-64	2/10/99	2.9		7.89	8.5	9520	9670		7962	29			76.5	398		130	1480	30			226		12		2783		684		1.9		86	
EP-64	5/6/99	2.3		7.57	7.9	9280	9910		7607	22			81.5	360		133	1952	24	J4		224		1	U	3748		830	J4	1.9		73	
EP-64	8/3/99	5		7.48	7.8	8380	9420		6922	11	J4	5.8	77.9	332		113	1578	18			309		1	U	4129		594		1.9		77	
EP-64	10/27/99	4.3		7.39	8.4	9080	9070		7580	14		8.51	70.9	409		125	1739	21			304	J3	8.4	J3	3930		703		1.8		76	
EP-64	1/28/00	4.6		7.84	8.3	9410	8960		7541	15		8.01	78.6	390		125	2085	19			227		1	U	4261		780		1.8		86	J3
EP-64	5/3/00	6.1		8.01	8.2	9320	8705		7740	2.8		2.75	85.3	329		116	1635	16			195		1	U	3787		737	J4	1.8	UJ1,J3	104	
EP-64	8/10/00	4.3		7.56	8.2	9200	8860		7559	4.1		3.16	72.5	344		104	1416	19			268		1	U	4164		616		1.9		86	J3
EP-64	10/31/00	2.7		7.63	8.1	9200	8880		7467	3.6		3.01	63.9	355	J4	107	1968	17			284		1	U	3585		634		1.9		79	
EP-64	2/21/01	4.6		8.02	8.1	8610	7830		7016	35		29	78.8	287		95	1390	15			194		1	U	4220		707		1.6		86	
EP-64	5/15/01	5.3	J4	8.24	8.1	9220	9040		7773	8		4.4	85.5	371		126	1937	21			203		1	U	4790		616		1.7		93	
EP-64	7/27/01	5.6		7.47	8	9010	9490		7352	2.2		1.96	80.1	382		124	1869	21			261		1	U	3660		727		1.8		67	
EP-65	8/16/97	0.35		7.15	7.7	7420	7360		6449	21			74.7	392		144	1380	24		408	498		1	U	2651		643		2.1		30	
EP-65	11/14/97	1.4		7.02	7.6	7380	9180		6235	25			68.7	373		143	1480	30			555		1	U	2699		676		1.9		66	
EP-65	2/18/98	0.84		7.07	7.5	7500	9190		6383	8.4	J4		79.3	409		165	1661	24			521		1	U	2718		690		2		58	
EP-65	5/18/98	0.56		7.1	7.3	7440	7310		5726	132			79.9	328		139	1349	28			515		1	U	2892		689		2.1		35	
EP-65	8/24/98	0.27		7.02	7.5	7330	7390		5862	15			73.9	383		152	1000	22			610		1	U	2837		651		1.9		33	
EP-65	11/16/98	0.6		7.08	7.6	7280	7060		6004	13			72.0	368		150	1270	25			639		1	U	2778		640		1.9		31	
EP-65	2/24/99	0.4		7.16	7.7	6980	8290		5630	9.8			71.8	330		136	1264	24			728		1	U	1635	J4	565		2		27	
EP-65	2/24/99	0.4		7.16	7.7	7010	8280		5730	7.5			82.4	335		138	1253	24			761		1	U	2309	J4	575		2		31	
EP-65	5/13/99	1		6.98	7.7	6740	6010		5324	10			77.9	297		149	1250	26			716		1	U	2280		511		1.9		24	
EP-65	8/10/99	0.3		7.14	7.8	6610	6660		5163	20			77.9	307		132	1078	20			667		1	U	2577		570		1.1	J4	36	J4
EP-65	8/10/99	0.3		7.14	7.7	6610	6660		5176	19			75.6	304		131	1107	21			639		1	U	2577		651		1.9	J4	29	J4

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-65	11/3/99	2.3		6.93	7.6	6400	7130	6536	64	J4		76.1	283		126	1080	19			544	J4	1	U	2545	J4	473	J4	2.1		25	
EP-65	2/7/00	0.4		6.99	7.6	6520	6190	5148	16		6.2	74.7	284		126	1135	17			703		1	U	2395		541		1.9		22	
EP-65	2/7/00	0.2		7	7.7	6500	6190	5129	16			79.0	283		128	1155	17			722		1	U	2338		491		1.9		20	
EP-65	5/8/00	0.4		7.05	7.6	6480	6340	5124	20		6.2	82.0	320		133	1100	21			699		1	U	2628		471		2.2	UJ1	25	
EP-65	8/15/00	1		7	8	6220	6190	4964	16		6.7	76.6	241		99	887	16			720		1	U	2539		559		1.7	J3	22	
EP-65	11/13/00	1.3		7.14	7.6	6340	8060	5050	5.4		3.52	72.9	254		107	1069	18			605		1	U	2516		524		2		19	J4
EP-65	2/23/01	1.1		7.12	7.8	6430	6730	5079	14		7	81.1	256		106	959	17			617		1	U	3007		501		2		26	
EP-65	5/16/01	2.6		7.2	7.4	6290	6260	5038	6.7		5.82	83.7	287		112	1072	21			654		1	U	2967		673		1.9		25	
EP-65	7/30/01	1.1	J4	6.94	7.6	6090	5580	4754	10		30	84.0	255		109	1077	21			489		1	U	2281		515		2.2		19	
EP-65	7/30/01	3.6	J4	7.01	7.6	6050	5640	4742	12			74.3	257		111	1068	22			499		1	U	2398		499		2.2		19	
EP-66	8/8/97	6.7		7.05	7.5	8390	8370	7776	78			80.8	666		161	1505	52		458	559		1	U	3474		697		3.2		40	
EP-66	11/5/97	1.3		6.8	7.5	7920	9020	7183	19			71.4	618		143	1502	48			498		1	U	3435		699		3.2		44	
EP-66	2/5/98	4.42		7.09	7.6	7220	8290	6329	5.6			74.5	541		122	1194	45			443		1	U	3098		625		3		44	
EP-66	5/8/98	2.99		7.39	7.7	7690	8980	6881	16			86.5	554		130	1429	58			478		1	U	3456		595		3.3		45	
EP-66	8/10/98	6.54		6.95	7.5	8130	7820	7017	1.7			74.3	591		140	1551	58			536		1	U	3523		606		3.4		40	
EP-66	11/9/98	5.3		7.09	7.4	7440	7530	6344	4			69.3	508		116	1326	43			470		1	U	3237		602		3.2		31	
EP-66	2/10/99	5.3		7.17	8	7720	7700	6808	7.9			81.3	585		139	1100	55			497		1	U	3054		622		3.3		34	
EP-66	5/6/99	5.5		6.98	7.5	7620	8660	6479	7.4			80.1	521		141	1298	43	J4		488		1	U	2864		687	J4	3.2		38	
EP-66	8/4/99			7	7.8	8000	7680	6952	8.9		6.35	85.1	594		147	1230	51			488		1	U	3404		564		3.7		47	
EP-66	10/27/99	6		6.92	8.3	5910	5920	4908	57		3.81	66.2	432		97	879	40			345	J3	1	U,UJ3	2631		420		3		30	
EP-66	1/28/00	6.4		7.28	7.8	7860	7530	6449	26		8.5	81.3	553		129	1313	42			519		1	U	3514		685		3		36	J3
EP-66	5/3/00	4.8		7.16	7.6	7510	7760	6405	7.6		5.77	86.5	493		130	1156	38			493		1	U	3225		595	J4	3	UJ1,J3	30	
EP-66	8/10/00	3.1		7.09	7.9	7420	7890	6233	2.5		2.35	75.0	454		112	1144	49			475		1	U	3531		543		3.2		34	J3
EP-66	10/31/00	3.8		7.04	7.8	7120	7080	5852	25		9.4	67.1	483	J4	111	1332	44			455		1	U	3170		415		3.2		38	
EP-66	2/21/01	5.7		7.37	7.7	6650	6200	5559	11		9.8	84.6	407		91	881	31			439		1	U	3128		536		2.6		31	
EP-66	5/15/01	5.4		7.54	7.8	6900	7320	5927	4		4.12	88.5	526		122	1269	47			415		1	U	3599		575		2.9		38	
EP-66	7/27/01	3.4		6.98	7.8	7380	1290	6231	2.2		7.57	75.7	489		126	1179	44			479		1	U	3236		554		3.2		33	
EP-67	8/12/97	1.5		6.74	7.6	4400	4490	4098	4			76.1	560		156	488	19		206	251		1	U	1923		415		0.82		18	
EP-67	11/7/97	0.9		6.84	7.4	4460	5000	4028	12			75.4	456		144	472	15			256		1	U	2228		377		0.79		17	
EP-67	2/11/98	1.71		6.66	7.3	4470	5820	4077	2.9	J3		75.4	477		144	511	16			251		1	U	1896		384		0.72		19	
EP-67	2/11/98	1.71		6.66	7.3	4480	5820	4056	3.2	J3		77.9	477		144	510	17			256		1	U	1969		385		0.72		19	
EP-67	5/12/98	0.94		6.94	7.2	4440	4450	3665	3.6			77.0	457		134	473	15			244		1	U	1900		364		0.79		17	
EP-67	8/13/98	1.09		6.79	7.6	4360	4310	3985	1.5			74.5	458		135	557	23			261		1	U	2017		362		0.74	J4	15	
EP-67	11/10/98	1.6		6.77	7.4	4370	4350	3806	7			76.3	465		140	497	15			255		1	U	1823		364		0.75		16	
EP-67	2/10/99	1.7		6.91	7.7	4340	4400	3438	13			77.0	492		141	390	15			256		1	U	1343		346		0.79		14	
EP-67	5/7/99	1.3		6.81	7.3	4440	4820	3837	29			76.3	438		139	483	33			261		1	U	1959		324		0.8		15	J4
EP-67	8/5/99			6.86	7.7	4330	4860	3756	10		9	76.1	433		132	414	13			239		1	U	2117		356		0.8		17	
EP-67	10/28/99	2		6.64	7.3	4400	4410	3730	2.2		4.36	75.4	425		130	416	12			244		1	U	1925		400		0.76		13	
EP-67	1/24/00	1.3		6.88	7.5	4380	4280	3619	4.8		4	76.5	368		112	432	12			246		1	U	2036		405		0.72		20	
EP-67	4/24/00	0.9		6.9	7.4	4370	4200	3818	3.4		3.85	77.9	367		114	377	10			257		1	U	2063		365		0.75	UJ1	17	
EP-67	8/2/00	1.1		6.86	7.9	4300	4280	3611	1.6		1.75	77.7	373		112	400	12			248		1	U	2067		366		0.73		16	
EP-67	8/2/00	1.1		6.85	7.7	4300	4270	3638	1.3			76.3	363		107	400	11			246		1	U	1848		382		0.77		16	
EP-67	10/31/00	1.3		6.83	7.7	4300	4150	3614	9.1		3.04	74.8	434	J4	124	440	11			251		1	U	1765		275		0.78		14	
EP-67	2/8/01	1.3		6.93	7.5	4380	4220	3617	3.8		5.4	75.0	358		107	392	9.5			254		1	U	2105		370		0.73		15	
EP-67	2/8/01	1.3		6.94	7.5	4370	4220	3551	3.3			76.8	432		126	429	11			256		1	U	2119		352		0.72		13	
EP-67	5/7/01	1.6	J4	6.86	8.1	4290	4230	3733	4.3		7.1	77.2	453		129	452	13			232		1	U	2049		412		0.7		15	
EP-67	7/17/01	1		6.89	7.6	4280	4200	3668	2.3		1.39	75.6	467		131	476	13			245		1	U	1973		389		0.75		15	
EP-68	8/14/97	6.38		7.14	7.7	5430	5290	4246	19			32.0	337		141	784	18		180	220		1	U	1740		717		0.77		24	
EP-68	8/14/97				7.7	5330		4220	19			72.9	320		133	774	18		184	224		1	U	1683		735		0.78		25	

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l	SO4 mg/l	Cl mg/l	F mg/l	N mg/l
EP-68	11/11/97	6.09	7.11	7.3	5440	5590	4350	38		74.7	314	132	841	12		223	1 U	1725	751	0.7	24
EP-68	2/11/98	7.59	6.93	7.7	4980	6080	3957	89 J3		74.7	271	114	765	17		244	1 U	1610	638	0.68	33
EP-68	5/13/98	5.87	7.17	7.4	5690	5320	4125	46		32.0	299	129	815	16		220	1 U	1845	715	0.76	23
EP-68	5/13/98			8.1	5740		4166	51		76.3	316	133	840	16		226	1 U	1878	789	0.76	21
EP-68	8/13/98	6.52	7.16	7.8	4260	3990	3252	25		73.9	236	99	672	16		259	1 U	1312	483	0.64 J4	41
EP-68	11/9/98	6.4	7.4	7.9	4480	4130	3329	51		75.4	207	88	630	14		248	1 U	1454	530	0.71	27
EP-68	2/18/99	5.6	7.31	7.5	3840	3690	2926	49		76.3	185	86	586	17		261	1 U	861	436	0.73	35
EP-68	5/10/99	6	7.08	7.6	4030	3990	2940	38		75.6	193	88	580	16		268	1 U	1064	407 J4	0.74	42
EP-68	8/5/99		7.17	7.9	4780	4790	3666	19	9.99	74.5	246	108	608	14		240	1 U	1609	555	0.75	39
EP-68	10/28/99	12.1	6.88	7.4	5900	5340	4467	42		72.9	296	125	677	14		224	1 U	1885	848	0.74	27
EP-68	1/25/00	5.4	7.07	7.8	5800	5570	4210	58	40	73.0	285	121	769	16		234	1 U	2051	764	0.72	24 J4
EP-68	1/25/00	5.2	7.09	7.7	5780	5560	4237	52		75.6	314	130	814	17		238	1 U	2067	783	0.73	30 J4
EP-68	4/24/00	6	7.21	7.5	4920	4830	3691	11	6.67	75.6	266	119	714	13		251	1 U	1860	615	0.72 UJ1	33
EP-68	4/24/00	5.9	7.21	7.6	4960	4970	3795	12		76.6	270	120	733	14		254	1 U	1805	586	0.73 UJ1	35
EP-68	8/2/00	6.1	7.18	7.9	4580	4590	3331	18	6.6	74.7	212	93	600	12		270	1 U	1492	549	0.69	39
EP-68	10/31/00	6.1	7.19	8	4150	3998	2963	18	7.14	71.8	201 J4	86	581	10		271	1 U	1298	472	0.73	40
EP-68	2/9/01	6.2	7.05	7.6	5150	5110	3954	25	9.96	75.6	305	131	752	14		249	1 U	1807	694	0.66	30
EP-68	5/7/01	6.3	7.18	8.1	4780	4530	3640	21	14	75.7	253	105	670	15		251	1 U	1776	575	0.67	39
EP-68	7/17/01	5.6	7.12	7.7	5320	4820	4097	17 J4	9.3	82.0	299	128	816	17		239	1 U	1823	754	0.68	35
EP-7	8/6/97	1.66	7.17	7.8	2810	2580	1942	12		72.0	103	34	490	12	320	390	1 U	672	320	1.7	0.05 U
EP-7	11/4/97	1.55	7.36	7.9	2710	2850	1974	15		60.8	96	32	484	5.9		390	1 U	687	311	1.8	0.05 U
EP-7	2/4/98	1.62	7.3	7.9	2810	501 R	1978	14		32.0	119	38	502	9.6		361	1 U	814	344	1.3	0.08
EP-7	5/5/98	3.73	7.67	7.8	2890	2500	1930	15		80.4	127	41	512	14		322	1 U	687	348	1.5	0.05 U
EP-7	8/5/98	0.69	7.28	7.8	2800	630 R	1938	8.9		75.0	106	34	506	9.5		296	1 U	767	365	1.7	0.05 U
EP-7	11/3/98	1.2	7.31	7.6	2660	2610	1790	18		65.3	83	27	446	9		289	1 U	567	322	1.9	0.05 U
EP-7	2/3/99	1.9	7.51	7.9	2960	2790	1960	12		65.3	103	34	553	5 U		362	1 U	702	320	1.8	0.1 U
EP-7	2/3/99	2	7.51	7.8	2950	2800	1998	11		65.8	110	36	570	5 U		360	1 U	735	322	1.7	0.1 U
EP-7	5/5/99	2.5	7.5	7.9	3110	3030	2119	10		76.6	112	39	551	7.5		390	1 U	829 J3	334	1.7	0.41
EP-7	8/2/99	1.9	7.33	7.7	3790	3800	2664	15 J4	9	74.7	146	47	500	11		366	1 U	907	467	1.7	0.13 UJ1
EP-7	10/25/99		6.97	7.8	6700	6910	4506	23		32.0	330	103	1223	16		460 J3	1 U,UJ3	1517	1197	1.7	0.11
EP-7	10/25/99			7.9	6700		4531	19		62.8	321	98	1168	15		454 J3	1 U,UJ3	1503	1133	1.7	0.1
EP-7	1/29/00	1.7	7.27	7.5	3840	3630	2516	36	8.4	63.5	123	40	652	7.2		407	1 U	924	581 J4	1.9	0.17 J3
EP-7	1/29/00	2.6	7.34	7.8	3820	3560	2446	36	5.24	71.6	124	40	669	7.3		378	1 U	852	469 J4	1.9	0.2 J3
EP-7	4/24/00	3.3	7.45	7.9	3110	3090	2047	23	8.89	80.2	79	28	476	6.1		388	1 U	898	343	2.1 UJ1	0.16
EP-7	8/1/00	1.9	7.47	8	2610	2590	1710 J4	5.9	3.67	77.0	62	20	450	6.3		338	1 U	633	287	2.3	0.1 U
EP-7	8/1/00	2.5	7.48	8.1	2600	2580	2437 J4	5.5		74.8	61	20	450	6.3		337	1 U	710	280	2.2	0.1 U
EP-7	10/30/00	3.3	7.52	8.1	2520	2450	1613	4.9	5.31	64.9	60 J4	20	442	6.4		293	1 U	657	213	2.2	0.1
EP-7	2/5/01	2.6	7.8	8	2720	2650	1753	6.8	9.55	65.3	77	25	460	5.5		329	1 U	722	285	1.5	0.1 U
EP-7	2/5/01	2.6	7.8	7.9	2720	2660	1746	11		66.6	75	25	463	5.3		325	1 U	746	273	1.5	0.1 U
EP-7	5/4/01	3.1	7.57	8.7	2620	2930	1767	23	6.45	66.7	90	30	488	7.7		275	17	710	303	1.6	0.24 UJ1
EP-7	5/4/01	2.9	7.55	8.3	2640	2930	1825	14		77.9	88	28	474	8.1		317	1 U	788	271	1.7	0.21 UJ1
EP-7	7/16/01	1.9	7.58	7.9	2710	2710	1832	13	8.38	78.1	88	27	475	7.5		310	1 U	704	324	1.7	0.05 U
EP-7	7/16/01	1.8	7.6	8	2710	2716	1835	10		76.6	88	27	468	7.7		293	1 U	785	272	1.7	0.05 U
EP-70	8/12/97	0.52	6.84			7150				80.8											
EP-70	8/26/97		7.19	7.9	6970	1291 R	5856	6.5 J4		32.0	274	149	1238	31	252	307	1 U	2496	615	1.3	62
EP-70	8/26/97			7.6	6970		5831	9.8 J4		76.1	278	152	1221	32	248	303	1 U	2639	626	1.3	59
EP-70	11/7/97	0.75	6.91	7.5	6740	7510	5436	6.4		75.0	298	165	1236	25		300	1 U	2586	624	1.2	62
EP-70	2/11/98	0.56	6.79	7.4	6600	8480	5373	1 U,UJ3		77.2	304	159	1230	26		290	1 U	2464	608	1.1	78
EP-70	5/12/98	0.38	7.07	7.4	6290	6210	4672	1 U		78.1	277	143	1097	20		283	1 U	2356	565	1.2	46

App

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l	CO3 mg/l		SO4 mg/l	Cl mg/l	F mg/l		N mg/l
EP-70	8/13/98	1.39		6.94	7.6	6150	5960	5053	6.3			74.7	301	153	1127	30			295	1	U	2374	516	1.1	J4	42
EP-70	11/10/98	0.8		7.02	7.4	6320	6230	5136	2.1			32.0	314	157	1182	24			285	1	U	2674	570	1.1		52
EP-70	11/10/98				7.3	6310		5108	1.9			75.7	310	157	1164	24			292	1	U	2477	587	1.1		55
EP-70	2/10/99	0.9		7.04	7.7	6080	6080	4910	1.7			76.1	309	158	790	30			282	1	U	1970	518	1.1		20
EP-70	5/7/99	0.7		6.92	7.5	6230	6630	4827	3.5			75.6	291	157	1009	50			289	1	U	2210	546	1.1		43
EP-70	8/5/99			7.01	7	6020	6660	4798	3.1		4.5	75.7	291	151	930	20			220	1	U	2600	488	1.1		53
EP-70	10/28/99	0.2		6.76	7.2	6220	6220	4909	1	U	0.71	74.8	279	143	852	17			288	1	U	2057	614	1.1		39
EP-70	1/24/00	0.2		7.03	7.6	6110	5950	4832	2.8		2.15	74.8	260	134	954	18			293	1	U	2485	561	1		38
EP-70	1/24/00	0.2		7.03	7.5	6100	5950	4771	2.7			76.6	262	135	927	18			296	1	U	2483	540	1		40
EP-70	4/25/00	0.4		7.1	7.6	6110	5980	4922	7.7		4.6	76.5	276	146	874	17			305	1	U	3038	530	1	UJ1	45
EP-70	8/3/00	0.3		6.97	7.9	6050	5990	4624	3.6		2.9	75.0	245	125	859	17			267	1	U	2406	576	0.99		51
EP-70	11/1/00	0.4		7	7.5	5980	5750	4643	2.8		1.85	74.8	266	133	869	19	J4		293	1	U	2308	506	1.1		41
EP-70	11/1/00	0.3		7	7.6	6010	5760	4628	2.7			73.2	248	123	808	15	J4		295	1	U	2290	487	1		48
EP-70	2/9/01	0.3		7.11	7.8	6030	5730	4824	1.9		1.75	76.6	272	141	910	16			311	1	U	2580	507	1		40
EP-70	5/7/01	0.3	J4	7.08	8.2	6460	6320	5071	4.8		5.63	76.1	292	152	930	21			232	1	U	2759	876	1.1		63
EP-70	7/18/01	0.6		6.99	7.4	6480	6380	5216	3.6		3.54	76.1	288	151	1119	23			220	1	U	2932	576	1.1		72
EP-71	8/12/97	0.43		6.79	7.5	6480	6560	5636	4.9			76.1	388	180	1046	21		248	303	1	U	2720	517	0.95		89
EP-71	11/7/97	0.54		6.85	7.5	6470	7180	5567	10			75.6	380	185	1091	18			298	1	U	2564	573	0.92		99
EP-71	2/11/98	0.82		6.7	7.5	6770	8670	5828	1.3	J3		77.2	379	180	1168	20			305	1	U	2575	574	0.8		114
EP-71	5/12/98	0.39		6.99	7.3	6440	6400	5049	3.2			77.0	362	169	1058	18			300	1	U	2329	476	0.89		46
EP-71	8/13/98	0.31		6.86	7.5	6290	6260	5538	1	U		74.7	392	179	1256	22			307	1	U	2424	498	0.86	J4	53
EP-71	11/10/98	1.1		7	7.3	5750	5670	4741	6			75.6	348	159	952	19			285	1	U	2506	478	0.85		79
EP-71	2/10/99	1		7.01	7.7	5940	5970	5085	4.5			75.6	344	172	730	20			287	1	U	1840	47	0.89		34
EP-71	8/5/99			6.92	7.5	5850	6560	4857	4		1.7	75.9	348	164	856	17			281	1	U	2329	475	0.92		92
EP-71	10/28/99	0.2		6.71	7.9	5800	5800	4623	1.4		4.04	74.5	320	150	741	15			294	1	U	2117	528	0.86		64
EP-71	1/24/00	0.9		6.97	7.6	5950	5770	4727	2.2		3.11	76.3	302	142	800	16			284	1	U	2438	503	0.86		72
EP-71	4/24/00	0.3		7.04	7.4	5840	5740	4802	1	U	1.06	75.9	316	150	787	15			292	1	U	2316	450	0.86	UJ1	65
EP-71	8/3/00	0.3		6.85	8	5780	5740	4632	1.2		1.87	75.9	295	137	700	16			285	1	U	2152	450	0.84		78
EP-71	8/3/00	0.3		6.85	8	5810	5760	4600	1.6			75.2	283	130	759	15			287	1	U	2233	475	0.85		70
EP-71	11/1/00	0.5		6.93	7.6	5740	5550	4566	1.2		1	73.0	299	135	744	16	J4		276	1	U	2260	421	0.9		67
EP-71	2/9/01	0.5		7.05	7.6	5860	5560	4778	2.1		2.95	72.9	298	139	761	14			290	1	U	2429	508	0.8		65
EP-71	2/9/01	0.5		7.05	7.6	5840	5550	4783	2.3			76.5	317	147	801	15			285	1	U	2519	510	0.81		78
EP-71	5/7/01	0.7	J4	7.03	8.2	6280	6170	5122	1.5		4	75.4	362	172	1045	20			298	1	U	2806	597	0.84		76
EP-71	7/18/01	0.7		6.86	8	6400	6260	5350	1.8		1.17	75.4	350	167	1008	17			298	1	U	2790	580	0.91		80
EP-71	7/18/01	0.7		6.86	7.9	6410	6260	5203	1	U	1.17	78.3	349	167	1055	18			303	1	U	2807	489	0.92		86
EP-72	8/12/97	0.37		6.77	7.8	6220	6300	5403	6.4			77.4	366	167	997	25		238	290	1	U	2767	553	1.4		58
EP-72	11/7/97	0.95		6.86	7.4	6040	6810	5075	11			77.0	347	162	995	22			287	1	U	2522	608	1.4		59
EP-72	2/11/98	0.72		6.72	7.4	6030	7900	4975	16	J3		77.7	349	158	1016	25			283	1	U	2209	574	1.3		53
EP-72	5/13/98	0.29		7.02	7.5	6030	5970	4600	2.9			77.5	327	150	985	21			282	1	U	2296	569	1.4		44
EP-72	8/13/98	0.21		6.89	7.5	6050	6000	5094	4.5			76.1	361	165	1040	29			293	1	U	2303	552	1.3	J4	49
EP-72	11/10/98	1.2		7	7.3	6090	6080	5018	9			77.9	365	165	1086	23			287	1	U	2506	588	1.4		68
EP-72	1/24/00	2.7		7.11	7.9	5700	5560	4539	16		31	81.1	250	148	900	16			295	1	U	2459	504	1.1		34
EP-72	4/25/00	1.7		7.16	7.8	7180	6980	6065	3.1		2.4	82.6	257	215	977	14			349	1	U	3904	554	1.2	UJ1	34
EP-72	8/3/00	1.9		7.01	8.1	7540	7430	6394	3.8		3.25	73.2	245	234	1227	16			351	1	U	3559	464	1.2		41
EP-72	11/1/00	1.5		7.11	7.6	6990	6770	5901	4.6		4.8	67.8	244	215	1081	15	J4		342	1	U	2957	386	1.2		34
EP-72	2/9/01	5.5		7.15	7.6	6330	6100	5239	2.5		3.1	82.0	232	178	962	13			331	1	U	2966	447	1.1		37
EP-72	5/7/01	2.3	J4	7.11	8.6	8520	8400	7586	2.9		4.5	79.3	291	337	1655	20			326	24		4662	559	1.2		52
EP-72	7/18/01	2.5		7.03	7.9	11940	11670	11307	1.3		2.52	84.0	352	558	2256	21			403	1	U	6639	674	1.3		86
EP-73	8/12/97	5.73		6.88	7.9	6760	6760	5763	2			82.2	287	117	1048	388		240	293	1	U	3223	485	2.8		25

H:\Files\128\1247\RI Phase III\Report\Appendices\Appendix D.xls

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field		TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l		SO4 mg/l		Cl mg/l		F mg/l		N mg/l	
EP-73	11/13/97	1.2	6.91	7.4	6520	8610		5329		12	J4		81.0	265	113	1087	382		287	1	U	2584		441		2.6		23	J4
EP-73	2/12/98	0.97	6.84	7.6	6850	9340		5672		8.2	J3		83.5	292	125	1185	417		285	1	U	2861		466		2.4		24	
EP-73	5/11/98	1.43	6.62	7.7	6900	7810		5747		3.5			86.4	283	123	1148	387		272	1	U	3124		422		2.8		22	
EP-73	8/17/98	0.81	6.97	7.5	6700	6610		5365		2.9			81.3	286	121	1162	394		285	1	U	2754		469		2.7		21	
EP-73	11/5/98	6.2	7.13	7.4	6580	5750		5375		1.6			81.9	262	112	1126	330		290	1	U	2776		466		2.6		15	
EP-73	2/9/99	2.7	7.13	7.7	6540	6340		5245		10			82.6	278	119	830	400		287	1	U	2155	J4	434		2.9		16	
EP-73	5/7/99	0.8	6.97	7.5	6700	7670		5284		7.4			82.8	264	122	977	365		293	1	U	3116		410		2.7		16	J4
EP-73	5/7/99	0.8	6.96	7.7	6700	7680		5239		6			83.5	263	121	1009	382		287	1	U	3079		430		2.7		21	J4
EP-73	8/5/99	5.2	7.01	7.5	6550	7280		5277		6.9		8.88	82.9	262	117	1066	348		268	1	U	3032		439		2.7		19	
EP-73	10/29/99	1.2	6.8	7.6	6520	5760		4302	J4	2.1	J4	6.48	81.3	247	111	901	315		296	1	U	2596		468		2.9		19	
EP-73	1/26/00	0.4	7.07	7.8	6600	6200		4896		5.3		8.89	84.4	265	116	959	352		300	1	U	2622		408		2.8		17	J3
EP-73	4/28/00	0.8	7.08	7.6	6380	6080		5088		7.4		7.5	84.4	239	111	925	315		1252	1	U	2735		394		2.6	UJ1	17	
EP-73	8/7/00	0.3	7.04	8.5	6220	6130		4747		1.4		4.5	80.2	218	92	900	286		257	24		2330		435		3		16	
EP-73	11/7/00	0.4	7.02	7.8	6350	7730		4736		8.2		8.46	79.5	199	97	941	303		329	1	U	2325		450		2.7		17	
EP-73	2/16/01	0.5	7.07	7.9	6180	5890		4845		11		8.5	82.8	212	95	803	263		281	1	U	2905		375		2.6		21	
EP-73	5/9/01	0.6	7.08	7.7	6080	5930		4702		7.4	J4	9.78	82.9	229	101	861	351		282	1	U	2938		424		2.7		16	
EP-73	7/20/01	0	7.04	7.8	6100	5940		4759		1	U	13.6	82.8	218	101	922	332		305	1	U	2857		428		2.7		14	
EP-73	7/20/01	0	7.05	8	6120	5960		4708		4.2			77.4	219	99	913	331		296	1	U	2996		426		2.6		16	
EP-74	8/13/97	9.41	7.42	8	2550	2530		1771		31			76.1	87	36	448	7.6	240	293	1	U	710		253		0.85		5.9	
EP-75	8/12/97	1.54	6.84	7.4	19620	18940		20923		116			76.3	438	463	4680	586	654	798	1	U	13167		352		1.8		191	
EP-75	11/13/97	1.96	6.82	7.2	18340	21300		18239		41	J4		75.9	406	407	5246	760		742	1	U	10061		258		1.5		193	J4
EP-75	2/6/98	1.11	6.86	7.2	19240	23900		19043		49			85.5	451	476	4055	655		288	1	U	11195		710		1.5		178	
EP-75	5/11/98	2.4	6.52	7.5	20000	20000	E	19297		260			83.3	452	501	4377	702		815	1	U	12795		377		2.3		148	
EP-75	8/17/98	1.13	6.85	7.4	18700	17890		17873		16			75.4	421	401	4249	661		758	1	U	11607		203		1.6		176	
EP-75	11/5/98	5	6.9	7.2	19100	16900		18662		11			76.8	455	477	4342	590		744	1	U	12536		302		1.8		111	
EP-75	2/22/99	6.8	6.94	7.3	18720	22000		17691		46			75.7	382	364	3962	858		664	1	U	9087		238		1.7		161	
EP-75	5/10/99	0.3	6.87	7.6	19390	20100		18775		102			79.9	447	472	4325	682		769	1	U	11378		277	J4	1.8		160	
EP-75	8/6/99	0.4	6.86	7.2	16010	18110		14853		6.7		6.3	76.5	380	372	3775	672		510	1	U	4626		192		1.5		124	
EP-75	1/26/00	1.8	7.01	7.7	18110	16220		16215		87		33	78.8	391	355	3938	604		641	1	U	9219		164		1.7		175	J3
EP-75	4/28/00	1.8	7.03	7.5	19000	16970		17965		32		9.6	83.5	332	337	4204	556		715	1	U	11533		257		1.6	UJ1	210	
EP-75	8/7/00	2.8	7.01	7.2	14850	12970		13269		7.4		5.5	69.3	339	300	3000	504		382	1	U	9407		230		1.4		182	
EP-75	11/7/00	2.6	6.98	7.5	13680	15280		11913		14		8.2	73.6	309	276	2818	411		454	1	U	6898		167		1.3		172	J3
EP-75	2/14/01	1.2	7.04	7.7	19010	17720		17974		24		14	82.0	361	344	4119	587		683	1	U	10383		330		1.8		212	
EP-75	5/9/01	1.5	7.02	7.1	17560	17190		16405		20	J4	6.43	80.1	396	374	3711	847		439	1	U	11056		227		1.5		215	
EP-75	7/20/01	0	6.96	7.4	19140	18240		18336		29		13	72.5	401	389	3849	848		573	1	U	11157		286		1.8		259	
EP-76	8/12/97	0.35	7.39	8	5110	5170		3967		25			72.3	195	105	937	72	396	483	1	U	1889		492		2.1		5.2	
EP-76	11/11/97	0.16	7.21	7.5	4670	5050		3497		5.6			71.8	157	88	891	58		486	1	U	1498		479		2.1		4.6	
EP-76	2/6/98	0.34	7.22	7.6	4800	6000		3704		4			75.7	159	90	882	63		476	1	U	1527		422		1.9		4.7	
EP-76	5/11/98	1.04	7.22	7.7	5000	5390		3843		1.6			72.1	168	97	885	62		481	1	U	1758		426		2.1		5	
EP-76	8/17/98	0.11	7.21	7.6	5070	5090		3737		5			71.4	182	102	985	68		487	1	U	1779		503		1.9		5.7	
EP-76	11/5/98	0.9	7.61	7.7	5680	5150		4278		4.2			71.1	151	86	1084	198		477	1	U	2157		466		2.4		3.8	
EP-76	2/22/99	4.4	7.34	7.6	5120	5860		3717		6.2			74.1	169	94	550	135		478	1	U	1477		451		2.1		0.63	J4
EP-76	5/10/99	0.7	7.05	7.6	5490	5550		4026		2.3			72.5	187	112	922	113		486	1	U	1852		455	J4	2.1		4.5	
EP-76	1/26/00	0.7	7.33	8.3	5060	4860		3613		2.7		1.61	71.8	164	92	837	104		475	1	U	1830		500		2.1		4.2	J3
EP-76	4/28/00	0.2	7.28	8	5120	4930		3827		5.3		2.33	74.3	152	88	827	75		515	1	U	1802		510		1.9	UJ1	5.7	
EP-76	8/7/00	0.5	7.28	8.1	5300	5250		3794		2.5		2.45	70.2	162	88	800	93		494	1	U	1827		456		2.2		4	
EP-76	11/7/00	0.6	7.35	7.9	5220	5740		3829		6.3		4.25	71.1	159	74	871	134		484	1	U	1812		406		2.2		3.8	
EP-76	2/14/01	0.6	7.37	7.9	5540	4930		3627		6		4.3	72.1	134	77	754	106		498	1	U	1914		433		2.1		4.1	
EP-76	5/9/01	0.6	7.36	8.1	5280	5190		3909		2.3	J4	2.98	73.4	154	90	800	121		495	1	U	2070		554		2.1		4.4	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field	TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l		DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-76	7/20/01	0	7.27	8.1	5140		4970	3698		1	U	2.81	78.3	161		95	852		96			490		1	U	1807	511		2		5.8	
EP-77	8/12/97	3.83	6.98	8.4	5400		5350	4175		752			75.6	240		58	1034		35		308	364		6		2129	616		2.6		0.67	
EP-77	11/13/97	1.5	7.02	7.6	5350		6550	3956		142	J4		32.0	223		53	1030		36			309		1	U	1793	608		2.4		13	J4
EP-77	11/13/97			7.6	5360			4057		82	J4		74.8	226		55	1045		35			310		1	U	1793	621		2.2		0.59	J4
EP-77	2/12/98	1.1	7	7.5	5330		6910	4046		249	J3		77.9	228		51	1067		34			329		1	U	1808	636		2.4		0.4	
EP-77	5/13/98	0.71	7.23	7.5	5070		5320	3502		190			77.9	220		48	1054		35			273		1	U	1698	608		2.7		0.4	
EP-77	8/17/98	0.82	7.09	7.5	5800		5730	4255		18			74.8	254		58	1199		39			293		1	U	1996	684		2.6		0.42	
EP-77	11/11/98		7.3	7.5	5770		5600	4383		412	J4		74.5	249		56	1192		37			303		1	U	2168	641		2.8		0.71	
EP-77	2/11/99	0.9	7.23	7.8	5450		5450	4029		256			77.4	227		50	850		40			296		1	U	1798	579		3.1		0.59	
EP-77	5/7/99	1.1	7.08	7.6	5350		5800	3880		177			77.9	200		50	940		55			333		1	U	1790	370		3		0.32	J4
EP-77	8/5/99	1.2	7.14	7.4	5110		5640	3766		22		18	76.1	182		42	823		32			230		1	U	2045	553		3.4		1.8	
EP-77	10/29/99	0.6	6.94	8.4	5080		4300	3006	J4	879	J4	33.1	32.0	190		45	809		26			500		1	U	1565	557		2.1		0.58	UJ1,J4
EP-77	10/29/99			7.9	5030			2121	J4	692	J4		75.6	184		44	735		25			479		1	U	1586	530		2.4		0.47	UJ1,J4
EP-77	1/25/00	0.2	7.21	8.2	4500		4410	3152		13		17.6	76.1	144		36	820		27			329		1	U	1464	449		3.5		0.94	J4
EP-77	4/28/00	0.6	7.26	7.8	4140		3870	2936		157		102	76.1	136		39	727		22			359		1	U	1302	469		3.2	UJ1	0.63	
EP-77	4/28/00	0.6	7.27	7.9	4140		3880	3040		137			77.2	119		35	718		19			359		1	U	1299	441		3	UJ1	0.71	
EP-77	8/4/00	0.5	7.2	8.1	3940		3860	2707		226		90.3	76.8	106		25	700		17			355		1	U	1271	372		3.5		0.97	
EP-77	11/3/00	0.6	7.24	7.8	4320		4380	2604		14	J4	14.3	74.8	101		26	706		22			367		1	U	1055	369		4.3		0.67	
EP-77	2/12/01	0.7	7.32	8	4140		3870	2871		561		62.3	75.6	124		36	729		15			586		1	U	1334	449		2.1		0.72	
EP-77	5/9/01	1	7.32	8.2	4000		3990	2807		320	J4	93.2	75.6	152		45	684		18		.	427		1	U	1483	426		2.5		1.1	J4
EP-77	5/9/01	1	7.32	8	4070		3980	2890		437	J4		76.6	162		48	714		18			423		1	U	1426	459		2.2		0.75	J4
EP-77	7/19/01	1.2	7.23	7.9	3820		3720	2627		32	J4	26.3	76.3	105		30	732		19			353		1	U	1214	434		3.5		0.69	UJ1,J4
EP-78	8/13/97	0.25	7.78	8	2600		2640	1773		9.8			73.9	46		26	492		46		282	344		1	U	807	179		4.9		7.6	
EP-78	11/18/97	0.74	7.77	7.9	2310	UJ1	2940	1437	UJ1	5.9	J4,UJ1		32.0	43	UJ1	24	380	UJ1	46			295		1	U	674	179		4.8		9.2	
EP-78	11/18/97			7.9	2320	UJ1		1484	UJ1	3.8	J4		74.8	44	UJ1	24	381		46			299		1	U	654	179	UJ1	4.9		8.7	
EP-78	2/6/98	0.73	7.69	7.9	2940		3780	2004		10			74.8	61		33	483		57			337		1	U	876	252		4.2		11	
EP-78	5/14/98	0.82	7.7	8	3730		3750	2364		18			73.9	78		40	669		48			362		1	U	1078	325		3.9		11	
EP-78	8/19/98	0.24	7.73	8.1	3660		3740	2561		1.8			73.4	68		37	658		56			334		1	U	1143	331		3.7		9.4	
EP-78	11/11/98	1	8.05	8.1	2220		2170	1422		46	J4		73.4	29		16	406		37			366		1	U	616	102		5.1		8.1	
EP-78	2/18/99	0.5	7.74	7.9	3450		3420	2315		22			75.4	72		38	606		77			362		1	U	760	298		4		10	
EP-78	5/11/99	2.3	7.62	7.3	3750	J3	3770	2549		14			75.4	76		43	600		71			295	J3	1	U,UJ3	1042	317		2.6	J4	9.8	
EP-78	5/11/99	2.2	7.62	7.5	3740	J3	3830	2558		16			74.8	76		44	600		74			296	J3	1	U,UJ3	1079	320		9.2	J4	9.1	
EP-78	8/9/99	0.9	7.86	7.8	2520		2440	1664		12		15.5	73.8	31		18	447		39			331		1	U	705	117		4.5		6.7	
EP-78	10/31/99		7.43	8	2620		2610	1604		4.3		1.55	72.3	51		29	393		47			346		1	U	750	208		4.3		6.3	
EP-78	1/28/00	0.7	7.62	7.6	3400		3250	2144		20			74.8	73		35	604		54			342		1	U	998	301		3.8		11	J3
EP-78	5/2/00	0.4	7.55	8	3800		3810	2577		8		9.22	76.1	69		35	587		48			390		1	U	1106	258		3.4	UJ1,J3	11	
EP-78	8/9/00	0.7	7.61	7.7	2480		2770	1624		21		9.1	73.2	51		24	376		53			301		1	U	741	130		3.6	J3	7.2	J3
EP-78	11/9/00	0.4	7.57	7.9	3400		4240	2254		4		3.65	72.9	68		33	495		48			366		1	U	898	305		3.5		9.5	
EP-78	2/15/01	0.4	7.52	7	3340		3300	2196		2.4		4	74.8	72		34	499		48			415		1	U	1015	287		3.4		8.6	
EP-78	5/14/01	2.1	7.75	7.7	3700		3560	2543		19		16.8	77.2	85		40	575		52			281		1	U	1232	357		3		12	J4
EP-78	7/25/01	0.5	7.66	8.1	3470		3260	2317		19		27.1	80.8	61		32	621		53			378		1	U	1020	295		3.1		10	
EP-79	8/13/97	1.06	7.47	8	4890		4870	3643		20			77.2	59		71	1018		9.3		388	473		1	U	1596	437		4.1		9.5	
EP-79	11/18/97	0.77	7.43	8.2	4900		6500	3560		89			77.9	58	UJ1	71	1153		12	UJ1		454		1	U	1802	432	UJ1	3.7		10	
EP-79	2/6/98	0.63	7.42	7.9	4940		6700	3770		37			79.0	59		74	1103		12			466		1	U	1748	451		3.9		11	
EP-79	5/14/98	0.43	7.52	7.8	5080		5150	3404		718			79.0	56		69	1144		5	U		610		1	U	1518	468		4.4		9.9	
EP-79	8/19/98	0.15	7.5	8	5330		5420	3921		1	U		77.4	60		74	1183		8.9			454		1	U	1766	524		3.9		9.5	
EP-79	11/11/98	1.6	7.67	7.8	4710		4650	3451		47	J4		77.9	53		62	1077		9.5			470		1	U	1517	421		4.4		9.3	
EP-79	2/18/99	1	7.61	7.8	4650		4660	3360		12			81.0	48		53	1016		12			471		1	U	1172	397		4.6		10	
EP-79	5/11/99	6.7	7.41	8.2	4900	J3	4790	3447		80			79.9	54		71	1050		10			447	J3	1	U,UJ3	1477	453		4.6	J4	9.2	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l		DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-79	8/9/99	0.4	7.53	8	4730		4770	3360	6.3		5.4	77.0	50		62	974		8.7			437		1	U	1509	396		4.6		9.5	
EP-79	10/31/99		7.27	8	4500		4480	2989	1	U	1.4	75.9	46		55	895		8			455		1	U	1362	445		4.6		7.5	
EP-79	1/28/00	0.2	7.48	8	4700		4520	3214	26			75.7	55		60	965		7.6			406		1	U	1441	389		4.7		11	J3
EP-79	1/28/00	0.1	7.48	8	4710		4520	3188	30			78.1	55		59	988		7.6			454		1	U	1369	393		4.7		11	J3
EP-79	5/2/00	0.2	7.45	7.9	4880		4880	3406	8.3		8.6	79.7	49		58	864		7.1			455		1	U	1546	514		4.7	J3	10	
EP-79	8/9/00	1	7.55	8.3	4350		4890	2946	30		6.5	76.3	44		46	813		12			455		1	U	1337	387		5	J3	10	J3
EP-79	11/9/00	0.5	7.52	8.5	4320		5600	3034	12		7.1	76.6	38		45	813		6.4			426		16		1191	366		4.8		7.7	
EP-79	2/15/01	0.7	7.53	7.8	4400		4380	3051	2		4.6	78.4	40		48	790		7.1			459		1	U	1412	378		4.8		11	
EP-79	5/14/01	4.9	7.62	8.1	4780		4870	3309	60		9.99	79.2	88		71	883		9.2			458		1	U	1159	636		4.6		11	J4
EP-79	7/25/01	0.6	7.55	8.1	4750		4630	3259	30		77	78.3	48		57	981		9.2			456		1	U	1337	587		4.5		9.7	
EP-80	8/13/97	0.31	7.23	7.7	5040		5040	4036	382			77.9	190		87	934		20		456	556		1	U	1889	432		1.3		1.4	
EP-80	11/17/97	2.9	7.05	7.9	5100		6840	4029	127			75.0	226		85	1052		19			542		1	U	2004	356		1.3		5	
EP-80	2/5/98	0.88	7.14	7.4	5040		6190	4032	67			77.5	202		81	1000		14			520		1	U	1954	362		1.3		7.1	
EP-80	5/13/98	0.68	7.26	7.6	4960		5020	3596	6.2			77.2	183		80	1004		15			499		1	U	1757	360		1.3		5.2	
EP-80	8/19/98	2.15	7.27	8	5180		5300	3949	61			77.5	163		79	984		20			547		1	U	1880	435		1.3		0.08	
EP-80	11/11/98	1.9	7.38	7.5	5130		5040	4016	77	J4		74.7	218		91	1045		18			525		1	U	2048	377		1.4		5.1	
EP-80	2/18/99	1.9	7.3	7.5	5290		5230	4048	45			73.6	220		92	1016		23			494		1	U	1573	373		1.3		9.8	
EP-80	5/11/99	0.6	7.19	7.9	5170	J3	5240	3976	20			76.8	202		96	900		21			500	J3	1	U,UJ3	1686	385		1.3	J4	5.6	
EP-80	8/9/99	0.2	7.27	7.8	5240		5250	3934	18		9.68	79.3	196		94	961		20			510		1	U	1991	432		1.3		0.07	
EP-80	10/27/99	0.6	6.96	8.3	5320		5280	4080	27		9.48	74.8	242		95	896		17			494	J3	1	U,UJ3	2117	406		1.2		7.4	
EP-80	1/28/00	0.8	7.22	8.1	5130		4870	3845	9.8		7.17	75.6	218		86	978		15			514		1	U	1880	372		1.4		2.4	J3
EP-80	5/2/00	0.5	7.21	7.8	5150		5120	3920	21		13.5	77.5	177		79	821		13			533		1	U	1794	385		1.3	UJ1,J3	1.7	
EP-80	8/10/00	0.3	7.13	7.9	5230		5.8	3789	6.6		6	75.2	163		74	766		21			542		1	U	1877	484		1.3		0.4	J3
EP-80	11/9/00	0.5	7.14	7.9	5300		6730	4033	4.3		4.15	72.3	194		77	916		14			547		1	U	1927	319		1.4		3.1	J4
EP-80	2/16/01	0.6	7.23	8.1	5300		5080	3970	18		7.02	74.1	194		83	877		15			512		1	U	2251	387		1.2		1.2	
EP-80	5/14/01	6.1	7.35	7.9	5200		4990	3967	40		9.12	78.6	166		74	887		18			531		1	U	1734	510		1.2		1.4	J4
EP-80	7/25/01	0.2	7.25	7.8	5040		4880	3656	6.9		8.8	77.5	182		85	916		20			514		1	U	1719	449		1.2		0.8	
EP-81	8/13/97	2.82	7.01	7.7	2550		2530	2045	233			79.0	176		86	327		18		360	439		1	U	961	164		1.4		6.2	
EP-81	11/17/97	2.88	6.9	7.8	2390		3290	1809	11			73.9	150		79	311		14			534		1	U	748	102		1.2		8.2	
EP-81	2/5/98	2.94	7	7.5	2560		2980	1967	76			74.8	152		76	331		17			527		1	U	923	125		1.6		9.4	
EP-81	5/14/98	3.44	7.04	7.4	2540		2630	1850	45			76.3	140		75	330		12			537		1	U	776	100		1.4		7.9	
EP-81	8/19/98	0.7	7.08	7.6	2630		2720	2039	3.3			77.7	163		84	336		12			477		1	U	987	142		1.2		6.9	
EP-81	11/11/98	3.6	7.1	7.3	2430		2370	1862	43	J4		71.6	174		85	294		11			550		1	U	952	70		1.2		12	
EP-81	2/18/99	4.7	7.19	7.4	2550		2590	2018	16			75.2	164		84	364		17			501		1	U	658	97		1.4		9.7	
EP-81	5/11/99	6.8	7	7.8	2530	J3	2570	1955	14			79.3	159		92	330		15			517	J3	1	U,UJ3	823	79		1.3	J4	9.5	
EP-81	8/9/99	3.6	7.12	7.7	2830		3150	2169	6		9.3	81.9	176		77	389		21			465		1	U	1011	103		2.1		7.9	
EP-81	10/27/99	4.9	6.83	8.1	2750		2710	2090	16			71.4	180		93	340		14			428	J3	1	U,UJ3	959	135		1.4		8	
EP-81	1/28/00	3.5	7.09	7.7	3310		2930	2382	81			66.9	178		83	459		25			397		1	U	1216	242		2.7		6.7	J3
EP-81	5/2/00	5.2	7.05	7.5	3200		3190	2413	79		72.8	87.1	170		82	425		25			449		1	U	1127	204		2.2	UJ1,J3	7.8	
EP-81	8/9/00	3.5	7.15	7.8	3260		3720	2344	11		6.35	61.7	169		76	431		30			342		1	U	1189	235		2.6	J3	6.1	J3
EP-81	11/9/00	2.4	7.06	7.5	2800		3120	2154	6.7		4.42	63.3	156		72	323		18			473		1	U	965	113		2		10	
EP-81	2/16/01	2.6	7.08	8	2780		2720	2111	17		18.4	82.0	147		71	318		16			478		1	U	1026	107		1.7		10	
EP-81	5/14/01	4.8	7.09	7.8	2720		2780	2119	17		14.8	81.7	157		80	308		15			476		1	U	986	125		1.6		11	J4
EP-81	7/25/01	3.6	7.06	7.6	2900		2920	2204	1.7		7.5	75.6	165		82	433		24			464		1	U	1034	145		2		7.7	
EP-82	8/13/97	1.31	7.06	7.7	3980		3960	2948	7.3			73.9	151		74	693		21		362	442		1	U	1310	422		2.5		8.9	
EP-82	11/18/97	2.15	7.03	8	3250	UJ1	4070	2274	36	J4		71.4	91	UJ1	48	613	UJ1	17	UJ1		508		1	U	865	361	UJ1	2.7	UJ1	6.4	
EP-82	2/11/98	1.73	6.94	7.6	4320		5360	3099	5.4	J3		71.1	167		87	780		24			394		1	U	1311	500		2.3		9.1	
EP-82	5/14/98	0.67	7.12	7.6	4740		4780	3297	47			72.3	170		85	844		20			381		1	J3	1317	530		2.5		10	
EP-82	8/19/98	0.43	7.16	7.7	4880		5000	3826	12			74.1	158		81	889		27			390		1	U	1604	567		2.7		8.7	

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	Ca mg/l (Dissolved)		Mg mg/l (Dissolved)	Na mg/l (Dissolved)		K mg/l (Dissolved)		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-82	11/11/98	1.6	7.33	7.4	4880		4820	3614	14	J4		71.1	152		78	987		25			412		1	U	1629	568		2.8		9.5	
EP-82	2/18/99	0.5	7.28	7.6	4720		4770	3490	22			71.8	136		70	930		33			421		1	U	825	513		3		10	
EP-82	5/11/99	1.5	7.15	7.8	4870	J3	4970	3576	13			73.6	144		86	850		33			398	J3	1	U,UJ3	1050	520		3	J4	10	
EP-82	8/9/99	0.4	7.23	7.7	4490		4560	3217	7.2		7.9	74.3	118		69	877		24			476		1	U	1478	367		3.2		7.8	
EP-82	10/31/99		7.01	7.7	3600		3580	2369	1	U	1.6	72.0	72		43	624		19			522		1	U	872	392		3.2		6	
EP-82	1/27/00	0.3	7.12	8.1	4340		4140	3018	16		8.2	72.1	136		76	821		24			445		1	U	1326	440		2.6		11	J3
EP-82	5/2/00	0.9	7.11	7.5	4680		4700	3426	7		5.45	74.8	139		83	756		22			410		1	U	1428	531		2.7	UJ1,J3	9.9	
EP-82	8/9/00	0.6	7.37	8.3	2130		2380	1453	5		3.3	72.7	33		18	359		17			561		1	U	569	109		3.8	J3	2.5	J3
EP-82	11/9/00	0.9	7.11	7.6	4240		5290	3019	2.5		2.1	69.4	135		79	626		23			422		1	U	1210	447		2.4		8.6	
EP-82	2/15/01	1.1	7.11	7.4	3800		3750	2697	4.7		4.68	70.7	143		82	569		23			410		1	U	1176	396		2.2		6.9	
EP-82	5/14/01	1.6	7.23	8	4610		4290	3449	7.3		6.4	75.2	202		114	700		27			395		1	U	1563	609		2.3		9.8	J4
EP-82	7/25/01	0.2	7.12	7.6	4760		4620	3456	3		3.7	74.7	169		94	829		26			421		1	U	1347	592		2.2		8.2	
EP-83	8/13/97	5.75	7.47	8	3940		3960	2910	6			72.5	86		73	748		12		308	376		1	U	1382	359		2.9		8.2	
EP-83	11/18/97	4.42	7.36	8.2	3940	UJ1	4930	2741	112			71.2	76	UJ1	68	799		13	UJ1		415		1	U	1192	399	UJ1	2.8	UJ1	6.5	
EP-83	2/6/98	6.33	7.51	7.8	3720		4670	2660	8.1			75.0	73		66	735		12			361		1	U	1161	364		2.7		7.6	
EP-83	5/13/98	4.85	7.51	7.8	3840		3880	2558	4			72.5	71		64	763		5	U		359		1	U	1126	350		3.1		9.1	
EP-83	8/19/98	3.4	7.53	8	3930		4040	2847	1			71.4	69		63	758		8.6			376		1	U	1316	391		2.9		7.5	
EP-83	11/12/98		7.6	7.7	3680		3470	2641	17	J4		72.7	75		63	756		12			356		1	U	1200	353		2.7		7.9	
EP-83	2/22/99	6	7.58	7.8	3880		4510	2740	7			72.9	71		64	740		8.5			354		1	U	1040	347		3		8.3	J4
EP-83	2/22/99	5.8	7.57	7.8	3870		4510	2663	5.8			73.4	73		66	747		11			371		1	U	997	341		3.1		6.1	J4
EP-83	5/11/99	5.6	7.51	8	3710	J3	3850	2525	9.4			74.5	76		75	550		13			361	J3	1	U,UJ3	1156	205		3	J4	8.2	
EP-83	8/9/99	4.9	7.48	7.9	3870		3910	2725	6.2		6.8	71.8	71		65	717		10			354		1	U	1266	336		3.1		8	
EP-83	10/30/99		7.22	7.8	3900		3920	2562	102	J4		32.0	83		63	638		9.5			403		1	U	1280	443		3		7.1	
EP-83	10/30/99			7.8	3910			2642	79	J4		71.8	83		64	621		9.5			379		1	U	1172	392		3		6.8	
EP-83	1/27/00	5.8	7.47	8.3	3900		3710	2609	16		7.5	72.0	75		65	759		9.1			367		1	U	1284	396		3		9.8	J3
EP-83	1/27/00	5.7	7.46	8.2	3910		3710	2610	18			73.4	75		65	753		9.1			377		1	U	1215	385		3		9.9	J3
EP-83	5/1/00	5.5	7.45	7.9	3810		3730	2708	22		9.31	73.2	66		58	779		10			378		1	U	1182	356	J4	3.1	UJ1	7.3	
EP-83	8/9/00	5.4	7.5	8.3	3820		3830	2623	4.3		3	70.9	63		55	609		9.4			375		1	U	1297	362		3.1	J3	9.2	J3
EP-83	11/8/00	4.9	7.52	8	3850		4580	2704	1.4		2.6	70.5	62		56	670		8.3			383		1	U	1073	369		3		8.7	
EP-83	11/8/00	4.9	7.52	8	3840		4570	2699	1.2			71.8	63		58	679		8.4			371		1	U	1124	346		3		8.5	
EP-83	2/14/01	5.4	7.49	7.8	3800		3720	2564	4.4		4.2	75.7	57		50	592		7.8			384		1	U	1233	322		3		9.3	
EP-83	5/11/01	5	7.37	8	3700		3700	2596	16		7.43	73.6	70		62	664		8.9			417		1	U	1145	414		2.9		9.7	
EP-83	7/24/01	5.2	7.43	8.2	3760		3610	2560	7.3		7.25	76.3	63		58	722		10			365		1	U	1323	374	J4	3		9.3	
EP-84	8/13/97	3.33	7.39	7.9	1958		1908	1525	18			70.5	148		62	224		8.5		224	273		1	U	524	184		0.8		8.4	
EP-84	11/18/97	1.37	7.16	8.1	2650	UJ1	3260	1979	31	J4		65.5	201		96	264	UJ1	13	UJ1		284		1	U	826	326	UJ1	0.77	UJ1	7.2	
EP-84	2/6/98	1.35	7.18	7.4	2990		3470	2293	4.4			75.0	219		104	390		11			295		1	U	942	371		0.63		11	
EP-84	5/13/98	2.28	7.22	7.5	3040		3050	2087	8.1			75.7	208		99	335		5	U		298		1	U	916	346		0.69		10	
EP-84	8/19/98	1.97	7.25	7.8	2780		2820	2183	1	U		70.5	195		88	268		7.2			295		1	U	924	330		0.66		6.6	
EP-84	11/12/98		7.31	7.6	2980		2790	2204	10	J4		68.0	223		101	329		8.5			306		1	U	961	346		0.68		9.7	
EP-84	2/22/99	3.3	7.21	7.5	3070		3370	2276	3.1			73.4	212		103	345		5	U		301		1	U	687	326		0.69		9.3	J4
EP-84	5/11/99	2.9	7.23	7.9	3030	J3	3080	2174	3.5			80.6	220		117	370		12			303	J3	1	U,UJ3	838	329		0.7	J4	9.4	
EP-84	8/9/99	2.7	7.44	7.9	1838		1854	1288	4.5		5	73.6	126		56	195		6.2			229		1	U	506	157		0.9		6	
EP-84	10/30/99		6.88	7.4	3080		3070	2234	4	J4	6.45	68.5	198		95	292		7.7			318		1	U	872	393		0.66		7.1	
EP-84	1/27/00	0.8	7.12	8	3090		2920	2196	62		8.5	69.4	216		101	338		7.6			306		1	U	1013	367		0.66		11	J3
EP-84	5/1/00	1.9	7.05	7.6	3080		3030	2317	3		3.4	69.6	180		91	345		6.6			314		1	U	970	202	J4	0.66	UJ1	8.2	
EP-84	5/1/00	1.8	7.05	8.4	3070		3030	2279	2.2			74.7	184		91	317		7.2			305		12	J4	892	378	J4	0.66	UJ1	8.1	
EP-84	8/9/00	1.1	7.1	7.9	2880		2870	2124	2.2		4	74.8	166		77	245		6.9			303		1	U	941	283		0.65	J3	8.3	J3
EP-84	8/9/00	1.1	7.11	7.9	2860		2810	2136	2.2			66.9	176		82	269		6.6			301		1	U	997	310		0.69	J3	8.6	J3
EP-84	11/8/00	2.4	7.48	7.8	1546		1774	1058	14		9.8	67.8	82		37	161		4.3			223		1	U	373	109		0.91		4.8	

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		Mg mg/l	Na mg/l		K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-84	2/14/01	0.9	7.17	7.6	3000		2960	2192	3.8		3.4	72.1	189		92	318		7			317		1	U	961	199		0.67		10	
EP-84	5/11/01	1.7	7.14	8.1	3020		2920	2271	1	U	5.63	72.1	181		93	307		6.6			299		1	U	967	441		0.65		12	
EP-84	5/11/01	1.7	7.14	7.9	3020		2930	2270	1	U		77.4	184		94	317		6.8			303		1	U	873	373		0.66		11	
EP-84	7/24/01	4.5	7.14	8	2850		2750	2091	1	U	2.32	75.2	199		92	303		8.6			301		1	U	962	295	J4	0.64		8.1	
EP-85	8/13/97	0.32	7.33	8	2900		2890	2126	4.4			74.5	106		49	495		32		314	383		1	U	1034	193		3.6		7.3	
EP-85	11/17/97	0.35	7.3	8	2300		2950	1622	1.1			73.0	67		32	401		26			361		1	U	680	143		3.8		5.8	
EP-85	2/5/98	0.61	7.34	7.7	2600		3140	1882	7.9			73.8	89		43	431		30			356		1	U	840	179		3.4		7.5	
EP-85	5/14/98	0.52	7.39	7.7	2970		3010	2047	7.3			73.4	105		51	496		28			344		1	U	857	233		3.5		7.1	
EP-85	8/19/98	0.14	7.38	7.8	3240		3340	2432	1.8			32.0	112		55	550		29			364		1	U	1158	265		3.3		6.8	
EP-85	8/19/98			7.8	3250			2427	1.8			74.8	113		56	553		28			366		1	U	1145	264		3.2		6.7	
EP-85	11/11/98	1.5	7.51	7.7	2850		2800	2011	13	J4		73.9	93		45	502		28			379		1	U	1021	170		3.5		7.6	
EP-85	2/18/99	0.4	7.45	7.6	2770		2780	1998	7.3			73.6	91		42	483		34			366		1	U	584	193		3.7		7.2	
EP-85	2/18/99	0.4	7.45	7.7	2770		2780	1724	5.6			73.9	92		44	500		36			371		1	U	623	200		3.8		6.6	
EP-85	5/11/99	0.5	7.32	8	3070	J3	3120	2061	1	U		75.2	107		57	540		34			356	J3	1	U,UJ3	949	230		3.4	J4	6.8	
EP-85	8/9/99	0.5	7.38	7.8	3200		3230	2276	2.7		1.1	75.0	105		53	524		29			343		1	U	1119	224		3.7		6.7	
EP-85	8/9/99	0.5	7.38	7.8	3190		3220	2282	2.7			75.9	107		54	542		30			337		1	U	1106	216		3.7		7.7	
EP-85	10/27/99	0.5	7.15	8.1	2700		2700	1831	1.2		1.21	76.1	82		39	444		26			364	J3	1	U,UJ3	773	172		3.7		6.6	
EP-85	10/27/99	0.5	7.15	8.2	2700		2700	1821	1	U	1.42	74.3	84		41	458		27			370	J3	1	U,UJ3	742	173		3.7		5.8	
EP-85	1/28/00	0.2	7.31	7.9	3000		2870	1448	1.9			73.9	96		47	520		27			399		1	U	948	219		3.3		6.4	J3
EP-85	5/2/00	0.7	7.3	7.2	3220		3230	2276	1	U	1.79	73.9	94		48	504		25			348		1	U	968	282		3.1	UJ1,J3	6.6	
EP-85	5/2/00	0.6	7.3	7.7	3220		3230	2249	1	U		76.6	96		50	515		25			386		1	U	984	259		3.2	UJ1,J3	7.4	
EP-85	8/9/00	1	7.35	8.1	2620		2920	1784	15		6.5	73.2	65		31	387		25			403		1	U	765	164		3.7	J3	8.4	J3
EP-85	11/9/00	0.6	7.33	8	2590		3250	1803	3.1		2.3	73.8	73		35	413		24			366		1	U	697	146		3.7		5.4	J4
EP-85	11/9/00	0.6	7.33	8.4	2580		3260	1805	3.2			72.0	70		34	387		23			355		1.2		761	157		3.7		6.7	J4
EP-85	2/16/01	0.5	7.37	8	2760		2660	1926	3		4.7	72.1	85		41	411		26			356		1	U	849	191		3.3		7.5	
EP-85	2/16/01	0.4	7.37	8.2	2760		2660	1928	4.4			74.7	80		38	386		24			344		1	U	850	199		3.3		7.6	
EP-85	5/14/01	0.9	7.43	7.9	3180		3090	2259	2.8		4.9	74.8	118		58	487		29			366		1	U	1280	323		3		8.8	J4
EP-85	7/25/01	0.1	7.43	7.8	3190		3130	2209	1	U	0.9	75.6	104		52	546		30			377		1	U	1061	273		3.1		8.7	
EP-86	8/13/97	7.68	7.63	8	2630		2610	1780	78			70.9	46		33	493		11		292	356		1	U	658	285		2.8		6.6	
EP-86	11/18/97	5.56	7.54	8.3	2650	UJ1	3240	1758	182			72.1	42	UJ1	32	519	UJ1	10	UJ1		415		1	U	664	291	UJ1	2.7	UJ1	5.9	
EP-86	2/6/98	6	7.53	7.8	2640		3300	1812	201			72.0	41		33	497		12			383		1	U	679	287		2.5		5.8	
EP-86	5/14/98	8.01	7.7	7.9	2640		2670	1628	61			72.3	40		30	507		5	U		346		1	U	599	274		2.8		5.6	
EP-86	8/19/98	7.66	7.67	8.1	2660		2690	1823	4			70.5	40		31	501		7.7			351		1	U	782	275		2.7		5.8	
EP-86	11/12/98		7.45	7.9	2640		2480	1762	183	J4		32.0	43		33	522		10			414		1	U	647	271		2.7		6.8	
EP-86	11/12/98			7.9	2640			1751	146	J4		71.8	43		32	531		11			366		1	U	640	271		2.8		6.6	
EP-86	2/18/99	6.5	7.74	7.9	2600		2600	1759	42			74.5	40		28	516		12			355		1	U	390	250		2.8		6.2	
EP-86	5/11/99	8.7	7.69	8.2	2570	J3	2600	1689	12			73.2	42		33	520		8.8			354	J3	1	U,UJ3	622	224		2.6	J4	5.6	
EP-86	8/9/99	6.9	7.66	8.1	2600		2600	1716	15		7.9	71.6	42		32	490		9.2			331		1	U	652	228		2.7		5.8	
EP-86	10/31/99		7.34	7.9	2640		2620	1687	11		5.41	32.0	39		29	452		8.5			366		1	U	550	351		2.7		4.9	
EP-86	10/31/99			8	2650			1665	8.8			70.9	39		30	452		8.6			355		1	U	575	309		2.7		4.9	
EP-86	1/27/00	7.5	7.58	8.2	2640		2520	1626	28		16.5	71.8	45		32	517		8.4			355		1	U	600	304		2.7		8.2	J3
EP-86	5/2/00	7.3	7.57	8	2630		2630	1739	10		8.25	74.8	38		28	436		7.6			366		1	U	625	248		2.8	UJ1,J3	6.2	
EP-86	8/9/00	8.7	7.6	8.6	2600		2910	1652	8.8		4.95	69.6	38		27	425		12			301		20		675	271		2.6	J3	6.3	J3
EP-86	11/9/00	7.5	7.58	8.5	2640		3160	1745	8.2		7.6	70.7	35		26	454		7.6			322		17		645	275		2.7		6.4	J4
EP-86	2/15/01	7.6	7.55	7.9	2610		2530	1658	15		6.5	70.7	34		25	408		7.2			346		1	U	665	256		2.6		6.7	
EP-86	2/15/01	7.7	7.55	7.8	2530		2530	1670	6.4			72.5	37		28	460		8			351		1	U	672	260		2.6		6.8	
EP-86	5/14/01	10.6	7.77	8.1	2650		2490	1767	20		6.69	73.8	47		34	469		8.9			351		1	U	680	304		2.6		6.3	J4
EP-86	7/25/01	7.7	7.7	8.1	2620		2530	1702	7.9		7	73.8	38		30	500		9.1			351		1	U	679	258		2.6		7	
EP-86	7/25/01	7.7	7.7	8	2630		2520	1695	9.1			32.0	37		29	496		8.8			349		1	U	636	297		2.6		6.6	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab		SC umhos/cm Field		TDS mg/l		TSS mg/l		Turb. NTU	Temp oF	DISSOLVED Ca mg/l		DISSOLVED Mg mg/l	DISSOLVED Na mg/l		DISSOLVED K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-87	9/15/97				7.5	546				365		20			68.0	72		17	18		5		232	283		1	U	41	7.6		0.47		1.5	
EP-87	11/18/97	4.7		7.49	8.2	560	UJ1	685		361	UJ1	1	U		75.9	66	UJ1	24	16	UJ1	2	U		289		1	U	39	12	UJ1	0.59	UJ1	2.2	
EP-87	8/10/99	3.4		7.34	7.8	666		688		405		458			77.2	77		26	23		5	U		537		1	U	48	15		0.64	J4	0.77	J4
EP-88	8/12/97	0.73		7.35	8.4	5150		5370		3679		438			74.3	68		46	1145		8.8		442	527		6		1790	483		2.3		1.7	
EP-88	11/11/97	0.43		7.41	7.9	5240		5980		3700		72			72.5	57		39	1323		4.9			540		1	U	1787	471		2.2		1	
EP-88	2/12/98	1.53		7.24	7.8	5320		6600		3946		60	J3		76.6	59		38	1344		6.9			339		1	U	1669	448		1.9		0.81	
EP-88	5/11/98	1.21		7.6	8	5370		5860		4085		205			77.5	54		35	1366		10			590		1	U	1848	425		2.2		0.95	
EP-88	8/17/98	0.85		7.31	7.7	5400		5460		3832		32			71.4	55		35	1359		15			614		1	U	1711	468		2.2		0.9	
EP-88	11/11/98	4.9		7.4	7.6	4940		4710		3660		16	J4		72.3	75		45	1184		8.5			501		1	U	1633	416		2.1		2.2	
EP-88	2/11/99	1.3		7.53	8.2	5350		5360		3822		143			76.1	50		31	1060		9			655		1	U	1720	454		2.4		0.51	
EP-88	5/7/99	0.9		7.34	7.9	5340		5810		3800		90			76.8	57		39	1139		10			572		1	U	1677	426		2.2		2.3	J4
EP-88	8/5/99	4.4		7.34	8.1	5070		5930		3742		61		18	75.0	59		37	1031		6.7			500		1	U	1865	407		2.2		1.7	
EP-88	10/30/99			7.13	7.7	5300		5360		3576		17	J4	7.33	73.9	60		38	932		6.7			595		1	U	1726	493		2.2		2.4	
EP-88	1/26/00	2.3		7.4	8.6	5220		4970		3560		29		17.3	73.9	74		49	1036		7.8			522		19.2	J4	1732	493		2.1		3.1	J3
EP-88	1/26/00	1.7		7.41	8.2	5230		5180		3462		30			76.1	76		49	1096		8			567		1	U,UJ4	1645	460		2.1		3	J3
EP-88	4/28/00	0		7.4	7.9	5180		5040		3772		50		46	80.4	61		37	1090		6.2			569		1	U	1813	452		2	UJ1	1.8	
EP-88	8/4/00	0.6		7.24	8.1	5290		5220		3705		3.4		3.5	73.6	54		34	1000		3.9			609		1	U	1633	292		2.1		2.8	
EP-88	11/7/00	0.3		7.32	8	5240		6010		3643		6.4		5.35	73.2	56		35	1029		8.2			628		1	U	1509	434		2.1		13	
EP-88	2/14/01	1.1		7.41	7.8	4900		4800		3406		33		39	79.0	67		45	875		6.3			542		1	U	1778	345		2		5.4	
EP-88	5/9/01	0.8		7.42	8.2	5080		4970		3575		3	J4	3.8	78.4	59		40	1042		8.6			594		1	U	1919	439		2.1		3.5	
EP-88	7/19/01	0.3		7.29	8.1	4860		4710		3465		30	J4	34.6	78.3	74		53	1000		6.6			495		1	U	1604	446		1.9		5.3	J4
EP-89	8/12/97	5.34		7.04	7.9	2780		2800		2085		5.4			74.5	175		68	379		21		224	273		1	U	859	308		0.77		8.3	
EP-89	11/13/97	3.98		7.12	7.4	2770		3350		1956		2.9	J4		75.7	157		62	350		20			281		1	U	777	356		0.72		9	J4
EP-89	2/11/98	4.09		7	7.7	2770		3600		1995		5.8	J3		75.9	165		65	378		20			266		1	U	747	314		0.7		9.8	
EP-89	5/13/98	4.05		7.29	7.7	2780		2770		1814		2.2			75.7	155		62	360		15			264		1	U	797	336		0.77		7.7	
EP-89	8/13/98	3.55		7.17	7.9	2840		2810		2144		2			74.8	177		70	433		22			278		1	U	840	338		0.72	J4	8.1	
EP-89	11/10/98	5.3		7.19	7.5	2860		2830		2067		4			76.3	170		67	387		20			272		1	U	860	336		0.76		8.2	
EP-89	2/10/99	3.7		7.32	8	2770		2810		1978		7.5			75.7	167		67	330		19			256		1	U	686	292		0.79		7.6	
EP-89	5/7/99	4.2		7.17	7.8	2790		2990		1941		3			74.8	154		63	378		45			264		1	U	818	294		0.76		7.1	J4
EP-89	8/5/99			7.24	7.9	2850		3220		2030		2.5		4.5	74.8	169		68	326		19			259		1	U	763	326		0.77		9.8	
EP-89	8/5/99			7.24	8	2860		3220		2045		8.1			75.6	168		67	368		18			261		1	U	811	316		0.8		9.4	
EP-89	10/28/99	2.8		6.92	8.1	2880		2580		2022		4.1		4.8	75.6	171		66	357		18			244	J3	1	U,UJ3	832	351		0.72		7.6	
EP-89	10/28/99	2.8		6.92	8.1	2880		2580		2016		5.2		4.76	74.5	175		70	365		18			277	J3	1	U,UJ3	838	345		0.71		7.3	
EP-89	1/24/00	3.5		7.14	7.9	2810		2750		1948		3.2		2.75	76.3	145		59	365		17			268		1	U	824	300		0.75		9.2	
EP-89	4/25/00	3.7		7.22	7.8	2800		2800		1984		3		2.1	76.5	149		60	330		16			273		1	U	886	304		0.75	UJ1	7.8	
EP-89	4/25/00	3.7		7.22	7.7	2840		2800		1982		2.8			76.6	144		59	319		15			271		1	U	882	320		0.74	UJ1	7.9	
EP-89	8/2/00	3.4		7.15	8.1	2900		2870		1995		2		2.41	75.6	139		55	350		16			278		1	U	796	334		0.77		7.9	
EP-89	10/31/00	3.2		7.17	8	2910		2810		1984		2		2.1	75.6	148	J4	57	414		16			272		1	U	900	337		0.78		7.8	
EP-89	10/31/00	3.1		7.17	8	2910		2820		1973		2.5		2.1	74.3	167	J4	65	381		17			272		1	U	883	336		0.75		8.6	
EP-89	2/8/01	4.5		7.14	7.7	2900		2800		2000		1.2		2.52	75.4	149		61	364		16			282		1	U	901	316		0.72		9.2	
EP-89	5/7/01	5.4	J4	7.21	8.2	2880		2820		2034		2.6		4	75.6	156		61	359		18			203		1	U	901	359		0.75		9.1	
EP-89	5/7/01	4.3	J4	7.22	8.2	2860		2820		2029		1.8			76.5	163		64	366		19			253		1	U	901	353		0.75		8.2	
EP-89	7/17/01	3.2		7.16	8	2930		2860		2092		2.3	J4	0.98	77.5	167		67	382		18			268		1	U	772	381		0.73		9.2	
EP-9	5/7/98	1.12		7.1	8.1	2650		3220		1750		6.4			71.8	55		23	534		18			218		1	U	729	265		2.3		12	
EP-90	12/12/97	0		7.41	8.1	2920		3700		2138		1058			75.7	102		49	588		11			398		1	U	908	281		0.56		10	
EP-90	2/17/98	5.13		7.12	7.8	2950		3920		2132		129			77.4	117		58	510		9			298		1	U	832	316		0.51		14	
EP-90	5/13/98	3.68		7.39	7.8	2900		2740		1930		74			79.9	120		55	461		5	U		283		1	U	828	315		0.6		12	
EP-90	8/17/98	1.91		7.42	7.8	2380		2390		1654		7.8			72.3	75		36	421		8.1			268		1	U	637	234		0.76		8.3	
EP-90	11/5/98	1.7		7.43	7.6	2660		512	R	1807		38			73.9	88		43	419		7.8			287		1	U	732	244		0.69		11	

Cummulative List of Groundwater Quality Results (General Chemistry)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l		PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l		Turb. NTU		Temp oF	DISSOLVED Ca mg/l	Mg mg/l	Na mg/l	K mg/l		CaCO3 mg/l	HCO3 mg/l		CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-90	2/11/99	1.2		7.41	7.9	3340	3320	2434	260				79.5	132	67	500	10			299		1	U	808	321		0.65		12	
EP-90	5/10/99	4.4		7.01	7.7	4090	4360	3026	21				77.7	184	100	665	13			281		1	U	1202	377	J4	0.58		32	
EP-90	8/5/99	1.1		7.19	7.8	4960	4960	3789	186		25.5		76.5	191	100	687	10			331		1	U	1834	480		0.56		38	
EP-90	10/30/99			6.92	7.6	4660	4680	3464	9.7	J4	7.91		74.8	193	101	680	9.8			311		1	U	1551	532		0.54		28	
EP-90	1/24/00	0.5		7.17	7.8	5340	5010	3948	236		45.2		76.6	204	106	756	11			345		1	U	2045	494		0.48		33	
EP-90	4/26/00	0.6	J4	7.11	7.8	5160	5160	3930	199		17		77.2	216	113	735	10			371		1	U	2024	549		0.49	UJ1	34	
EP-90	8/4/00	0.3		6.99	8.1	5030	5020	3853	133		61		77.2	219	106	712	8.3			343		1	U	1953	500		0.5		29	
EP-90	11/3/00	0.4		7.11	7.6	5330	5990	4138	39	J4	19.5		77.2	242	116	832	14			338		1	U	1594	469		0.49		38	
EP-90	11/3/00	0.5		7.1	7.7	5360	5990	4143	100	J4			75.2	232	113	884	14			336		1	U	1727	486		0.5		33	
EP-90	2/12/01	0.3		7.11	7.7	5660	5380	4494	44		52.7		76.6	256	134	885	10			366		1	U	2043	538		0.44		40	
EP-90	5/8/01	0.8		7.1	7.9	5840	5780	4694	235		36.2		76.1	287	145	996	16			406		1	U	2632	544		0.51		38	
EP-90	7/19/01	0.9		6.95	7.8	5560	5420	4384	103	J4	194		76.1	249	131	938	11			382		1	U	2340	467		0.52		25	J4
EP-90	7/19/01	0.8		6.96	7.9	5580	5400	4398	151	J4			71.1	257	135	975	11			383		1	U	2419	511		0.51		35	J4
EP-93	10/13/99	4.6		7.33	7.7	5100	5180	3728	1251				70.2	143	86	1005	19			942		1	U	1252	602		1.9		11	
EP-93	1/27/00	3.4		7.31	8.1	5210	4890	3560	1868		200	>	74.5	418	149	1090	24			1301		1	U	1455	670		1.7		9.5	J3
EP-93	5/1/00	3.2		7.16	7.7	3740	4050	2680	367		59.2		78.3	85	58	718	9.2			544		1	U	936	399	J4	1.4	UJ1	4.9	
EP-93	8/9/00	2.9		7.19	8.1	4840	4680	3351	337		16.5		69.3	116	73	850	12			756		1	U	1118	448		1.7	J3	8.2	J3
EP-93	11/8/00	3.5		7.28	7.7	4900	5746	3449	232		112		72.5	91	67	895	8.8			712		1	U	1225	469		1.8		8.1	
EP-93	2/14/01	3.2		7.21	7.8	4680	4520	3222	216		34.8		82.8	82	63	823	8.7			664		1	U	1397	457		1.7		7.3	
EP-93	5/11/01	3.2		7.14	7.9	4560	4870	3208	188		108		85.6	93	72	866	9.4			728		1	U	1227	555		1.7		9.7	
EP-93	7/24/01	4.1		7.19	8	4610	4290	3196	117		217		75.4	62	58	887	8.8			628		1	U	1355	517	J4	1.7		5.8	
EP-94	10/13/99	5.9		7.18	7.6	5040	5110	3609	94				70.3	134	117	928	21			436		1	U	1290	655		1.3		14	
EP-94	1/27/00	2		7.31	8	4870	4580	3275	14		7.7		73.8	123	111	811	14			387		1	U	1448	668		1.3		7.9	J3
EP-94	5/1/00	3.4		7.24	7.7	4900	4800	3468	13		8.75		75.9	99	97	839	12			406		1	U	1380	560	J4	1.2	UJ1	10	
EP-94	8/9/00	4.2		7.25	8	4910	4870	3391	1.2		3.7		71.4	100	96	725	13			400		1	U	1411	554		1.3	J3	15	J3
EP-94	11/8/00	4.1		7.3	7.9	4800	5770	3410	3		2.45		72.1	98	98	799	12			390		1	U	1254	577		1.3		13	
EP-94	2/14/01	4.6		7.29	7.5	4720	4720	3363	7.1		4.45		75.9	99	98	761	11			569		1	U	1543	571		1.3		11	
EP-94	5/11/01	4		7.21	8	4660	4090	3368	8.7		9.32		75.6	102	103	747	12			398		1	U	1431	592		1.2		13	
EP-94	7/24/01	3.9		7.22	8.1	4820	4600	3431	1	U	8.81		77.9	102	103	870	16			418		1	U	1674	647		1.2		13	
EP-95	10/26/99			6.67	8.3	3340	3110	2200	26	J4			70.7	48	63	582	4.9			377	J3,J4	1	U,UJ3	817	336		3.4		7.8	
EP-95	1/27/00	6		7.66	8.3	3380	3200	2187	2.7		3.2		70.9	44	65	625	5	U		367		1	U	972	332		3.7		9.6	J3
EP-95	5/1/00	4.1		7.65	8.3	3300	3250	2229	2.5		2.22		71.6	37	60	575	2.8			388		1	U	806	380	J4	3.5	UJ1	7.7	
EP-95	8/9/00	5.1		7.67	8.3	3220	3240	2127	2.8		3.7		70.3	35	57	481	2.7			372		1	U	859	355		4	J3	9.2	J3
EP-95	11/8/00	4.7		7.7	8.1	3240	3820	2192	1	U	1.6		71.4	34	58	554	2.4			386		1	U	813	355		3.7		8.9	
EP-95	2/14/01	4.7		7.66	7.4	3120	3060	2065	1.4		2.5		72.1	34	56	529	2	U		390		1	U	825	338		3.9		8.2	
EP-95	5/11/01	5.5		7.62	8.3	3140	2900	2109	1.4		1.6		71.1	34	58	531	5	U		371		1	U	811	399		3.8		10	
EP-95	7/24/01	6.9		7.53	8.2	3280	3150	2185	1	U	1.9		71.1	36	61	610	4.8			354		1	U	853	395	J4	3.7		8.6	
EP-95	7/24/01	6.8		7.53	8.2	3280	3150	2159	1	U			69.4	37	60	615	5.4			356		1	U	930	301	J4	3.6		8	
EP-96	10/13/99	6.6		7.27	7.7	4960	5090	3692	349				70.0	257	118	874	24			561		1	U	1416	573		1.1		15	
EP-96	1/27/00	3.8		7.21	8	4930	4680	3450	341		200	>	73.8	222	116	934	16			647		1	U	1577	493		1		15	J3
EP-96	5/1/00	4.2		7.17	7.8	4780	4690	3514	438		190		76.1	162	93	791	13			527		1	U	1361	465	J4	1.1	UJ1	11	
EP-96	8/9/00	6.1		7.19	8	4780	4700	3366	307		69.3		71.2	140	84	681	12			500		1	U	1388	454		1	J3	17	J3
EP-96	11/8/00	4.1		7.24	7.8	4780	5750	3436	217		72		74.3	133	86	792	12			605		1	U	1364	455		1.1		12	
EP-96	2/14/01	4.3		7.19	7.6	4600	4540	3200	103		17.5		81.9	107	77	694	11			498		1	U	1497	485		1.1		13	
EP-96	5/11/01	4.1		7.14	7.9	4680	5010	3437	59		45.3		78.8	131	98	828	13			471		1	U	1329	545		1.1		16	
EP-96	7/24/01	7.1		7.15	8.1	4560	4444	3258	231		45.1		63.9	108	84	819	13			453		1	U	1610	511	J4	1.1		13	
EP-97	10/18/99	6.8		7.16	7.8	4940	5030	3689	42				49.6	198	123	847	15			599		1	U	1310	545		1.5		0.37	
EP-97	1/27/00	1		7.36	8.1	5020	4880	3584	169		77		68.5	187	128	851	8.8			627		1	U	1679	609		1.1		0.46	UJ1,J3
EP-97	5/1/00	3.1		7.36	7.8	5350	5170	3928	50		31.1		83.5	142	109	941	8.2			644		1	U	1345	530	J4	1.3	UJ1	0.28	UJ1

Appe

Cummulative List of Groundwater Quality Results (General Chemistry)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Date	DO mg/l	PH Field	PH Lab	SC umhos/cm Lab	SC umhos/cm Field	TDS mg/l	TSS mg/l	Turb. NTU	Temp oF	DISSOLVED Ca mg/l	DISSOLVED Mg mg/l	DISSOLVED Na mg/l	DISSOLVED K mg/l	CaCO3 mg/l	HCO3 mg/l	CO3 mg/l		SO4 mg/l	Cl mg/l		F mg/l		N mg/l	
EP-97	8/9/00	4.5	7.01	8	4040	4190	2817	7.5	3.2	57.9	108	72	663	11		659	1	U	947	348		1.4	J3	0.07	UJ1,J3
EP-97	11/8/00	1.2	7.55	7.9	3480	3440	2458	208	52	70.5	96	60	548	6.2		510	1	U	975	284		1.4		0.05	U
EP-97	2/14/01	1.7	7.49	7.8	5260	6160	3786	188	5	58.6	149	104	807	7.1		695	1	U	1560	513		1.3		0.44	
EP-97	5/14/01	9.1	7.45	8.1	5140	4590	3771	1029	61	82.2	206	126	866	14		756	1	U	1610	607		1.5		0.27	J4
EP-97	7/24/01	6.6	7.09	7.8	5440	5260	4039	15	19	71.1	154	109	973	10		500	1	U	2035	548	J4	1.7		3	
EP-98	10/18/99	4.9	7.66	8.1	6370	6930	4659	235		71.6	162	92	1290	134		467	1	U	2293	571		2.7		12	
EP-98	1/27/00	2.6	7.72	8.1	7370	6960	5153	162	150	75.2	112	78	1715	116		470	1	U	2867	559		3.4		18	J3
EP-98	5/1/00	3.4	7.55	8	7880	7680	6035	22	20.2	80.1	79	69	1802	148		471	1	U	3432	550	J4	4.8		11	
EP-98	8/9/00	2.8	7.44	8.3	6460	7140	4548	14	7.8	72.7	73	67	1008	90		432	1	U	2168	684		2.5	J3	11	J3
EP-98	11/8/00	4.5	7.5	8	5880	7120	4212	6.1	5.26	70.5	71	68	1036	87		439	1	U	1841	580		2.2		12	
EP-98	2/14/01	1.7	7.49	8	6230	6160	4547	12	5	72.7	72	66	1057	87		439	1	U	2063	488		2.7		14	
EP-98	5/14/01	2.7	7.61	8.4	7080	6690	5320	10	9.03	72.5	96	87	1385	149		422	16	J4	2669	712		3.7		14	J4
EP-98	5/14/01	2.6	7.61	8.3	7080	6700	5391	14		80.4	82	75	1405	153		458	1	U	2604	694		3.8		18	J4
EP-98	7/24/01	2.5	7.4	8.1	6210	5940	4539	2	1.84	70.7	81	77	1255	96		416	1	U	2380	584		2.7		12	
EP-99	10/18/99	9.1	7.03	7.6	5600	5660	4758	473		77.9	387	156	713	75		451	1	U	2587	354		3		68	
EP-99	8/9/00	1.5	7.07	7.6	5830	5840	4783	18	9.8	71.4	323	112	676	91		365	1	U	2274	358		3.6	J3	80	J3
EP-99	11/8/00	1.9	7.25	7.7	5460	6500	4541	43	5.96	67.5	392	139	727	87		370	1	U	2093	304		2.4		75	
EP-99	2/22/01	2.8	7.3	7.9	5110	4960	4192	365	4.2	32.0	281	106	646	60		476	1	U	2232	324		3.4		64	
EP-99	5/9/01									32.0															
EP-99	7/26/01																								

Note:

J The associated numerical value is an estimated quantity because quality control criteria were not met

J2 calibration range exceeded or significant deviation from known values. Possible bias.

J3 Holding time not met. Indicates low bias.

J4 Other QC outside control limits

U Undetected. Below method detection limits.

UJ The material was analyzed for, but was not detected above the associated value.

UJ1 Blank contamination. Indicates possible high bias and/or false positive.

UJ2 Calibration range exceeded or significant deviation from known value.

UJ3 Holding times not met. Indicates low bias.

UJ4 Other QC outside control limits.

R Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.

A Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code).

APPENDIX E

CUMULATIVE LIST OF GROUNDWATER QUALITY RESULTS (METAL ANALYSIS)

APPENDIX E

CUMULATIVE LIST OF GROUNDWATER QUALITY RESULTS (METAL ANALYSIS)

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l		As T mg/l		Cd Dis mg/l		Cd T mg/l		Cr Dis mg/l		Cr T mg/l		Cu Dis mg/l		Cu T mg/l		Fe Dis mg/l		Fe T mg/l		Pb Dis mg/l		Pb T mg/l		Se Dis mg/l		Se T mg/l		Zn Dis mg/l		Zn T mg/l	
EM-1	8/13/97	0.011				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.017				0.029			
EM-1	11/17/97	0.007				0.005	U			0.005	U			0.025	U			0.1	U			0.003	U			0.005	U			0.02	U		
EM-1	2/19/98	0.056				0.005	U			0.01	U			0.025	U			0.1	U,UJ4			0.003	U			0.005	U			0.02	U,UJ4		
EM-1	5/18/98	0.005	U			0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.02			
EM-1	8/20/98	0.005	U			0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.033			
EM-1	11/18/98	0.007				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.018				0.02			
EM-1	2/24/99	0.005	U			0.005	U			0.01	U			0.025	U			0.15				0.003	U			0.005	U			0.02	U		
EM-1	5/12/99	0.005	U			0.005	U			0.01	U			0.025	U			0.1				0.003	U			0.008				0.029			
EM-1	8/11/99	0.005	U	0.005	U	0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	0.27		0.23	J4	0.003	U	0.007		0.005	U	0.005	U	0.033	UJ1	0.042	
EM-1	10/30/99			0.005	U			0.005	U			0.01	U			0.025	U			0.59	J2			0.004				0.005	U			0.02	U
EM-1	1/31/00			0.005	U			0.005	U			0.01	U			0.025	U			0.84				0.003				0.007				0.02	U
EM-1	5/4/00			0.005	U			0.005	U			0.01	U			0.025	U			3.1	J4			0.011				0.005	U			0.023	UJ1
EM-1	8/16/00			0.005	U,UJ4			0.005	U			0.01	U			0.025	U			0.52				0.015				0.005	U,UJ4			0.023	J4
EM-1	11/14/00			0.005	U			0.005	U			0.01	U			0.025	U			2.2				0.009				0.007				0.031	J4, UJ1
EM-1	2/22/01			0.005	U			0.005	U			0.01	U			0.025	U			0.37	J4			0.003	U			0.005	U			0.02	U
EM-1	2/22/01			0.005	U			0.005	U			0.01	U			0.025	U			0.48	J4			0.003	U			0.005	U			0.023	
EM-1	5/16/01			0.005	U			0.005	U			0.01	U			0.025	U			3.5	J4			0.007				0.005	U			0.02	U
EM-1	7/31/01	0.005	U	0.005	U	0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	0.54		2.4		0.003	U	0.008		0.005	U	0.005	U	0.02	U,UJ4	0.026	J4
EM-1	7/31/01	0.005	U	0.005	U	0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	0.56		2.6		0.003	U	0.009		0.005	U	0.005	U	0.02	U,UJ4	0.025	J4
EM-2	8/11/97																																
EM-2	8/26/97	0.84				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.16				0.025			
EM-2	11/17/97	0.57				0.005	U			0.005	U			0.025	U			0.1	U			0.003	U			0.11				0.023			
EM-2	2/17/98	0.55				0.005	U			0.01	U			0.025	U			0.1	U,UJ4			0.003	U			0.12				0.02	U,UJ4		
EM-2	5/18/98	0.58				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.13				0.02	U		
EM-2	8/13/98	0.68				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.13				0.031			
EM-2	11/11/98	0.54				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.12				0.085			
EM-2	2/22/99	0.45				0.007				0.01	U			0.025	U			0.1	U			0.003	U			0.1				0.043			
EM-2	5/10/99	0.95				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.11				0.033	J4		
EM-2	8/6/99	2.1		1.9		0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.03		0.1	U	2.4		0.003	U	0.013		0.12		0.11		0.034		0.038	
EM-2	10/29/99			1.4				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.17				0.02	U
EM-2	1/25/00			1				0.005	U			0.01	U			0.025	U			1.2	J4			0.019	UJ1			0.12				0.02	U
EM-2	4/26/00			0.8				0.005	U			0.01	U			0.025	U			0.23				0.004				0.12				0.023	
EM-2	8/3/00			0.68				0.005	U			0.01	U			0.025	U			0.61				0.008				0.098				0.02	U
EM-2	11/1/00			0.56				0.005	U			0.01	U			0.025	U			0.94				0.004				0.1				0.049	UJ1
EM-2	2/9/01			0.57				0.005	U			0.01	U			0.025	U			0.48				0.003				0.13	J4			0.051	
EM-2	5/8/01			0.83				0.005	U			0.01	U			0.025	U			0.16				0.003	U			0.13	J4			0.079	
EM-2	5/8/01			0.88				0.005	U			0.01	U			0.025	U			0.14				0.003	U			0.13	J4			0.083	
EM-2	7/18/01	0.99		1.1		0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	0.1	U	0.26		0.003	U	0.006	UJ1	0.11		0.11		0.032		0.04	
EM-4	8/11/97																																
EM-4	8/26/97	0.009				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.011				0.031			
EM-4	11/17/97	0.005	U			0.005	U			0.005	U			0.025	U			0.1	U			0.003	U			0.005	U			0.02	U		
EM-4	2/17/98	0.009				0.008				0.01	U			0.025	U			0.1	U,UJ4			0.003	U			0.005	U			0.02	U,UJ4		
EM-4	5/18/98	0.019				0.005	U			0.01	U			0.071				0.1	U			0.003	U			0.005	U			0.032			
EM-4	8/13/98	0.01				0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.028			
EM-4	11/11/98	0.005	U			0.009				0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.13			
EM-4	2/22/99	0.005	U			0.006				0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.059			
EM-4	5/10/99	0.005	U			0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.031	J4		
EM-4	5/10/99	0.005	U			0.005	U			0.01	U			0.025	U			0.1	U			0.003	U			0.005	U			0.035	J4		
EM-4	8/6/99	0.009	J4	0.007		0.005	U	0.005	U	0.01	U	0.01	U	0.025	U	0.025	U	0.1	U	0.18		0.003	U	0.003		0.005	U	0.005	U	0.033		0.022	
EM-4	10/29/99			0.012				0.005	U			0.01	U			0.025	U			0.1	U			0.004				0.005	U			0.037	
EM-4	1/25/00			0.005	U			0.005	U			0.01	U			0.025	U			0.1	U,UJ4			0.007	UJ1			0.005	U			0.021	

Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EM-4	4/26/00		0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.023
EM-4	4/26/00		0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.021
EM-4	8/3/00		0.005 U		0.005 U		0.01 U		0.025 U		0.12		0.005 U		0.006 UJ1		0.02 U
EM-4	11/1/00		0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.006		0.057 UJ1
EM-4	2/9/01		0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U,UJ4		0.069
EM-4	5/7/01		0.005		0.005 U		0.01 U		0.029		0.15		0.003 U		0.005 U		0.095
EM-4	7/18/01	0.019	0.024	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.005 U	0.005 U	0.039	0.045
EM-5	8/11/97																
EM-5	8/26/97	1.6		0.08		0.01 U		0.046		0.55		0.01		0.027		0.31	
EM-5	11/17/97	1.7		0.069		0.005 U		0.025 U		1.8		0.006		0.009		0.31	
EM-5	2/17/98	1.6		0.066		0.01 U		0.03		2.4		0.009		0.012		0.38	
EM-5	5/18/98	1.7		0.017		0.01 U		0.025		1.3		0.005		0.013		0.17	
EM-5	8/17/98	1.8		0.055		0.01 U		0.044		0.49		0.003		0.005 U		0.17	
EM-5	11/11/98	2		0.081		0.01 U		0.028		1		0.003 U		0.005 U		0.3	
EM-5	2/11/99	1.9		0.046		0.01 U		0.025 U		1.2		0.003		0.007		0.27	
EM-5	2/11/99	1.9		0.046		0.01 U		0.025 U		1.2		0.003		0.006		0.27	
EM-5	5/10/99	2.2		0.009		0.01 U		0.025 U		1.5		0.003		0.005 U		0.1 J4	
EM-5	8/6/99	2.4	2.3	0.016	0.017	0.01 U	0.01 U	0.025 U	0.025 U	0.64	0.72	0.003 U	0.003	0.008	0.007	0.11	0.11
EM-5	11/2/99		2.4		0.005		0.01 U		0.025 U		0.87 J2		0.006		0.005 U		0.061
EM-5	11/2/99		2.3		0.006		0.01 U		0.025 U		0.83 J2		0.009		0.005 U		0.063
EM-5	1/25/00		2.6		0.016		0.01 U		0.025 U		0.53 J4		0.012 UJ1		0.006		0.072
EM-5	4/26/00		2.3		0.009		0.01 U		0.028		0.6		0.013		0.005 U		0.062
EM-5	8/4/00		1.6		0.006		0.01 U		0.025 U		0.83		0.013		0.005 U		0.059
EM-5	11/3/00		1.7		0.008		0.01 U		0.025 U		0.94		0.006		0.005 U		0.076 UJ1
EM-5	2/14/01		1.8		0.009		0.01 U		0.025 U		1.2		0.008		0.005 U		0.11
EM-5	5/9/01		1.5		0.005 U		0.01 U		0.025 U		1.4		0.005		0.005 U		0.1
EM-5	7/19/01	1.5	1.5	0.005 U	0.006	0.01 U	0.01 U	0.025 U	0.025 U	1.2	1.4	0.003 U	0.005 J4	0.011	0.007	0.061	0.075
EM-6	8/11/97	0.03		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.03	
EM-6	8/11/97	0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.027	
EM-6	11/17/97	0.026		0.005 U		0.005 U		0.045		0.1 U		0.003 U		0.11		0.039	
EM-6	2/17/98	0.028		0.006		0.01 U		0.043		0.1 U,UJ4		0.003 U		0.1		0.045 J4	
EM-6	5/18/98	0.025		0.005 U		0.01 U		0.045		0.1 U		0.003 U		0.099		0.052	
EM-6	5/18/98	0.024		0.005 U		0.01 U		0.044		0.1 U		0.003 U		0.098		0.044	
EM-6	8/17/98	0.021		0.005 U		0.01 U		0.043		0.1 U		0.003		0.12		0.037	
EM-6	11/11/98	0.031		0.006		0.01 U		0.063		0.1 U		0.003 U		0.076		0.12	
EM-6	2/11/99	0.024		0.007		0.01 U		0.041		0.1 U		0.003 U		0.097		0.087	
EM-6	5/10/99	0.025		0.007		0.01 U		0.052		0.1 U		0.005		0.07		0.099 J4	
EM-6	8/6/99	0.042 J4	0.033	0.007	0.007	0.01 U	0.01 U	0.059	0.067	0.1 U	0.1 U	0.004	0.008	0.067	0.071	0.1	0.1
EM-6	8/6/99	0.033 J4	0.032	0.007	0.007	0.01 U	0.01 U	0.06	0.065	0.1 U	0.1 U	0.004	0.009	0.076	0.07	0.099	0.1
EM-6	11/2/99		0.037		0.007		0.01 U		0.069		0.12 J2		0.013		0.066		0.11
EM-6	1/25/00		0.024		0.005 U		0.01 U		0.025		0.1 U,UJ4		0.012 UJ1		0.083		0.024
EM-6	4/26/00		0.022		0.005 U		0.01 U		0.035		0.1 U		0.005		0.068		0.037
EM-6	8/4/00		0.022		0.005 U		0.01 U		0.031		1.2		0.008		0.072		0.026
EM-6	11/3/00		0.024		0.005 U		0.01 U		0.025 U		0.12		0.004		0.076		0.035 UJ1
EM-6	2/14/01		0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.007		0.08		0.05
EM-6	2/14/01		0.025		0.005 U		0.01 U		0.025 U		0.1 U		0.007		0.078		0.051
EM-6	5/9/01		0.025		0.005 U		0.01 U		0.025 U		0.1 U		0.003		0.078		0.051
EM-6	7/19/01	0.04	0.042	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.004 J4	0.088	0.088	0.039	0.032 J4
EM-7	11/17/97	1.7		0.021		0.008		0.067		0.35		0.058		0.13		0.11	
EM-7	2/19/98	2.1		0.009		0.01 U		0.055		0.34 J4		0.03		0.055		0.078 J4	
EM-7	5/7/98	1.8		0.018		0.01 U		0.073		0.2		0.039		0.055		0.11	

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Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EM-7	8/20/98	2.3		0.019		0.01 U		0.042		0.16		0.032		0.037		0.1	
EM-7	11/11/98	2.1		0.014		0.01 U		0.025 U		0.29		0.019		0.02		0.079	
EM-7	2/24/99	2		0.011		0.01 U		0.049		0.18		0.025		0.051		0.093	
EM-7	5/12/99	2.4		0.005		0.01 U		0.025 U		0.27		0.011		0.006		0.039	
EM-7	8/6/99	2.4	2.2	0.023	0.073	0.01 U	0.018	0.056	0.16	0.17	1.4	0.034	0.63	0.03	0.037	0.073	0.31
EM-7	10/30/99		3.3		0.26		0.036		0.81		2.9		1.5		0.077		0.8 J2
EM-7	1/31/00		2.1		0.29		0.043		1.3		4		2		0.071		1
EM-7	2/14/01																
EM-7	5/9/01																
EP-100	10/20/99		0.008		0.022		0.01 U		0.025 U		0.34		0.007		0.42		0.13
EP-100	1/26/00		0.02		0.043		0.01 U		0.034		7.3		0.01		0.42		0.24
EP-100	4/28/00		0.019		0.031		0.01 U		0.039		2.1 J4		0.009		0.54		0.22 J2
EP-100	8/7/00		0.014		0.027		0.01 U		0.03		1.9		0.005		0.52		0.18
EP-100	11/7/00		0.015		0.02		0.01 U,UJ4		0.025 U		0.79 J4		0.003 U		0.52		0.12
EP-100	2/20/01		0.016		0.019		0.01 U		0.025		1.9		0.004		0.58		0.22
EP-100	5/9/01		0.021		0.032		0.01 U		0.025 U		2.3		0.007		0.58		0.43
EP-100	7/20/01	0.023	0.023	0.015	0.015	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.81	0.003 U	0.003	0.54	0.55	0.12	0.13
EP-101	10/21/99		7.2		0.78		0.01 U		0.028		2.6		0.015		2.3		0.16
EP-101	1/25/00		4.5		0.72		0.01 U		0.025 U		1.6 J4		0.018 UJ1		2.8		0.048
EP-101	4/26/00		6.3		1.1		0.01 U		0.025 U		0.64		0.033		3.5		0.1
EP-101	8/4/00		6.8		1.3		0.01 U		0.026		2.1		0.012		3.4		0.13
EP-101	11/2/00		7.3		1.7		0.01 U		0.029		1.8 J4		0.011		3.3		0.34
EP-101	2/9/01		6.3		1.4		0.01 U		0.025 U		0.31		0.004		2.4		0.25
EP-101	5/8/01		4.7		1.6		0.01 U		0.025 U		0.55		0.005		1.7 J4		0.32
EP-101	7/18/01	5.3	5.2	1.5	1.6	0.01 U	0.01 U	0.025	0.029	0.1 U	0.95	0.003 U	0.007 UJ1	1.7	1.9	0.28	0.32
EP-102	10/21/99		0.21		0.05		0.01 U		0.025 U		0.1 U		0.004		5		0.094
EP-102	1/25/00		0.21		0.075		0.01 U		0.025 U		0.48 J4		0.012 UJ1		4.8		0.045
EP-102	4/26/00		0.26		0.095		0.01 U		0.025 U		1.4		0.012		3.7		0.069
EP-102	8/4/00		0.28		0.099		0.01 U		0.025 U		1.2		0.009		3.6		0.053
EP-102	11/3/00		0.24		0.053		0.01 U		0.025 U		1.1		0.007		2.4		0.063 UJ1
EP-102	2/9/01		0.38		0.095		0.01 U		0.025 U		1.4		0.012		4		0.077
EP-102	5/8/01		0.4		0.11		0.01 U		0.025 U		0.96		0.006		5.7 J4		0.11
EP-102	7/18/01	0.3	0.3	0.13	0.17	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	1.2	0.003 U	0.01 UJ1	6.8	6.4	0.048	0.07
EP-103	10/21/99		0.005		0.005 U		0.01 U		0.025 U		0.15		0.003 U		0.22		0.027
EP-103	1/24/00		0.011		0.005 U		0.01 U		0.025 U		0.55		0.013 UJ1		0.16		0.02
EP-103	4/26/00		0.016		0.005 U		0.01 U		0.025 U		1.3		0.01		0.19		0.036
EP-103	8/4/00		0.023		0.007		0.01 U		0.025 U		0.28		0.003 U		0.23		0.02 U
EP-103	11/2/00		0.008		0.005 U		0.01 U		0.025 U		0.33 J4		0.003 U		0.27		0.029 UJ1
EP-103	2/12/01		0.022		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.29		0.047
EP-103	5/8/01		0.019		0.007		0.01 U		0.025 U		0.06		0.003 U		0.26 J4		0.041
EP-103	7/19/01	0.044	0.04	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U,UJ4	0.27	0.27	0.02 U	0.02 U
EP-104	10/21/99		0.071		0.005 U		0.01 U		0.025 U		0.41		0.006		0.11		0.02 U
EP-104	1/24/00		0.08		0.005 U		0.01 U		0.025 U		0.9		0.015 UJ1		0.093		0.023
EP-104	4/26/00		0.072		0.005 U		0.01 U		0.025 U		2.2		0.015		0.085		0.043
EP-104	8/3/00		0.082		0.005 U		0.01 U		0.025 U		0.63		0.008		0.096		0.026
EP-104	11/1/00		0.091		0.005 U		0.01 U		0.025 U		1.4		0.011		0.097		0.066 UJ1
EP-104	2/12/01		0.084		0.005 U		0.01 U		0.025 U		0.2		0.003		0.1		0.041
EP-104	2/12/01		0.087		0.005 U		0.01 U		0.025 U		0.15		0.003		0.11		0.048
EP-104	5/8/01		0.081		0.005 U		0.01 U		0.025 U		0.62		0.005		0.1 J4		0.072
EP-104	7/18/01	0.091	0.095	0.013	0.013	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.36	0.003 U	0.006 UJ1	0.11	0.11	0.027	0.035
EP-105	10/21/99		0.3		0.005 U		0.01 U		0.025 U		0.91		0.012		0.068		0.055

Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-105	1/25/00		0.4		0.005 U		0.01 U		0.078		5.7 J4		0.076		0.034		0.18
EP-105	4/26/00		0.051		0.005 U		0.01 U		0.025 U		0.57		0.011		0.005 U		0.049
EP-105	8/4/00		0.6		0.005 U		0.01 U		0.045		1.2		0.018		0.039		0.089
EP-105	11/1/00		0.099		0.005 U		0.01 U		0.036		0.59		0.012		0.024		0.083 UJ1
EP-105	2/14/01		0.84		0.005 U		0.01 U		0.025 U		0.3		0.008		0.054		0.078
EP-105	5/9/01		0.17		0.005 U		0.01 U		0.2		8.7		0.1		0.025 J4		0.39
EP-105	7/19/01	0.94	0.97	0.005 U	0.005 U	0.01 U	0.01 U	0.026	0.025 U	0.1 U	0.15	0.003 U	0.005 J4	0.057	0.067	0.057	0.067
EP-106	10/21/99		0.005 U		0.005 U		0.01 U		0.025 U		3.1		0.004		0.087		0.053
EP-106	1/25/00		0.007		0.005 U		0.01 U		0.025 U		0.6 J4		0.014 UJ1		0.11		0.022
EP-106	4/26/00		0.005 U		0.005 U		0.01 U		0.025 U		0.4		0.003 U		0.1		0.02 U
EP-106	8/2/00		0.006		0.005 U		0.01 U		0.025 U		0.43		0.006		0.11		0.02 U
EP-106	11/2/00		0.007		0.005 U		0.01 U		0.025 U		0.83 J4		0.003 U		0.12		0.041 UJ1
EP-106	2/12/01		0.017		0.015		0.01 U		0.025 U		0.98		0.006		0.12		0.067
EP-106	5/9/01		0.014		0.005 U		0.01 U		0.025 U		0.69		0.003 U		0.12 J4		0.1
EP-106	7/18/01	0.05	0.049	0.073	0.07	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.53	0.52	0.052	0.057
EP-107	10/21/99		0.015		0.005 U		0.01 U		0.025 U		0.18		0.003 U		0.49		0.027
EP-107	1/24/00		0.012		0.005 U		0.01 U		0.025 U		0.1 U		0.009 UJ1		0.42		0.02 U
EP-107	4/25/00		0.022		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.44		0.029
EP-107	8/3/00		0.022		0.005 U		0.01 U		0.025 U		0.1 U		0.005 U		0.43		0.024
EP-107	11/3/00		0.029		0.029		0.01 U		0.025 U		0.1 U		0.003 U		0.42		0.035 UJ1
EP-107	2/12/01		0.03		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.45		0.074
EP-107	5/8/01		0.026		0.006		0.01 U		0.025 U		0.1 U		0.003 U		0.45 J4		0.073
EP-107	7/17/01	0.019	0.022	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.28	0.003 U	0.004	0.12	0.11	0.028	0.069
EP-108	10/26/99		0.7 J4		0.005 U		0.01 U,UJ4		0.025 U		2.3 J2,J4		0.004 J4		0.037 J2,J4		0.06
EP-108	1/28/00		1.4		0.005 U		0.01 U		0.025 U		0.52		0.006		0.046		0.034
EP-108	5/2/00		1.2		0.005 U		0.01 U		0.025 U		0.49		0.006		0.043		0.027
EP-108	8/9/00		1.3		0.005 U		0.01 U		0.025 U		0.12		0.005		0.051		0.021
EP-108	11/9/00		1.2		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.05		0.02 U
EP-108	2/15/01		1.1		0.005 U		0.01 U		0.025 U		0.51		0.004		0.049		0.034
EP-108	5/14/01		1.1		0.005 U		0.01 U		0.025 U		0.57 J4		0.007		0.043		0.031
EP-108	7/25/01	1.2	1.2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.48	0.003 U	0.003	0.045	0.045 J4	0.02 U	0.023 J4
EP-109	10/26/99		0.007 J4		0.005 U		0.01 U,UJ4		0.025 U		0.91 J2,J4		0.003 U,UJ4		0.063 J2,J4		0.02
EP-109	1/28/00		0.014		0.005 U		0.01 U		0.025 U		1.2		0.039		0.064		0.026
EP-109	5/2/00		0.016 UJ1		0.005 U		0.01 U		0.025 U		0.76		0.006		0.063		0.026
EP-109	8/9/00		0.011		0.005 U		0.01 U		0.025 U		0.16		0.003 U		0.056		0.022
EP-109	11/9/00		0.019		0.005 U		0.01 U		0.025 U		0.22		0.003 U		0.064		0.02 U
EP-109	2/15/01		0.014		0.005 U		0.01 U		0.025 U		0.89		0.005		0.078		0.069
EP-109	5/14/01		0.013		0.005 U		0.01 U		0.025 U		0.19 J4		0.003 U		0.072		0.026
EP-109	7/25/01	0.033	0.026	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.28	0.003 U	0.003 U	0.067	0.07 J4	0.02 U	0.023 J4
EP-110	10/29/99		0.005 U		0.005 U		0.01 U		0.025 U		1.3 J2		0.013		0.017		0.02 U
EP-110	1/24/00		0.009		0.005 U		0.01 U		0.025 U		0.78		0.02 UJ1		0.017 UJ1		0.048
EP-110	4/25/00		0.006		0.005 U		0.01 U		0.025 U		0.38		0.008		0.016		0.028
EP-110	8/2/00		0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.005 U		0.017		0.02 U
EP-110	10/31/00		0.008		0.005 U		0.01 U		0.025 U		0.15 J4		0.003 U		0.016		0.047 UJ1,J4
EP-110	2/8/01		0.008		0.005 U		0.01 U		0.025 U		0.14		0.004		0.017		0.037 UJ1
EP-110	5/7/01		0.007		0.005 U		0.01 U		0.025 U		0.13		0.003 U		0.015		0.044
EP-110	7/17/01	0.013	0.013	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.12	0.003 U	0.003 U	0.016	0.016	0.026	0.032
EP-111	10/28/99		0.97		0.005 U		0.01 U		0.039		15		0.047		0.01		0.13 J2
EP-111	1/29/00		0.91		0.005 U		0.01 U		0.025 U		2		0.003 U		0.005 U		0.02 U
EP-111	5/2/00		0.83		0.005 U		0.01 U		0.025 U		1.4		0.004		0.01		0.02 U
EP-111	8/14/00		0.97		0.005 U		0.01 U		0.025 U		1.6		0.003 U		0.007		0.02 U

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-111	11/10/00		1.1		0.005 U		0.01 U		0.025 U		1.6		0.003		0.007		0.023
EP-111	11/10/00		1.1		0.005 U		0.01 U		0.025 U		1.4		0.005		0.007		0.024
EP-111	2/21/01		0.98		0.005 U		0.01 U		0.025 U		1.6		0.003 U		0.014		0.047 UJ1
EP-111	5/15/01		0.95		0.005 U		0.01 U		0.025 U		1.6		0.003 U		0.005		0.02 U
EP-111	7/31/01	0.98	0.93	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.3	1.4	0.003 U	0.003 U	0.011	0.008	0.02 U,UJ4	0.025 J4
EP-112	10/28/99		0.012		0.005 U		0.01 U		0.025 U		11		0.015		0.012		0.096 J2
EP-112	1/29/00		0.013		0.005 U		0.01 U		0.025 U		0.48		0.003 U		0.007		0.02 U
EP-112	5/2/00		0.013 UJ1		0.005 U		0.01 U		0.025 U		0.32		0.003		0.016		0.02 U
EP-112	8/14/00		0.015		0.005 U		0.01 U		0.025 U		0.42		0.003 U		0.016		0.02 U
EP-112	8/14/00		0.014		0.005 U		0.01 U		0.025 U		0.38		0.003 U		0.013		0.02 U
EP-112	11/10/00		0.03		0.005 U		0.01 U		0.025 U		0.29		0.003 U		0.012		0.02 U
EP-112	2/21/01		0.027		0.005 U		0.01 U		0.025 U		0.22		0.003 U		0.022		0.046 UJ1
EP-112	5/15/01		0.012		0.005 U		0.01 U		0.025 U		0.22		0.003 U		0.01		0.022
EP-112	7/31/01	0.03	0.029	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.21	0.25	0.003 U	0.003 U	0.018	0.018	0.02 U	0.02 U
EP-113	10/28/99		0.005		0.005 U		0.01 U		0.025 U		4.5 J2		0.009		0.005 U		0.051
EP-113	1/29/00		0.005 U		0.005 U		0.01 U		0.025 U		1.3		0.003		0.005 U		0.02 U
EP-113	5/2/00		0.006 UJ1		0.005 U		0.01 U		0.025 U		0.77		0.003 U		0.006		0.02 U
EP-113	8/14/00		0.005		0.005 U		0.01 U		0.025 U		0.67		0.003 U		0.005 U		0.02 U
EP-113	11/10/00		0.015		0.005 U		0.01 U		0.025 U		0.72		0.003 U		0.005 U		0.02 U
EP-113	2/21/01		0.016		0.005 U		0.01 U		0.025 U		0.51		0.003 U		0.007		0.045 UJ1
EP-113	5/15/01		0.007		0.005 U		0.01 U		0.025 U		0.48		0.003 U		0.005 U		0.02 U
EP-113	7/31/01	0.013	0.013	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.66	0.78	0.003 U	0.003 U	0.005	0.005	0.02 U	0.02 U
EP-114	11/18/99		118		0.13		0.019		0.044		58		0.02		0.06		35
EP-114	1/31/00		214		2.7		0.16		11		361		6.6		0.12		75
EP-114	5/4/00		203		2.6		0.11		2.3		266		2.1		0.05 U		66
EP-114	8/14/00		240		1.7		0.066		1.6		210		1.1		0.063		51
EP-114	11/10/00		250		2.2		0.062		0.96		172		0.53		0.01 U		51
EP-114	5/4/01		292		3		0.044		1.9		473		0.87		0.17		109
EP-114	7/16/01	227	280	0.12	2.2	0.01 U	0.15	0.025 U	0.87	47	325	0.003 U	0.41	0.062	0.14	6.9	76
EP-115	11/22/99		0.28		1.1		0.01 U		0.49		2.8		0.18		0.38		0.8
EP-115	1/31/00		0.26		0.19		0.01 U		0.14		0.87		0.02		0.42		0.34
EP-115	5/4/00		0.25		0.15		0.01 U		0.18		1.5 J4		0.084		0.11		0.29
EP-115	8/14/00		0.25		0.14		0.01 U		0.18		0.48		0.037		0.31		0.24
EP-115	11/10/00		0.45		0.17		0.01 U		0.42		0.93		0.19		1.7		0.5
EP-115	2/23/01																
EP-115	5/4/01																
EP-115	7/16/01	0.29	0.29	0.13	0.13	0.01 U	0.01 U	0.14	0.2	0.1 U	0.65	0.025	0.077	0.1	0.11	0.39	0.45 J4
EP-116	11/18/99		2.3		1.2		0.032		3.7		41		2		0.47		6
EP-116	1/31/00		4.9		1.5		0.044		6.9		90		4.1		0.42		4.4
EP-116	5/4/00		3.3		0.66		0.022		1.9		32		1.4		0.29		2.3
EP-116	8/14/00		3.1		0.4		0.01 U		5.6		11		0.55		0.19		2.4
EP-116	11/10/00		1.5		0.8		0.01 U		15		17		1.1		0.21		6.3
EP-116	2/22/01		6		1.6		0.069		38		77		4.2		0.37		7.4
EP-116	5/4/01		6.2		1.4		0.039		30		72		3.7		0.32		7.4
EP-116	7/16/01	3.2	11	0.37	3.2	0.01 U	0.12	1.3	70	0.1 U	170	0.02	9.5	0.25	0.36	2.6	15
EP-117	11/18/99		6		0.2		0.01 U		0.086		5.4		0.28		1.1		0.2
EP-117	1/31/00		11		2.7		0.16		2.1		228		10		1.1		3.4
EP-117	5/4/00		7.2		0.89		0.062		0.51		73		3.5		1.1		1.1
EP-117	8/14/00		5.8		0.54		0.028		0.35		37		1.8		0.95		0.79
EP-117	11/10/00		6.1		0.67		0.033		0.47		42		2.4		0.87		0.85
EP-117	2/22/01		6.4		1.2		0.064		0.77		78		4.1		1.3		1.6

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EP-117	5/4/01		11		1.7		0.055		4.5		129		4.5		1.2		3.2
EP-117	7/16/01	6.6	7.4	0.12	0.66	0.01 U	0.034	0.025 U	0.4	0.1 U	46	0.007	2	1.3	1.3	0.11	0.97
EP-118	11/18/99		0.22		0.009		0.052		0.14		184		0.17		0.29		0.46
EP-118	1/31/00		0.43		0.071		0.27		1.2		868		2.5		0.28		1.7
EP-118	5/4/00		0.21		0.019		0.058		0.38		184		0.66		0.25		0.47
EP-118	8/14/00		0.22		0.005 U		0.01		0.073		37		0.12		0.3		0.11
EP-118	11/10/00		3		0.012		0.035		0.3		103		0.36		0.87		0.2
EP-118	2/22/01		1.4		0.061		0.27		1.2		784		1.4		0.39		2.3
EP-118	5/4/01		0.52		0.014		0.079		0.39		256		0.49		0.32		0.71
EP-118	7/17/01	0.18	0.45	0.005 U	0.026	0.01 U	0.073	0.025 U	0.77	0.1 U	369	0.003 U	1.1	0.28	0.28	0.02 U	1.1
EP-119	5/15/01		2		0.005 U		0.01 U		0.025 U		0.27		0.003 U		0.26		0.023
EP-119	7/27/01	2.2	2.2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.26	0.28 J4	0.046	0.048 J4
EP-119	7/27/01	2.2	2.3	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.26	0.28 J4	0.048	0.051 J4
EP-12	11/3/97	1.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		6.9		0.022	
EP-12	2/3/98	1.2		0.005 U		0.01 U		0.025 U,UJ4		0.15 J4		0.003 U		1.7		0.02 U,UJ4	
EP-12	5/20/98	1		0.005 U		0.01 U		0.031		0.1 U		0.004 U		0.57		0.031	
EP-12	8/27/98	1.5		0.019		0.01 U		0.025 U		0.88		0.003 U		0.47		0.62	
EP-12	11/16/98	1.6		0.005 U		0.01 U		0.025 U		0.75		0.003 U		0.29		0.021	
EP-12	2/25/99	1.8		0.005 U		0.01 U		0.025 U		4.7		0.003 U		0.53		0.02 U	
EP-12	5/14/99	2.4		0.005 U		0.01 U		0.025 U		0.74		0.003 U		0.26 J4		0.024	
EP-12	5/14/99	2.7		0.005 U		0.01 U		0.025 U		0.76		0.003 U		0.32 J4		0.035	
EP-12	8/11/99	1.7	2	0.005 U	0.005 U	0.01 U	0.01	0.025 U	0.025 U	0.75	1.4 J4	0.003 U	0.004	0.2	0.48	0.024 UJ1	0.02 U
EP-12	10/29/99		3.3		0.005 U		0.015		0.031		0.44 J2		0.021		0.42		0.02 U
EP-12	2/8/00		2.3		0.005 U		0.01 U		0.025 U		1.6		0.009		0.26		0.02 U
EP-12	2/8/00		2.6		0.005 U		0.011		0.025 U		1.5		0.011		0.28		0.021
EP-12	5/9/00		2		0.005 U		0.017		0.038		2.8		0.024		0.61		0.032 UJ1,J2
EP-12	8/16/00		1.8		0.005 U		0.028		0.044		3.7		0.028		0.71 J4		0.038 J4
EP-12	11/14/00		2.1		0.005 U		0.011		0.045		3.6		0.028		0.43		0.038 J4, UJ1
EP-12	2/26/01		0.92		0.005 U		0.01 U		0.025 U		0.92		0.015 J4		0.1		0.032 UJ1
EP-12	5/17/01		0.83		0.005 U		0.01 U		0.025 U		1.2		0.005		0.069		0.02 U
EP-12	7/30/01	0.71	0.96	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.47	2.5	0.003	0.01	0.032	0.097	0.02 U,UJ4	0.024 J4
EP-120	5/7/01		0.27		0.005 U		0.01 U		0.025 U		0.17		0.003 U		0.058 J4		0.036
EP-120	8/1/01	0.35	0.35	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.67	0.003 U	0.003 U	0.15	0.15	0.02 U	0.023
EP-120	8/1/01	0.35	0.36	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.55	0.003 U	0.003 U	0.15	0.15	0.02 U	0.02 U
EP-121	5/7/01		0.59		0.005 U		0.01 U		0.025 U		0.8		0.01		0.031 J4		0.046
EP-121	8/1/01	0.57	0.6	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.97	0.003 U	0.003 U	0.032	0.031	0.02 U	0.02
EP-122	5/14/01		2.1		0.005 U		0.01 U		0.025 U		1.1 J4		0.003 U		0.19		0.02 U
EP-122	7/27/01	2.2	2.3	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.18	0.19 J4	0.079	0.079 J4
EP-123	5/8/01		1.5		0.005 U		0.01 U		0.025 U		1.4		0.005		0.082		0.034
EP-123	7/25/01	1.7	1.7	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.72	0.003 U	0.003 U	0.073	0.074 J4	0.02 U	0.02 U,UJ4
EP-124	5/16/01		7.1		0.024		0.018		0.087		22		0.19		0.005 U		0.16
EP-124	7/27/01	10	9.8	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.79	0.008	0.018	0.005	0.005 J4	0.03	0.044 J4
EP-125	5/7/01		0.013		0.005 U		0.01 U		0.025 U		1.2		0.003 U		0.64 J4		0.22
EP-125	7/19/01	0.026	0.04	0.005 U	0.005 U	0.01 U	0.087	0.025 U	0.092	0.1 U	81	0.003 U	0.11	0.21	0.2	0.93	1.5 J4
EP-126	5/8/01		0.021		0.005 U		0.01 U		0.025 U		1.8		0.009		0.93		0.083
EP-126	7/19/01	0.039	0.042	0.006	0.006	0.057	0.051	0.025 U	0.025 U	0.1 U	1.1	0.003 U	0.004 J4	1.2	1.3	0.05	0.064 J4
EP-127	5/8/01		2.5		0.005 U		0.01 U		0.025 U		1.3		0.003 U		0.028		0.032
EP-127	7/31/01	2.5	2.5	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.1	1.5	0.003 U	0.003 U	0.024	0.02	0.021 J4	0.026 J4
EP-128	5/8/01		0.61		0.005 U		0.01 U		0.025 U		1		0.003		0.005 U		0.033
EP-128	7/31/01	0.74	0.68	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.52	0.68	0.003 U	0.003 U	0.01	0.007	0.02 U,UJ4	0.02 U,UJ4
EP-129	5/11/01		0.011		0.005 U		0.01 U		0.025 U		8.6		0.007 UJ1		0.028		0.063 UJ1

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-129	7/24/01	0.007	0.008	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.6	0.003 U	0.003 U	0.038	0.036	0.02 U	0.028
EP-13	8/7/97	49		0.82		0.01 U		0.025 U		0.1 U		0.008		7		0.052 J2	
EP-13	11/6/97	46		0.8		0.01 U		0.025 U		0.15		0.003 U		6.7		0.033	
EP-13	2/17/98	48		0.68		0.01 U		0.027		0.1 U,UJ4		0.003 U		6.1		0.025 J4	
EP-13	5/7/98	36		0.71		0.01 U		0.025		0.1 U		0.003 U		5.7		0.059	
EP-13	8/6/98	36		0.7		0.01 U		0.025 U		0.1 U		0.003 U		5.4		0.1	
EP-13	11/4/98	39 J4		0.77		0.01 U		0.025 U		0.1 U		0.003 U		5.7		0.072	
EP-13	2/8/99	36		0.74		0.01 U		0.025 U		0.1 U		0.003 U		5.1		0.1	
EP-13	5/6/99	38		0.65		0.01 U		0.025 U		0.1 U		0.007		5.1		0.077	
EP-13	8/3/99	39	38	0.66	0.66	0.01 U	0.01 U	0.048	0.053	0.1 U	0.4	0.003 U	0.009	5.9	5.7	0.067	0.068 J2
EP-13	10/28/99		31		0.38		0.01 U		0.025 U		0.47 J2		0.01		4.4 J2		0.03
EP-13	1/25/00		34		0.53		0.01 U		0.025 U		0.47 J4		0.025 UJ1		4.5		0.02
EP-13	4/26/00		32		0.57		0.01 U		0.025 U		0.25		0.008		5.3		0.028
EP-13	8/4/00		17		0.36		0.01 U		0.03		0.63		0.017		3.1		0.034
EP-13	11/2/00		29		0.56		0.01 U		0.025 U		0.25 J4		0.009		5.3		0.05 UJ1
EP-13	2/9/01		1.6		0.005 U		0.01 U		0.025 U		0.1		0.004		0.32 J4		0.039
EP-13	5/8/01		25		0.54		0.01 U		0.025 U		0.27		0.006		4.5 J4		0.078
EP-13	7/18/01	30	28	0.47	0.52	0.01 U	0.01 U	0.028	0.026	0.1 U	0.22	0.003 U	0.006 UJ1	4.5	4.6	0.041	0.045
EP-130	6/8/01	0.44	0.56	0.005 U	0.005 U	0.015	0.01 U	0.025 U	0.025 U	0.48	2.6	0.003 U	0.005	0.36	0.25	0.05	0.088
EP-130	7/26/01	0.13	0.16	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025	0.11	9.4	0.003	0.033	0.24	0.22 J4	0.053	0.072 J4
EP-130	7/26/01	0.13	0.16	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025	0.1 U	9.9	0.003	0.034	0.24	0.23 J4	0.053	0.075 J4
EP-131	6/8/01	0.91	0.9	0.005 U	0.005 U	0.012	0.011	0.025 U	0.025 U	0.57	0.79	0.003 U	0.005	0.15	0.098	0.021	0.048
EP-131	7/26/01	1.2	1.3	0.005 U	0.005	0.01 U	0.01 U	0.025 U	0.028	0.1 U	3	0.003 U	0.02	0.099	0.1 J4	0.024	0.048 J4
EP-132	6/8/01	1.5	1.5	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.91	0.003 U	0.022	0.27	0.2	0.02 U	0.021
EP-132	6/8/01	1.5	1.5	0.005 U	0.005 U	0.01 U	0.01	0.025 U	0.025 U	0.1	0.9	0.003 U	0.018	0.27	0.2	0.02 U	0.021
EP-132	7/27/01	1.9	2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.76	0.003 U	0.003 U	0.27	0.28 J4	0.02 U	0.021 J4
EP-14	11/5/97	1.1		0.005 U		0.01 U		0.025 U		0.1		0.003 U		0.36		0.02 U	
EP-14	2/17/98	1.3		0.005 U		0.01 U		0.025 U		0.17 J4		0.004		0.3		0.02 U,UJ4	
EP-14	5/7/98	1.4		0.005 U		0.01 U		0.025 U		0.15		0.004		0.23		0.046	
EP-14	8/6/98	2.5		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.084		0.032	
EP-14	11/4/98	2.2 J4		0.005 U		0.01 U		0.025 U		0.18		0.003		0.18		0.022	
EP-14	2/8/99	1.7		0.005 U		0.01 U		0.025 U		0.29		0.003		0.3		0.031	
EP-14	5/6/99	1.7		0.005 U		0.01 U		0.025 U		0.18		0.006		0.25		0.02 U	
EP-14	8/3/99	2.1	2.1	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.57	0.9	0.003 U	0.008	0.22	0.19	0.038	0.055 J2
EP-14	10/28/99		1.4		0.005 U		0.01 U		0.025 U		0.18 J2		0.003 U		0.2 J2		0.02 U
EP-14	1/25/00		1.5		0.005 U		0.01 U		0.025 U		0.18 J4		0.01 UJ1		0.21		0.01
EP-14	4/26/00		1.3		0.005 U		0.01 U		0.025 U		0.12		0.005		0.19		0.028
EP-14	8/4/00		1.3		0.005 U		0.01 U		0.025 U		0.28		0.004		0.19		0.02 U
EP-14	8/4/00		1.3		0.005 U		0.01 U		0.025 U		0.33		0.004		0.19		0.03
EP-14	11/2/00		1.4		0.005 U		0.01 U		0.025 U		0.41 J4		0.004		0.2		0.035 UJ1
EP-14	2/9/01		23		0.52		0.01 U		0.025 U		0.44		0.013		4.1		0.091
EP-14	5/8/01		1.4		0.005 U		0.01 U		0.025 U		0.14		0.004		0.32 J4		0.047
EP-14	7/18/01	1.5	1.5	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.33	0.39	0.003	0.004 UJ1	0.34	0.33	0.02 U	0.02 U
EP-15	8/7/97	0.076		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.022 J2	
EP-15	11/6/97	0.013		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.021	
EP-15	2/17/98	0.031		0.016		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.16		0.02 U,UJ4	
EP-15	5/7/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.031	
EP-15	8/10/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.031	
EP-15	11/5/98	0.007 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.048	
EP-15	2/8/99	0.025		0.015		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.048	
EP-15	2/8/99	0.028		0.014		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.06	

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-15	5/5/99	0.008		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.066	
EP-15	8/3/99	0.012	0.014	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.74	0.003 U	0.003 U	0.17	0.15	0.02 U	0.021 J2
EP-15	8/3/99	0.012	0.014	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.74	0.003 U	0.003 U	0.17	0.15	0.02 U	0.022 J2
EP-15	10/28/99		0.021		0.012		0.01 U		0.025 U		1.2 J2		0.004		0.12 J2		0.02 U
EP-15	1/24/00		0.009		0.005 U		0.01 U		0.025 U		3.6		0.01 UJ1		0.14		0.02 U
EP-15	4/26/00		0.007		0.005 U		0.01 U		0.025 U		2.8		0.004		0.13		0.029
EP-15	8/3/00		0.007		0.005 U		0.01 U		0.025 U		1.7		0.005 U		0.14		0.02 U
EP-15	11/2/00		0.008		0.005 U		0.01 U		0.025 U		2.1 J4		0.003		0.31		0.041 UJ1
EP-15	11/2/00		0.009		0.005 U		0.01 U		0.025 U		1.4 J4		0.003 U		0.32		0.033 UJ1
EP-15	2/12/01		0.011		0.005 U		0.01 U		0.025 U		1.6		0.003 U		0.27		0.06
EP-15	5/8/01		0.013		0.008		0.01 U		0.025 U		2.4		0.004		0.23 J4		0.065
EP-15	7/19/01	0.015	0.013	0.005	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	1.8	0.003 U	0.003 U,UJ4	0.23	0.2	0.022	0.026
EP-20	8/7/97	1.2		0.036		0.01 U		0.025 U		0.1 U		0.003 U		0.38		0.057 J2	
EP-20	11/3/97	1.2		0.04		0.01 U		0.026		0.1 U		0.003 U		0.35		0.059	
EP-20	2/3/98	0.96		0.048		0.01 U		0.036 J4		0.11 J4		0.003 U		0.37		0.063 J4	
EP-20	5/6/98	0.85		0.042		0.01 U		0.03		0.1 U		0.003 U		0.34		0.098	
EP-20	8/6/98	0.87		0.038		0.01 U		0.025 U		0.1 U		0.003 U		0.35		0.096	
EP-20	11/4/98	0.92 J4		0.034		0.01 U		0.025 U		0.1 U		0.003 U		0.37		0.051	
EP-20	2/4/99	0.79 J4		0.039		0.01 U		0.025 U		0.1 U		0.003 U		0.33		0.039 UJ1	
EP-20	5/4/99	0.92		0.048		0.01 U		0.025 U		0.1 U		0.003 U		0.37		0.025	
EP-20	8/2/99	1	1.1	0.03	0.03	0.01 U	0.01 U	0.025 U	0.026	0.1 U	0.9	0.003 U	0.005 UJ1	0.37	0.35	0.04	0.046 J2
EP-20	10/26/99		0.75 J4		0.03		0.01 U,UJ4		0.025 U		1.6 J2,J4		0.003 J4		0.27 J2		0.04
EP-20	1/31/00		0.97		0.076		0.01 U		0.025 U		1.7		0.004		0.28		0.06
EP-20	1/31/00		0.9		0.066		0.01 U		0.025 U		1.9		0.007		0.29		0.055
EP-20	5/4/00		0.76		0.068		0.01 U		0.025 U		0.46 J4		0.003 U		0.3		0.042 UJ1
EP-20	5/4/00		0.78		0.063		0.01 U		0.025 U		0.96 J4		0.003 U		0.31		0.037 UJ1
EP-20	8/2/00		0.76		0.047		0.01 U		0.025 U		0.72		0.005 U		0.3		0.036
EP-20	10/30/00		0.86		0.07		0.01 U		0.025 U		0.5 J4		0.003 U,UJ4		0.34		0.093 UJ1,J4
EP-20	2/22/01		0.98		0.093		0.01 U		0.025 U		3.4		0.006		0.32		0.065
EP-20	5/16/01		0.93		0.087		0.01 U		0.025 U		2.8 J4		0.006		0.34		0.04
EP-20	5/16/01		0.92		0.091		0.01 U		0.025 U		2.1 J4		0.004		0.34		0.039
EP-20	7/17/01	0.97	0.96	0.063	0.073	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	6.8	0.003 U	0.011	0.39	0.35	0.032	0.055
EP-20	7/17/01	0.96	0.96	0.063	0.073	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	6.3	0.003 U	0.011	0.39	0.35	0.031	0.055
EP-21	11/18/97	0.067		0.005 U		0.01 U		0.025 U		0.39		0.003 U		0.073		0.031	
EP-21	2/18/98	0.062 J4		0.005 U		0.01 U		0.025 U		0.17 J4,J4		0.003 U		0.095		0.038 J4	
EP-21	5/21/98	0.052		0.005 U		0.01 U		0.025 U		0.34		0.004 U		0.018		0.028	
EP-21	8/24/98	0.032		0.005 U		0.01 U		0.025 U		0.32		0.003 U		0.019		0.02	
EP-21	11/16/98	0.034		0.005 U		0.01 U		0.025 U		0.2		0.003 U		0.016		0.026	
EP-21	2/24/99	0.033		0.005 U		0.01 U		0.025 U		0.21		0.003 U		0.015		0.02 U	
EP-21	8/10/99	0.022	0.042	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.03	0.83	1.3 J4	0.003 U	0.016	0.005 U	0.017	0.031 UJ1	0.079 UJ1
EP-21	11/3/99		0.15		0.012		0.01 U		0.13		8.7		0.078 J4		0.015		1
EP-21	2/1/00		0.064 J4		0.005 U		0.01 U		0.025 U		1.8 J4		0.007		0.071		0.15
EP-21	5/8/00		0.062		0.005 U		0.01 U		0.034		1.7		0.013		0.025		0.28 J2
EP-21	8/16/00		0.068 J4		0.005 U		0.01 U		0.025 U		1.2		0.004		0.01 J4		0.25 J4
EP-21	8/16/00		0.054 J4		0.005 U		0.01 U		0.025 U		1		0.005		0.01 J4		0.2 J4
EP-21	11/14/00		0.036		0.005 U		0.01 U		0.026		0.83		0.005		0.013		0.19 J4
EP-21	11/14/00		0.038		0.005 U		0.01 U		0.025 U		1		0.004		0.012		0.24 J4
EP-21	2/26/01		0.067		0.011		0.01 U		0.076		4.9		0.029 J4		0.012		0.91
EP-21	2/26/01		0.061		0.009		0.01 U		0.067		4.5		0.023 J4		0.012		0.79
EP-21	5/16/01		0.057		0.005 U		0.01 U		0.025 U		1.9 J4		0.006		0.01		0.32
EP-21	7/30/01	0.01	0.039	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.2	2.4 J4	0.003 U	0.006	0.005	0.01	0.02 U	0.38

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-22	8/15/97	0.035		0.006		0.01 U		0.031		0.1 U		0.016		0.32		0.64	
EP-22	11/18/97	0.044 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.006		0.11		0.91	
EP-22	2/18/98	0.035 J4		0.005		0.01 U		0.035		0.1 U,UJ4,UJ4		0.018		0.59		2.1	
EP-22	6/10/98	0.096		0.044		0.019		0.034		0.11		0.044		0.54		5.9	
EP-22	8/24/98	0.011		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.073		0.089	
EP-22	11/16/98	0.008		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.054		0.083	
EP-22	1/26/00		1.2		0.011		0.012		0.037		12		0.1		0.11		0.26
EP-22	4/28/00		1.2		0.009		0.01 U		0.046		3.7 J4		0.075		0.21		0.36 J2
EP-22	8/7/00		1.5		0.013		0.01 U		0.036		0.87		0.006		0.53		0.41
EP-22	11/3/00		2.6		0.009		0.01 U		0.026		0.19		0.003 U		1.1		0.23
EP-22	2/14/01		3.4		0.009		0.01 U		0.029		0.14		0.004		1.6		0.52
EP-22	5/9/01		3		0.007		0.01 U		0.039		0.62		0.015		1.8		0.47
EP-22	7/19/01	3.7	3.9	0.006	0.007	0.01 U	0.01 U	0.051	0.074	0.1 U	1.1	0.003 U	0.045 J4	1.6	1.8	0.46	0.5 J4
EP-23	8/11/97	2.5		0.005 U		0.01 U		0.025 U		0.65		0.003 U		0.027		0.027	
EP-23	11/4/97	4		0.005 U		0.01 U		0.025 U		0.46		0.003 U		0.023		0.028	
EP-23	2/4/98	1.5		0.005 U		0.01 U		0.025 U,UJ4		0.25 J4		0.003 U		0.019		0.02 U,UJ4	
EP-23	5/11/98	4.2		0.005 U		0.01 U		0.025 U		0.63		0.003 U		0.011		0.045	
EP-23	8/12/98	1.6		0.005 U		0.01 U		0.025 U		0.49		0.003 U		0.009		0.023	
EP-23	11/5/98	2.5 J4		0.005 U		0.01 U		0.025 U		0.34 J4		0.003 U		0.005 U		0.02 U	
EP-23	2/11/99	0.81		0.005 U		0.01 U		0.025 U		0.33		0.003 U		0.011		0.02 U	
EP-23	5/7/99	1.9		0.005 U		0.01 U		0.025 U		0.26		0.003 U		0.005 U		0.02 J4	
EP-23	5/14/99	4.9		0.005 U		0.01 U		0.025 U		0.34		0.003 U		0.008 J4		0.02 U	
EP-23	8/4/99	8.8	9.4	0.005 U	0.005 U	0.01 U	0.01 U,UJ4	0.025 U	0.039 J4	0.49	0.78 J4	0.003 U	0.02 J4	0.005 U	0.009	0.02 U	0.099
EP-23	10/30/99		11		0.008		0.01 U		0.24		0.93		0.088		0.013		0.14 J2
EP-23	2/1/00		3.1 J4		0.006		0.01 U		0.15		1.1 UJ1,J4		0.081		0.012		0.1
EP-23	5/3/00		2.6		0.005		0.01 U		0.14		0.8		0.06		0.015		0.075
EP-23	8/16/00		4.7		0.007		0.01 U		0.26		1.1		0.077		0.009 J4		0.1 J4
EP-23	11/13/00		7		0.005 U		0.01 U		0.15		1.1		0.043		0.011		0.074 UJ1
EP-23	2/21/01		8.6		0.016		0.01 U		0.45		1.4		0.16		0.013		0.33
EP-23	5/10/01		5.2		0.012		0.01 U		0.18		6.5		0.12		0.005		0.11
EP-23	7/20/01	0.77	0.96	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.04	0.37	1.2	0.003 U	0.02	0.013	0.018	0.02 U	0.035
EP-24	8/15/97	0.47		0.005 U		0.01 U		0.025 U		4.4		0.003 U		0.014		0.035	
EP-24	11/18/97	0.071		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.079		0.02 U	
EP-24	2/18/98	0.031 J4		0.005 U		0.01 U		0.025 U		0.2 J4,J4		0.003 U		0.005 U		0.02 U,UJ4	
EP-24	5/21/98	0.38		0.005 U		0.01 U		0.12		0.81		0.004 U		0.005 U		0.33	
EP-24	8/24/98	0.06		0.005 U		0.01 U		0.025 U		0.35		0.003 U		0.01 U		0.02 U	
EP-24	11/16/98	0.062		0.005 U		0.01 U		0.025 U		0.16		0.003 U		0.005 U		0.02 U	
EP-24	2/11/99	0.17		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005		0.02 U	
EP-24	5/14/99	0.097		0.005 U		0.01 U		0.025 U		0.69		0.003 U		0.33 J4		0.02 U	
EP-24	8/10/99	0.006	0.013	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.17 J4	0.003 U	0.003 U	0.005 U	0.005 U	0.02 U	0.02 U
EP-24	11/3/99		0.007		0.005 U		0.01 U		0.022		1.4		0.009 J4		0.005 U		0.024
EP-24	2/1/00		0.006 J4		0.005 U		0.01 U		0.025 U		0.43 UJ1,J4		0.008		0.006		0.02 U
EP-24	5/8/00		0.028		0.005 U		0.01 U		0.025 U		0.14		0.003		0.013		0.02 U
EP-24	8/16/00		0.042 J4		0.005 U		0.01 U		0.025 U		0.57		0.003 U		0.005 U,UJ4		0.02 U,UJ4
EP-24	11/14/00		0.01		0.005 U		0.01 U		0.025 U		0.53		0.004		0.005 U		0.024 J4, UJ1
EP-24	2/26/01		0.005 U		0.005 U		0.01 U		0.025 U		0.11		0.01 J4		0.005 U		0.02 U
EP-24	5/16/01		0.055		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.005 U		0.02 U
EP-24	7/30/01	0.022	0.042	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.27 J4	0.003	0.003 U	0.005 U	0.005 U	0.02 U	0.02 U
EP-25	8/15/97	3		0.005 U		0.01 U		0.025 U		2.6		0.003 U		0.17		0.021	
EP-25	11/19/97	3.5		0.005 U		0.01 U		0.025 U		4.8		0.011		0.079		0.037	
EP-25	2/18/98	3.1		0.005 U		0.01 U		0.025 U		4 J4		0.003 U		0.044		0.02 U,UJ4	

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-25	5/21/98	2.6		0.005 U		0.01 U		0.028		5.8		0.004 U		0.083		0.039	
EP-25	8/24/98	5.1		0.005 U		0.01 U		0.025 U		9.7		0.003 U		0.051		0.02 U	
EP-25	11/16/98	2.4		0.005 U		0.01 U		0.025 U		1.3		0.003 U		0.063		0.02 U	
EP-25	5/14/99	1		0.005 U		0.01 U		0.025 U		26		0.003 U		0.84 J4		0.022	
EP-25	8/11/99	0.82	1.1	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	8	8.2 J4	0.003 U	0.009	0.073	0.15	0.024 UJ1	0.033
EP-25	11/3/99		7.8		0.005 U		0.01 U		0.06		6.7		0.052 J4		0.3		0.038
EP-25	11/3/99		6.7		0.005 U		0.01 U		0.041		6.2		0.034 J4		0.25		0.026
EP-25	2/8/00		4		0.006		0.01 U		0.14		7.5		0.12		0.22		0.1
EP-25	5/8/00		15		0.005 U		0.01 U		0.025 U		2.2		0.025		0.44		0.024 UJ1,J2
EP-25	8/16/00		6.5		0.005 U		0.01 U		0.011		1		0.012		0.13 J4		0.026 J4
EP-25	11/14/00		12		0.005 U		0.01 U		0.025 U		1		0.011		0.18		0.025 J4, UJ1
EP-25	2/26/01		4.8		0.005 U		0.01 U		0.025 U		1.1		0.009 J4		0.088		0.064 UJ1
EP-25	5/16/01		8		0.005 U		0.01 U		0.025 U		1.1 J4		0.011		0.1		0.02 U
EP-25	7/30/01	2.8	7.4	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	1.3 J4	0.003 U	0.007	0.11	0.16	0.02 U	0.027
EP-26	8/11/97	0.32		0.62		0.01 U		0.21		0.12		0.036		0.079		1.9	
EP-26	11/4/97	0.32		1.5		0.01 U		0.16		0.1 U		0.01		0.27		4.2	
EP-26	2/4/98	0.58		0.18		0.01 U		0.042 J4		0.1 U,UJ4		0.01		0.05		0.56	
EP-26	5/7/98	0.45		0.18		0.01 U		0.025		0.1 U		0.007		0.059		0.57	
EP-26	8/12/98	0.38		0.28		0.01 U		0.037		0.1 U		0.005		0.065		1.2	
EP-26	11/4/98	0.28 J4		0.44		0.01 U		0.026		0.1 U		0.003		0.23		1.5	
EP-26	2/4/99	0.38 J4		0.15		0.01 U		0.025 U		0.1 U		0.004		0.057		0.52	
EP-26	5/5/99	0.31		0.73		0.01 U		0.039		0.1 U		0.01		0.23		2.3	
EP-26	8/4/99	0.23	0.28 J4	3.5	2.5	0.01 U	0.01 U,UJ4	0.082	0.28 J4	0.1 U	2.2 J4	0.015	0.1	0.64	0.56	7.1	5.4
EP-26	1/26/00		0.085		0.29		0.01 U		0.057		17		0.12		0.74		0.53
EP-26	4/28/00		0.31		0.29		0.01 U		0.025 U		1.6 J4		0.014		1.1		0.87 J2
EP-26	8/7/00		0.38		0.35		0.01 U		0.025 U		0.89		0.008		1.1		1.2
EP-26	11/7/00		0.3		0.26		0.01 U,UJ4		0.025 U		1.2 J4		0.01		0.92		1
EP-26	2/20/01		0.26		0.21		0.01 U		0.025 U		0.57		0.006		1.1		0.74
EP-26	5/10/01		0.26		0.34		0.01 U		0.025 U		0.76		0.006		1.1		0.95
EP-26	5/10/01		0.28		0.35		0.01 U		0.025 U		0.76		0.006		1.1		0.98
EP-26	7/26/01	0.39	0.38	0.43	0.41	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.5 J4	0.003 U	0.003 U	1.3	1.1	1.4	1.6
EP-29	8/7/97	0.31		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.022 J2	
EP-29	11/3/97	0.48		0.005 U		0.01 U		0.025 U		1.8		0.003 U		0.12		0.03	
EP-29	2/3/98	0.29		0.005 U		0.01 U		0.025 U,UJ4		0.11 J4		0.003 U		0.19		0.02 U,UJ4	
EP-29	5/6/98	0.21		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.024	
EP-29	8/6/98	0.26		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.028	
EP-29	11/4/98	0.31 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.02 U	
EP-29	2/3/99	0.26		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.03	
EP-29	5/4/99	0.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.02 U	
EP-29	5/4/99	0.31		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.02 U	
EP-29	8/2/99	0.26	0.26	0.005 U	0.005 U	0.01 U	0.014	0.025 U	0.025 U	0.1 U	7.2	0.003 U	0.008 UJ1	0.12	0.11	0.02 U	0.029 J2
EP-29	10/26/99		0.27 J4		0.005 U		0.03 J4		0.027		14 J2,J4		0.013 J4		0.13 J2		0.03
EP-29	1/31/00		0.33		0.005 U		0.03		0.025 U		10		0.01		0.18		0.025
EP-29	5/4/00		0.38		0.005 U		0.057		0.037		52		0.034		0.21		0.099 UJ1
EP-29	8/2/00		0.28		0.005 U		0.01		0.025 U		13		0.009		0.13		0.042
EP-29	10/30/00		0.28		0.005 U		0.01 U		0.025 U		4.3 J4		0.007 J4		0.15		0.041 UJ1,J4
EP-29	2/22/01		0.32		0.005 U		0.089		0.025 U		28		0.018		0.17		0.051
EP-29	5/16/01		0.27		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.16		0.02 U
EP-29	7/17/01	0.27	0.28	0.005 U	0.005 U	0.01 U	0.015	0.025 U	0.025 U	0.1 U	14	0.003 U	0.01	0.16	0.14	0.02 U	0.037
EP-35	8/7/97	0.4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.4		0.026 J2	
EP-35	11/3/97	0.4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		6.7		0.022	

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EP-35	2/3/98	0.37		0.005 U		0.01 U		0.025 U,UJ4		0.1 J4		0.003 U		4.1		0.021 J4	
EP-35	5/6/98	0.62		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		2.5		0.049	
EP-35	8/6/98	0.26		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		2.5		0.025	
EP-35	11/4/98	0.59 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.5		0.024	
EP-35	2/4/99	0.51 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		2.9		0.02 U	
EP-35	5/4/99	0.58		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		2		0.02 U	
EP-35	8/2/99	0.82	0.78	0.005 U	0.005 U	0.01 U	0.015	0.025 U	0.025 U	0.1 U	1.6	0.003 U	0.009 UJ1	2	1.7	0.02 U	0.027 J2
EP-35	10/26/99		0.67 J4		0.005 U		0.011 J4		0.026		2.8 J2,J4		0.011 J4		1.3 J2		0.02
EP-35	1/31/00		0.92		0.005 U		0.028		0.046		9.8		0.033		0.96		0.044
EP-35	5/4/00		0.51		0.005 U		0.016		0.025 U		1.5 J4		0.008		1.2		0.02 U
EP-35	8/2/00		0.62		0.005 U		0.036		0.025 U		1.9		0.011		1.1		0.039
EP-35	10/30/00		0.73		0.005 U		0.012		0.025 U		1.1 J4		0.007 J4		1.2		0.047 UJ1,J4
EP-35	2/22/01		0.65		0.005 U		0.034		0.033		6.8		0.028		0.86		0.053
EP-35	5/16/01		0.67		0.005 U		0.044		0.025 U		1.9 J4		0.008		0.96		0.022
EP-35	7/17/01	0.59	0.68	0.005 U	0.005 U	0.01 U	0.074	0.025 U	0.025 U	0.1 U	3.2	0.003 U	0.013	0.98	0.92	0.02 U	0.031
EP-4	8/6/97	0.16		0.005 U		0.01 U		0.025 U		1.1		0.003 U		0.005 U		0.02 U	
EP-4	11/4/97	0.14		0.005 U		0.01 U		0.025 U		0.85		0.003 U		0.005 U		0.02 U	
EP-4	2/4/98	0.068		0.005 U		0.01 U		0.025 U,UJ4		0.91		0.003 U		0.005		0.02 U,UJ4	
EP-4	5/5/98	0.085		0.005 U		0.01 U		0.025 U		1.3		0.003 U		0.005 U		0.029	
EP-4	8/5/98	0.14		0.005 U		0.01 U		0.025 U		1.4		0.003 U		0.005 U		0.025	
EP-4	2/3/99	0.08 J4		0.005 U		0.01 U		0.025 U		0.29		0.003 U		0.005 U		0.02 U	
EP-4	5/5/99	0.086		0.005 U		0.01 U		0.025 U		0.88		0.003 U		0.005 U		0.02 U	
EP-4	8/2/99	0.15	0.13	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.9	2.2	0.003 U	0.015 UJ1	0.005 U	0.005 U	0.02 U	0.025 J2
EP-4	10/25/99		0.16		0.005 U		0.012		0.18		13 J2		0.086		0.005 J2		0.14
EP-4	1/29/00		0.13		0.005 U		0.01 U		0.025 U		7.5		0.057		0.005 U		0.074
EP-4	4/24/00		0.12		0.005 U		0.01 U		0.14		10		0.077		0.005 U		0.098
EP-4	8/1/00		0.14		0.005 U		0.01 U		0.025		3.2		0.016 UJ1		0.005 U		0.025 UJ1
EP-4	10/30/00		0.13		0.005 U		0.01 U		0.039		2.8 J4		0.023 J4		0.005 U		0.068 UJ1,J4
EP-4	10/30/00		0.14		0.005 U		0.01 U		0.029		2 J4		0.017 J4		0.005 U		0.062 UJ1,J4
EP-4	2/5/01		0.072		0.005 U		0.01 U		0.045		3.3		0.022		0.005 U		0.042 J4
EP-4	5/4/01		0.075		0.005 U		0.01 U		0.26		22		0.1		0.005 U		0.17
EP-4	7/16/01	0.095	0.11	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.047	0.63	6.6	0.003 U	0.038	0.005 U	0.005 U	0.02 U	0.09
EP-43	11/3/97	0.78		0.005 U		0.01 U		0.025 U		1.1		0.003 U		0.053		0.02 U	
EP-43	2/3/98	1.2		0.005 U		0.01 U		0.025 U,UJ4		0.17 J4		0.003 U		0.15		0.02 U,UJ4	
EP-43	5/20/98	0.72		0.005 U		0.01 U		0.025 U		1.6		0.004 U		0.52		0.02 U	
EP-43	8/27/98	0.78		0.005 U		0.01 U		0.025 U		0.15		0.003 U		0.61		0.04	
EP-43	11/16/98	7		0.005 U		0.01 U		0.025 U		9		0.003 U		0.094		0.02	
EP-43	2/25/99	1.3		0.005 U		0.01 U		0.025 U		0.48 J4		0.003 U		0.17		0.02 U	
EP-43	2/25/99	1.1		0.005 U		0.01 U		0.025 U		0.77 J4		0.003 U		0.19		0.02 U	
EP-43	5/14/99	0.37		0.005 U		0.01 U		0.025 U		0.96		0.003 U		0.34 J4		0.029	
EP-43	8/11/99	0.33	0.32	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.8	1.7 J4	0.003 U	0.003 U	0.27	0.27	0.02 U	0.02 U
EP-43	8/11/99	0.32	0.33	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.7	1.7 J4	0.003 U	0.003 U	0.26	0.28	0.023 UJ1	0.02 U
EP-43	10/29/99		1		0.005 U		0.01 U		0.027		1.7 J2		0.015		0.15		0.03
EP-43	2/8/00		1.3		0.005 U		0.054		0.035		2.4		0.023		0.12		0.028
EP-43	8/16/00		1.4		0.005 U		0.046		0.069		2.1		0.041		0.14 J4		0.054 J4
EP-43	11/14/00		1.1		0.005 U		0.01 U		0.025 U		0.4		0.006		0.05		0.028 J4, UJ1
EP-43	2/26/01		0.62		0.005 U		0.01 U		0.025 U		0.4		0.004 J4		0.028		0.022 UJ1
EP-43	5/17/01		0.81		0.005 U		0.014		0.025 U		0.71		0.015		0.051		0.038
EP-43	7/30/01	0.24	0.44	0.005 U	0.005 U	0.01 U	0.031	0.025 U	0.026	0.24 J4	1.2	0.006	0.022	0.01	0.041	0.028 J4	0.05 J4
EP-44	10/26/99		3.1		0.005 U		0.01 U,UJ4		0.036		1.1 J2,J4		0.028 J4		0.089 J2,J4		0.12
EP-49	11/19/97	207		43		0.24		5.1		1732		0.11		0.11		579	

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EP-49	2/19/98	464		43		0.047		0.089		2381		0.014		0.14		1900	
EP-49	5/21/98	274		43		0.1		0.044		1609		0.004 U		0.19		1138	
EP-49	8/27/98	417		40		0.05 U		0.1 U		1833		0.048		0.1 U		1499	
EP-49	11/16/98	294		38		0.037		0.025		1541		0.003 U		0.1 U		975	
EP-49	2/25/99	320		26		0.05 U		0.025 U		1266		0.003 U		0.25		789	
EP-49	5/14/99	354		29		0.011		0.031		1548		0.005		0.12 J4		1063	
EP-49	11/2/99		221		13		0.023		1.2		631 J2		0.78		0.11		420
EP-49	1/29/00		40		0.28		0.017		0.045		49		0.023		0.056		59
EP-49	4/28/00		42		0.053		0.01 U		0.025 U		29		0.007		0.1		35 J2
EP-49	8/7/00		34		0.088		0.02		0.025		21		0.007		0.05		32
EP-49	11/7/00		33		0.038		0.01 U,UJ4		0.025 U		25		0.003 U		0.051		30
EP-49	2/20/01		26		0.034		0.014		0.025 U		9.5		0.006		0.11		19
EP-49	2/20/01		26		0.033		0.011		0.025 U		9.4		0.006		0.12		19
EP-49	5/10/01		17		0.038		0.02 U		0.025 U		1.6		0.003		0.089		11
EP-49	7/26/01	21	11	0.035	0.15	0.01 U	0.01 U	0.025 U	0.11	0.83	1.7 J4	0.003 U	0.003 U	0.14	0.14	10	16
EP-5	8/6/97	0.047		0.005 U		0.016		0.025 U		0.31		0.003 U		0.005 U		0.02 U	
EP-5	11/4/97	0.033		0.005 U		0.01 U		0.025 U		0.1 U		0.01		0.033		0.027	
EP-5	2/4/98	0.059		0.005 U		0.01 U		0.025 U,UJ4		0.21 J4		0.003 U		0.005		0.021 J4	
EP-5	5/5/98	0.05		0.005 U		0.01 U		0.025 U		0.21		0.003		0.005 U		0.057	
EP-5	8/5/98	0.056		0.005 U		0.01 U		0.025 U		0.86		0.003 U		0.005 U		0.028	
EP-5	11/3/98	0.069 J4		0.005 U		0.01 U		0.03		0.16		0.005		0.005 U		0.033	
EP-5	2/3/99	0.037 J4		0.005 U		0.01 U		0.025 U		0.11		0.003		0.005 U		0.029	
EP-5	5/5/99	0.054		0.005 U		0.01 U		0.025 U		0.1 U		0.005		0.005 U		0.032	
EP-5	8/2/99	0.061	0.057	0.005 U	0.005 U	0.012	0.01 U	0.025 U	0.025 U	0.1	1.5	0.003 U	0.018 UJ1	0.005 U	0.005	0.02 U	0.057 J2
EP-5	10/25/99		0.042		0.005 U		0.01 U		0.055		0.43 J2		0.013		0.15 J2		0.04
EP-5	4/24/00		0.044		0.005 U		0.01 U		0.13		0.19		0.009 UJ1		0.027		0.03
EP-5	8/1/00		0.13		0.005 U		0.01 U		0.047		0.46		0.017 UJ1		0.006		0.03 UJ1
EP-5	10/31/00		0.08		0.005 U		0.01 U		0.055		3.1 J4		0.039		0.019		0.078 UJ1,J4
EP-5	2/5/01		0.064		0.005 U		0.01 U		0.078		1.5		0.029		0.013		0.044 J4
EP-5	5/4/01		0.095		0.005		0.01 U		0.16		1.8		0.027		0.005 U		0.061
EP-5	7/16/01	0.1	0.1	0.005 U	0.005 U	0.01 U	0.01 U	0.029	0.053	0.21	0.64	0.005	0.016	0.005 U	0.005 U	0.028	0.1
EP-51	8/11/97																
EP-51	8/26/97	0.033		0.034		0.029		0.076		1.4		0.003 U		0.22		0.53	
EP-51	11/6/97	0.29		0.18		0.031		0.19		2.2		0.003 U		0.16		4.4	
EP-51	11/6/97	0.28		0.21		0.022		0.19		2.2		0.003 U		0.19		5.1	
EP-51	2/12/98	10		3.9		0.01 U		5.6		1.8		0.003 U		0.17		61	
EP-51	5/11/98	0.26		0.15		0.01 U		0.44		0.54		0.003 U		0.13		2.2	
EP-51	8/12/98	0.25		0.076		0.01 U		0.3		0.98		0.003 U		0.24		1	
EP-51	11/5/98	0.079 J4		0.062		0.013		0.26		2		0.003 U		0.25		0.97	
EP-51	11/5/98	0.11 J4		0.061		0.014		0.24		2		0.003 U		0.25		0.96	
EP-51	2/9/99	0.12		0.078		0.017		0.094		3.2 J4		0.003 U		0.23		1	
EP-51	2/9/99	0.11		0.075		0.016		0.077		2.6 J4		0.003 U		0.23		1	
EP-51	5/6/99	0.3		0.049		0.01 U		0.098		1.5		0.003 U		0.25		0.71	
EP-51	8/4/99	0.44	0.37 J4	0.034	0.035	0.01 U	0.1 J4	0.049	0.051 J4	0.1 U	0.31 J4	0.003 U	0.004 J4	0.23	0.23	0.35	0.35
EP-51	8/4/99	0.46	0.55 J4	0.033	0.033	0.01 U	0.51 J4	0.047	0.084 UJ4	0.1 U	1.3 J4	0.003 U	0.012 J4	0.24	0.24	0.34	0.33
EP-51	11/2/99		0.97		0.034		3		0.25		4.2		0.038		0.29		0.5
EP-51	1/26/00		1.2		0.031		4.7		0.24		6.2		0.051		0.23		0.43
EP-51	4/28/00		0.56		0.031		1.5		0.2		2.3 J4		0.02		0.27		0.46 J2
EP-51	8/7/00		0.75		0.029		4.3		0.19		5.1		0.039		0.27		0.43
EP-51	8/7/00		0.88		0.03		5.5		0.21		5.9		0.047		0.27		0.47
EP-51	11/7/00		0.48		0.038		2.1 J4		0.17		8.1 J4		0.031		0.2		0.45

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EP-51	11/7/00		0.42		0.038		1.4 J4		0.16		5.5 J4		0.032		0.2		0.45
EP-51	2/16/01		0.37		0.034		1.6		0.24		9.8		0.015		0.22		0.69
EP-51	5/10/01		0.34		0.038		0.99		0.18		2.6		0.011		0.22		0.49
EP-51	7/20/01	0.14	0.29	0.038	0.041	0.077	1.5	0.091	0.17	4.1	5.8	0.003 U	0.014	0.18	0.19	0.48	0.56
EP-52	11/6/97	0.97		0.64		0.017		0.53		0.55		0.044		0.36		2.6	
EP-52	2/12/98	1.6		0.71		0.01 U		0.45		0.55		0.043		0.3		3.6	
EP-52	8/12/98	1.6		0.56		0.01 U		0.69		0.1 U		0.05		0.34		2.6	
EP-52	8/12/98	1.7		0.59		0.01 U		0.7		0.1 U		0.051		0.36		2.8	
EP-52	11/5/98	1.7 J4		0.6		0.01 U		0.59		0.1 U		0.13		0.35		2.9	
EP-52	2/9/99	0.23		0.59		0.032		0.41		1.7 J4		0.021		0.25		3.9	
EP-52	5/6/99	0.81		1.9		0.057		0.35		2.5		0.031		0.38		3.1	
EP-52	8/5/99	1	1.4	0.51	0.51	0.024	0.16	0.36	0.39	0.59	2.2	0.041	0.44	0.28	0.29	2.1	2.7
EP-52	10/29/99		1.6		0.45		0.097		0.5		2.1 J2		0.75		0.25		2.2
EP-52	1/26/00		1.5		0.43		0.041		0.44		1.2		0.51		0.21		1.7
EP-52	4/28/00		1.5		0.51		0.12		0.64		2.8 J4		0.96		0.24		2.5 J2
EP-52	8/7/00		1.3		0.43		0.12		0.54		3.1		0.83		0.18		2.7
EP-52	11/7/00		1.7		0.45		0.19 J4		0.57		6.4 J4		1.5		0.18		2.8
EP-52	2/20/01		1.5		0.36		0.18		0.59		5.9		1.4		0.2		2.2
EP-52	5/10/01		1.7		0.45		0.32		0.57		11		1.6		0.17		3.5
EP-52	7/20/01	0.22	0.81	0.4	0.4	0.01 U	0.072	0.3	0.42	0.19	4	0.05	0.68	0.17	0.17	2.3	2.3
EP-53	8/11/97	51		1.3		0.01 U		0.025 U		0.1 U		0.003 U		0.76		3.6	
EP-53	2/4/98	63		1.4		0.01 U		0.032 J4		0.1 U,UJ4		0.003 U		1.7		4.3	
EP-53	6/10/98	63		1.3		0.01 U		0.025 U		0.1 U		0.003 U		1.4		4.2	
EP-53	8/12/98	62		1.4		0.01 U		0.025 U		0.1 U		0.003 U		1.2		4.5	
EP-53	11/5/98	56 J4		1.6		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		2		5.2	
EP-53	2/4/99	55		1.7		0.01 U		0.025 U		0.1 U		0.003 U		1.4		5.7	
EP-53	5/5/99	54		1.4		0.01 U		0.025 U		0.1 U		0.003 U		1.1		4.6	
EP-53	8/4/99	44	42	0.46	0.46	0.01 U	0.01 U,UJ4	0.025 U	0.025 U,UJ4	0.1 U	1.7 J4	0.003 U	0.004 J4	0.75	0.62	1.2	1.1
EP-53	10/26/99		55		1.8		0.01 U,UJ4		0.041		7 J2,J4		0.006 J4		1.7 J2		5.5
EP-53	2/1/00		45		1.2		0.01 U		0.04		13 J4		0.011		1.1		4
EP-53	5/3/00		32		0.38		0.01 U		0.025 U		8.8		0.007		0.53		1.1
EP-53	8/16/00		35		1.3		0.01 U		0.043		6.6		0.008		2.1 J4		3.4
EP-53	11/13/00		49		1.4		0.01 U		0.027		6.7		0.006		1.2		4.1
EP-53	2/21/01		37		1		0.01 U		0.025 U		3.8		0.003 U		1.1		3.6
EP-53	5/10/01		32		0.47		0.02 U		0.034		39		0.019		0.66		2.2
EP-53	7/30/01	30	27	0.19	0.22	0.01 U	0.01 U	0.025 U	0.026	0.1 U	10 J4	0.003 U	0.008	0.64	0.52	0.61	0.95
EP-54	8/11/97																
EP-54	8/26/97	22		5.7		0.01 U		0.18		13		0.003 U		0.075		113	
EP-54	11/6/97	29		4.5		0.01 U		0.57		14		0.003 U		0.071		94	
EP-54	2/12/98	27		2		0.01 U		0.21		2.3		0.003 U		0.065		41	
EP-54	5/11/98	50		1.5		0.01 U		0.12		3.4		0.011		0.082		32	
EP-54	8/12/98	59		0.84		0.01 U		0.06		2.1		0.035		0.065		17	
EP-54	11/5/98	50 J4		0.7		0.01 U		0.086		0.24 J4		0.007		0.11		12	
EP-54	2/9/99	50		0.55		0.01 U		0.066		0.36 J4		0.004		0.098		10	
EP-54	5/6/99	56		0.53		0.01 U		0.059		0.22		0.005		0.07		9.2	
EP-54	5/7/99	47		0.47		0.01 U		0.089		0.1 U		0.003 U		0.11		8	
EP-54	8/4/99	50	45	0.49	0.47	0.01 U	0.015 J4	0.1	0.12 J4	0.16	2.9 J4	0.003 U	0.007 J4	0.17	0.13	9.8	9.4
EP-54	10/29/99		49		0.86		0.013		0.62		11 J2		0.019		0.21		10
EP-54	1/26/00		57		0.57		0.016		0.38		16		0.022		0.12		12
EP-54	4/28/00		42		0.6		0.01 U		0.36		6.9 J4		0.011		0.16		10 J2
EP-54	8/7/00		34		0.66		0.02		0.55		14		0.018		0.13		11

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EP-54	11/7/00		37		0.7		0.019 J4		0.49		13 J4		0.015		0.12		12
EP-54	2/20/01		25		0.45		0.01 U		0.22		2.8		0.008		0.12		9.8
EP-54	5/10/01		37		0.67		0.02 U		0.067		21		0.04		0.11		10
EP-54	7/26/01	22	26	0.34	0.45	0.01 U	0.01	0.13	0.37	0.1 U	7.8 J4	0.003 U	0.013	0.16	0.16	6.9	7.9
EP-55	8/15/97	62		0.13		0.01 U		0.025 U		229		0.02		0.28		200	
EP-55	11/19/97	59		0.043		0.01 U		0.025 U		130		0.003 U		0.24		82	
EP-55	2/12/98	57		0.042		0.01 U		0.025 U		99		0.003 U		0.19		71	
EP-55	5/20/98	56		0.013		0.01 U		0.025 U		84		0.004 U		0.18		43	
EP-55	8/27/98	61		0.008		0.01 U		0.025 U		77		0.003 U		0.068		35	
EP-55	11/16/98	40		0.005 U		0.01 U		0.025		71		0.003 U		0.1 U		27	
EP-55	2/11/99	55		0.005 U		0.01 U		0.025 U		95		0.003 U		0.079		41	
EP-55	5/14/99	26		0.005 U		0.01 U		0.025 U		52		0.003 U		0.1 J4		20	
EP-55	8/10/99	25	29	0.005 U	0.19	0.01 U	0.01 U	0.025 U	0.033	35	45 J4	0.003 U	0.028	0.026	0.052	12	27
EP-55	10/29/99		36		0.58		0.011		0.11		57 J2		0.13		0.17		51
EP-55	2/7/00		54		0.16		0.01 U		0.031		46		0.031		0.15		29
EP-55	5/4/00		54		1.3		0.026		0.28		67		0.6		0.27		102
EP-55	8/16/00		63		0.56		0.01 U		0.064		41		0.14		0.12 J4		43
EP-55	11/14/00		51		0.38		0.01 U		0.027		31		0.08		0.11		32
EP-55	2/22/01		60		0.84		0.019		0.18		50		0.29		0.2		77
EP-55	5/11/01		63		2.3		0.02 U		0.17		89		0.44		0.36		177
EP-55	7/26/01	43	92	0.005 U	8.7	0.01 U	0.09	0.025 U	0.28	16	292 J4	0.003 U	1.1	0.027	0.43	4.4	923
EP-56	8/11/97																
EP-56	8/26/97	1.9		0.004		0.01 U		0.025 U		0.1 U		0.003		0.048		0.026	
EP-56	11/4/97	2.9		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.057		0.022	
EP-56	2/4/98	2.2		0.005 U		0.01 U		0.027 J4		0.1 U,UJ4		0.003 U		0.048		0.025 J4	
EP-56	5/7/98	1.9		0.005 U		0.01 U		0.025		0.1 U		0.003		0.058		0.039	
EP-56	8/12/98	1.5		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.036		0.021	
EP-56	11/4/98	1 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003		0.018		0.02 U	
EP-56	2/4/99	0.74 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.011		0.037 UJ1	
EP-56	2/4/99	1.3 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.013		0.032 UJ1	
EP-56	5/4/99	1.3		0.005 U		0.01 U		0.025 U		0.1 U		0.005		0.015		0.037	
EP-56	8/4/99	2.8	2.2 J4	0.005 U	0.005 U	0.01 U	0.01 U,UJ4	0.025 U	0.025 U,UJ4	0.1 U	2.9 J4	0.004	0.01 J4	0.026	0.024	0.02 U	0.049
EP-56	10/26/99		0.33 J4		0.005 U		0.01 J4		0.047		14 J2,J4		0.016 J4		0.041 J2,J4		0.05
EP-56	10/26/99		0.43 J4		0.005 U		0.022 J4		0.064		28 J2,J4		0.026 J4		0.031 J2,J4		0.06
EP-56	2/1/00		2.7 J4		0.005 U		0.012		0.028		29 J4		0.017		0.05		0.045
EP-56	2/1/00		2.1 J4		0.005 U		0.012		0.03		23 J4		0.015		0.051		0.041
EP-56	5/3/00		1.2		0.005 U		0.014		0.034		32		0.026		0.015		0.055
EP-56	8/16/00		1.4		0.005 U		0.063		0.064		77		0.036		0.035 J4		0.11 J4
EP-56	11/13/00		2.5		0.005 U		0.021		0.033		25		0.02		0.016		0.053 UJ1
EP-56	2/22/01		2.1		0.005 U		0.064		0.071		73		0.035		0.029		0.23
EP-56	5/10/01		3.1		0.005 U		0.15		0.15		235		0.099		0.028		0.57
EP-56	7/26/01	3	3	0.005 U	0.005 U	0.01 U	0.02	0.025 U	0.038	0.01 U	60 J4	0.003 U	0.038	0.002	0.027	0.02 U	0.089
EP-57	8/16/97	1.1		0.005 U		0.01 U		0.025 U		0.6		0.003 U		0.03		0.027	
EP-57	11/14/97	0.97		0.005 U		0.01 U		0.025 U		0.28		0.003 U		0.005 U		0.02 U	
EP-57	2/18/98	0.98 J4		0.005 U		0.01 U		0.025 U		0.1 U,UJ4,UJ4		0.003 U		0.005 U		0.022 J4	
EP-57	5/18/98	0.79		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
EP-57	8/24/98	0.6		0.005 U		0.01 U		0.025 U		0.28		0.003 U		0.01 U		0.02 U	
EP-57	11/16/98	0.52		0.005 U		0.01 U		0.025 U		0.26		0.003 U		0.005 U		0.02 U	
EP-57	2/24/99	0.56		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.028		0.02 U	
EP-57	5/13/99	0.35		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.64		0.02 U	
EP-57	8/10/99	0.25	0.29	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.27	3.1 J4	0.003 U	0.003	0.005 U	0.006	0.02 U	0.02 U

Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-57	11/3/99		0.5		0.005 U		0.01 U		0.025 U		6.7		0.012 J4		0.005 U		0.03
EP-57	2/7/00		0.43		0.005 U		0.01 U		0.025 U		0.79		0.004		0.015		0.02 U
EP-57	5/8/00		0.37		0.005 U		0.01 U		0.025 U		1.2		0.006		0.01		0.02 U
EP-57	8/15/00		0.35 J4		0.005 U		0.01 U		0.025 U		0.59		0.003 U		0.005 U		0.02 U
EP-57	11/13/00		0.25		0.005 U		0.01 U		0.025 U		1.4		0.003		0.005 U		0.02 U
EP-57	2/23/01		0.41		0.005 U		0.01 U		0.025 U		2.8 J4		0.003 UJ1		0.005 U		0.034 UJ1
EP-57	5/16/01		0.32		0.005 U		0.01 U		0.025 U		0.93 J4		0.003 U		0.005 U		0.02 U
EP-57	7/30/01	0.17	0.38	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U,UJ4	2.4	0.003 U	0.003 U	0.005 U	0.005 U	0.02 U,UJ4	0.02 U,UJ4
EP-58	8/16/97	1.4		0.005 U		0.01 U		0.025 U		2.7		0.003 U		0.16		0.022	
EP-58	11/14/97	4.8		0.005 U		0.01 U		0.025 U		0.98		0.003 U		0.027		0.024	
EP-58	2/18/98	4.2		0.005 U		0.01 U		0.025 U		0.9 J4		0.003 U		0.027		0.02 U,UJ4	
EP-58	5/18/98	4.5		0.005 U		0.011		0.025 U		0.9		0.003 U		0.034		0.023	
EP-58	8/24/98	4.1		0.005 U		0.01 U		0.025 U		1.4		0.003 U		0.046		0.03	
EP-58	11/16/98	3.7		0.005 U		0.01 U		0.025 U		1		0.003 U		0.036		0.02 U	
EP-58	2/24/99	3.7		0.005 U		0.01 U		0.025 U		1		0.003 U		0.03		0.02 U	
EP-58	5/13/99	5.1		0.005 U		0.01 U		0.025 U		0.91		0.003 U		0.034		0.02 U	
EP-58	8/10/99	4.1	4	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.7	2.1 J4	0.003 U	0.004	0.019	0.037	0.02 U	0.02 U
EP-58	11/3/99		4.2		0.005 U		0.02		0.11		30		0.082 J4		0.1		0.15
EP-58	2/7/00		3.4		0.005 U		0.01 U		0.025 U		7.6		0.016		0.16		0.031
EP-58	5/8/00		3.6		0.005 U		0.01 U		0.025 U		4.2		0.013		0.069		0.033 UJ1,J2
EP-58	5/8/00		3.7		0.005 U		0.01 U		0.025 U		3.9		0.01		0.065		0.034 UJ1,J2
EP-58	8/15/00		3.1 J4		0.005 U		0.01 U		0.025 U		2.1		0.006		0.023		0.02 U
EP-58	8/15/00		5.8 J4		0.005 U		0.01 U		0.025 U		2		0.005		0.024		0.02 U
EP-58	11/13/00		3.4		0.005 U		0.01 U		0.025 U		1.7		0.003		0.027		0.02 U
EP-58	2/23/01		3.2		0.005 U		0.01 U		0.025 U		1.2 J4		0.003 U		0.053		0.033 UJ1
EP-58	2/23/01		3.5		0.005 U		0.01 U		0.025 U		0.97 J4		0.003 U		0.053		0.038 UJ1
EP-58	5/16/01		3.7		0.005 U		0.01 U		0.025 U		0.5 J4		0.003 U		0.029		0.02 U
EP-58	7/30/01	3.2	3.3	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.98	2.9	0.003 U	0.008	0.11	0.1	0.023 J4	0.034 J4
EP-59	8/9/97	3.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.18		0.023 J2	
EP-59	11/5/97	3.8		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.021	
EP-59	2/5/98	3.4		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.23		0.02 U	
EP-59	5/8/98	3.1		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.29		0.043	
EP-59	8/10/98	3.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.32		0.046	
EP-59	8/10/98	3.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.32		0.059	
EP-59	11/9/98	2.9		0.007		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.33		0.22	
EP-59	2/10/99	2.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.28		0.045	
EP-59	2/10/99	2.6		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.29		0.055	
EP-59	5/6/99	3.1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.29		0.039	
EP-59	8/3/99	2.8	2.7	0.005 U	0.005 U	0.01 U	0.012	0.025 U	0.025 U	0.1 U	0.22	0.003 U	0.003 U	0.31	0.28	0.02	0.02 U
EP-59	10/27/99		2.6		0.005 U		0.12		0.062		2.1 J2		0.016 UJ1		0.22 J2		0.05
EP-59	1/28/00		2.9		0.005 U		0.032		0.025 U		0.44		0.003		0.26		0.039
EP-59	5/3/00		2.4		0.005 U		0.023		0.025 U		0.28		0.003		0.25		0.02 U
EP-59	8/10/00		2.3		0.005 U		0.027		0.025 U		0.38		0.003 U		0.23		0.02 U
EP-59	8/10/00		2.4		0.005 U		0.026		0.025 U		0.34		0.003 U		0.24		0.02 U
EP-59	10/31/00		2.5		0.005 U		0.031		0.025 U		0.44 J4		0.004		0.28		0.041 UJ1,J4
EP-59	2/21/01		2.5		0.005		0.018		0.025 U		0.14		0.003 U		0.31		0.11 UJ1
EP-59	2/21/01		2.2		0.005		0.01		0.025 U		0.16		0.003 U		0.29		0.1 UJ1
EP-59	5/15/01		2.2		0.005 U		0.01		0.025 U		0.1 U		0.003 U		0.25		0.11
EP-59	7/27/01	2.1	2	0.005 U	0.005 U	0.01 U	0.05	0.025 U	0.025 U	0.18	0.67 J4	0.003 U	0.003 U	0.24	0.21	0.058	0.064
EP-6	8/6/97	0.032		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.033		0.021 J2	
EP-6	11/4/97	0.031		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.049		0.024	

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-6	2/4/98	0.023		0.005 U		0.01 U		0.025 U,UJ4		0.1 U,UJ4		0.003 U		0.009		0.02 U,UJ4	
EP-6	5/5/98	0.021		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.01		0.044	
EP-6	8/5/98	0.024		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.034		0.046	
EP-6	11/3/98	0.025 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.035		0.022	
EP-6	2/3/99	0.014 J4		0.005 U		0.01 U		0.025 U		0.23		0.003 U		0.008		0.02 U	
EP-6	5/5/99	0.023		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.007		0.025	
EP-6	5/5/99	0.023		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.007		0.029	
EP-6	8/2/99	0.021	0.027	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.12	0.003 U	0.003 U	0.043	0.028	0.02 U	0.02 U
EP-6	10/25/99		0.018		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.039 J2		0.02
EP-6	1/29/00		0.02		0.005 U		0.01 U		0.031		0.39		0.016		0.042		0.03
EP-6	4/24/00		0.022		0.005 U		0.01 U		0.025 U		0.1 U		0.004 UJ1		0.054		0.029
EP-6	8/1/00		0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.023 UJ1		0.057		0.02 U
EP-6	10/30/00		0.032		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U,UJ4		0.038		0.047 UJ1,J4
EP-6	2/5/01		0.026		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.064		0.02 U,UJ4
EP-6	5/4/01		0.033		0.007		0.01 U		0.025 U		0.16		0.01		0.068		0.027
EP-6	7/16/01	0.03	0.034	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.038	0.03	0.02 U	0.035
EP-60	8/8/97	0.007		0.005 U		0.011		0.025 U		0.38		0.003 U		0.24		0.026 J2	
EP-60	11/5/97	0.005 U		0.005 U		0.01 U		0.025 U		0.8		0.003 U		0.24		0.021	
EP-60	2/5/98	0.009		0.005 U		0.01 U		0.034		0.4 J4		0.003 U		0.26		0.027	
EP-60	5/8/98	0.008		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.052	
EP-60	8/10/98	0.007		0.005 U		0.01 U		0.025 U		0.13		0.003 U		0.24		0.055	
EP-60	11/9/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.23		0.15	
EP-60	2/10/99	0.009		0.005		0.01 U		0.025 U		1.3		0.003 U		0.25		0.059	
EP-60	5/6/99	0.007		0.005 U		0.01 U		0.025 U		0.16 J4		0.003 U		0.2		0.027	
EP-60	8/3/99	0.006	0.008	0.005 U	0.005 U	0.01 U	0.05	0.025 U	0.025 U	0.18	0.46	0.003 U	0.003 U	0.22	0.21	0.02 U	0.029
EP-60	10/27/99		0.01		0.005 U		0.26		0.025 U		2 J2		0.003 U		0.18 J2		0.02 U
EP-60	1/28/00		0.008		0.005 U		0.06		0.025 U		1.1		0.003 U		0.19		0.02 U
EP-60	5/3/00		0.009		0.005 U		0.43		0.025 U		1.9		0.003 U		0.21		0.021
EP-60	8/10/00		0.012		0.005 U		0.91		0.025		4.8		0.006 UJ1		0.21		0.02 U
EP-60	10/31/00		0.012		0.005 U		0.97		0.025 U		3.9 J4		0.003 U		0.2		0.038 UJ1,J4
EP-60	2/21/01		0.021		0.005 U		0.29		0.025 U		1.8		0.003 U		0.21		0.083 UJ1
EP-60	5/15/01		0.012		0.005 U		0.28		0.025 U		2		0.003 U		0.21		0.057
EP-60	7/27/01	0.022	0.025	0.005 U	0.005 U	0.01 U	0.63	0.025 U	0.025 U	0.1 U	3 J4	0.003 U	0.003 U	0.2	0.21	0.063	0.071
EP-61	8/16/97	0.005 U		0.005 U		0.01 U		0.025 U		1.4		0.003 U		0.42		0.021	
EP-61	11/14/97	0.011		0.005 U		0.01 U		0.025 U		1.2		0.003 U		0.38		0.021	
EP-61	2/18/98	0.025 J4		0.005 U		0.01 U		0.025 U		0.35 J4,J4		0.003 U		0.36		0.02 U,UJ4	
EP-61	2/18/98	0.015 J4		0.005 U		0.01 U		0.025 U		1 J4		0.003 U		0.35		0.02 U,UJ4	
EP-61	5/18/98	0.008		0.005 U		0.01 U		0.025 U		0.18		0.003 U		0.31		0.022	
EP-61	8/24/98	0.011		0.005 U		0.01 U		0.025 U		0.13		0.003 U		0.26		0.022	
EP-61	11/16/98	0.008		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.29		0.02	
EP-61	2/24/99	0.073		0.005 U		0.011		0.025 U		0.18		0.003 U		0.22		0.02 U	
EP-61	5/13/99	0.011		0.005 U		0.015		0.025 U		0.26		0.003 U		0.29		0.02 U	
EP-61	8/10/99	0.014	0.014	0.005 U	0.005 U	0.014	0.02	0.025 U	0.025 U	0.3	1.9 J4	0.003 U	0.003 U	0.3	0.31	0.02 U	0.02 U
EP-61	11/3/99		0.039		0.005 U		0.021		0.091		14		0.035 J4		0.37		0.065
EP-61	2/7/00		0.026		0.005 U		0.01 U		0.025 U		0.29		0.003 U		0.34		0.02 U
EP-61	5/8/00		0.013		0.005 U		0.01 U		0.025 U		0.51		0.004		0.32		0.021 UJ1,J2
EP-61	8/15/00		0.007 J4		0.005 U		0.01 U		0.025 U		0.24		0.003 U		0.21		0.02 U
EP-61	11/13/00		0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.32		0.02 U
EP-61	11/13/00		0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.33		0.02 U
EP-61	2/23/01		0.011		0.005 U		0.01 U		0.025 U		0.38 J4		0.003 U		0.29		0.036 UJ1
EP-61	5/16/01		0.023		0.005 U		0.01 U		0.025 U		0.5 J4		0.003 U		0.31		0.02 U

Cummulative List of Groundwater Quality Results (Metal Analysis)
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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-61	7/30/01	0.011	0.008	0.005 U	0.005 U	0.014	0.012	0.025 U	0.025 U	0.2 J4	0.48	0.003 U	0.003 U	0.3	0.29	0.02 U,UJ4	0.02 U,UJ4
EP-62	8/9/97	1.1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.36		0.023 J2	
EP-62	11/5/97	1.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.39		0.023	
EP-62	2/5/98	0.84		0.005 U		0.01 U		0.026		0.1 J4		0.003 U		0.39		0.023	
EP-62	5/8/98	0.96		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.38		0.039	
EP-62	8/10/98	1.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.36		0.069	
EP-62	11/9/98	0.99		0.011		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.36		0.14	
EP-62	2/10/99	0.77		0.024		0.01 U		0.025 U		0.1 U		0.003 U		0.27		0.13	
EP-62	5/6/99	0.83		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.28		0.039	
EP-62	8/3/99	0.77	0.75	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.14	0.003 U	0.003 U	0.31	0.29	0.028	0.031
EP-62	10/27/99		0.56		0.005 U		0.01 U		0.025 U		0.57 J2		0.003 U		0.19 J2		0.02
EP-62	1/28/00		0.82		0.005 U		0.01 U		0.025 U		0.24		0.003 U		0.26		0.02 U
EP-62	5/3/00		0.87		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.28		0.02 U
EP-62	8/10/00		1.1		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.28		0.02 U
EP-62	10/31/00		1.4		0.005 U		0.01 U		0.025 U		0.28 J4		0.003 U		0.29		0.038 UJ1,J4
EP-62	2/21/01		1.1		0.01		0.01 U		0.025 U		0.31		0.003 U		0.31		0.11 UJ1
EP-62	5/15/01		1.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.31		0.056
EP-62	7/27/01	1.1	1.2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.24 J4	0.003 U	0.003 U	0.26	0.24	0.073	0.079
EP-63	8/9/97	0.019		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.23		0.022 J2	
EP-63	11/5/97	0.021		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.21		0.025	
EP-63	2/5/98	0.02		0.005 U		0.01 U		0.029		0.2 J4		0.003 U		0.2		0.03	
EP-63	5/8/98	0.022		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.052	
EP-63	8/10/98	0.02		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.066	
EP-63	11/9/98	0.025		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.24		0.11	
EP-63	2/10/99	0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.039	
EP-63	5/6/99	0.02		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.028	
EP-63	5/6/99	0.018		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.022 J4	
EP-63	8/3/99	0.021	0.022	0.005 U	0.005 U	0.012	0.01 U	0.025 U	0.025 U	0.1 U	0.55	0.003 U	0.007	0.23	0.24	0.023	0.041
EP-63	10/27/99		0.024		0.005 U		0.01 U		0.035		0.64 J2		0.009 UJ1		0.14 J2		0.02
EP-63	1/28/00		0.022		0.005 U		0.01 U		0.025 U		0.1 U		0.003		0.12		0.02 U
EP-63	5/3/00		0.025		0.005 U		0.021		0.025 U		0.32		0.007		0.14		0.027
EP-63	5/3/00		0.026		0.005 U		0.02		0.025 U		0.33		0.004		0.14		0.024
EP-63	8/10/00		0.021		0.005 U		0.022		0.025 U		0.89		0.01 UJ1		0.2		0.021
EP-63	10/31/00		0.028		0.005 U		0.027		0.026		1 J4		0.013		0.17		0.089 UJ1,J4
EP-63	2/21/01		0.041		0.005 U		0.057		0.031		2.6		0.027		0.077		0.15 UJ1
EP-63	5/15/01		0.03		0.005 U		0.16		0.037		3.6		0.034		0.099		0.091
EP-63	5/15/01		0.028		0.005 U		0.16		0.035		4.1		0.036		0.094		0.094
EP-63	7/27/01	0.041	0.047	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U,J4	0.003 U	0.003 U	0.18	0.18	0.032	0.03
EP-64	8/9/97	0.025		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.5		0.023 J2	
EP-64	11/5/97	0.048		0.005 U		0.01 U		0.025 U		0.1		0.003 U		0.7		0.03	
EP-64	2/5/98	0.043		0.005 U		0.01 U		0.049		0.1 J4		0.003 U		0.65		0.024	
EP-64	5/8/98	0.041		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.61		0.053	
EP-64	8/10/98	0.04		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.6		0.067	
EP-64	11/9/98	0.045		0.014		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.58		0.32	
EP-64	2/10/99	0.039		0.011		0.01 U		0.025 U		0.1 U		0.003 U		0.48		0.084	
EP-64	5/6/99	0.038		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.49		0.043	
EP-64	8/3/99	0.036	0.038	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.51	0.003 U	0.003 U	0.51	0.48	0.026	0.027
EP-64	10/27/99		0.049		0.005 U		0.01 U		0.03		0.39 J2		0.004 UJ1		0.39 J2		0.02
EP-64	1/28/00		0.043		0.005 U		0.01 U		0.025 U		0.76		0.003		0.52		0.02 U
EP-64	5/3/00		0.052		0.005 U		0.01 U		0.025 U		0.14		0.005		0.5		0.02 U
EP-64	8/10/00		0.049		0.005 U		0.01 U		0.025 U		0.17		0.003 U		0.5		0.02 U

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-64	10/31/00		0.051		0.005 U		0.01 U		0.025 U		0.19 J4		0.003 U		0.53		0.052 UJ1,J4
EP-64	2/21/01		0.096		0.009		0.019		0.025 U		1.5		0.004		0.49		0.088 UJ1
EP-64	5/15/01		0.057		0.005 U		0.01 U		0.025 U		0.17		0.003 U		0.54		0.062
EP-64	7/27/01	0.1	0.11	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U,J4	0.003 U	0.003 U	0.5	0.46	0.043	0.049
EP-65	8/16/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.33		0.02 U	
EP-65	11/14/97	0.013		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.29		0.02 U	
EP-65	2/18/98	0.009 J4		0.005 U		0.01 U		0.025 U		0.1 U,UJ4,UJ4		0.003 U		0.2		0.02 U,UJ4	
EP-65	5/18/98	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.02 U	
EP-65	8/24/98	0.006		0.005 U		0.01 U		0.025 U		0.27		0.003 U		0.14		0.02 U	
EP-65	11/16/98	0.007		0.005 U		0.01 U		0.025 U		0.12		0.003 U		0.15		0.02 U	
EP-65	2/24/99	0.007		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.17		0.02 U	
EP-65	2/24/99	0.008		0.005 U		0.01 U		0.025 U		0.12		0.003 U		0.18		0.02 U	
EP-65	5/13/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.3		0.02 U	
EP-65	8/10/99	0.006	0.012	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.3	0.57 J4	0.003 U	0.003 U	0.17	0.18	0.021 UJ1	0.02 U
EP-65	8/10/99	0.005	0.012	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.3	0.56 J4	0.003 U	0.003 U	0.17	0.19	0.02 U	0.02 U
EP-65	11/3/99		0.033		0.005 U		0.01 U		0.026		0.67		0.007 J4		0.24		0.02 U
EP-65	2/7/00		0.02		0.005 U		0.01 U		0.025 U		0.17		0.003 U		0.2		0.02 U
EP-65	2/7/00		0.018		0.005 U		0.01 U		0.025 U		0.23		0.003 U		0.2		0.02 U
EP-65	5/8/00		0.012		0.005 U		0.01 U		0.025 U		0.12		0.003 U		0.22		0.02 U
EP-65	8/15/00		0.006 J4		0.005 U		0.01 U		0.025 U		0.5		0.003		0.18		0.02 U
EP-65	11/13/00		0.005 U		0.005 U		0.01 U		0.025 U		0.1		0.003 U		0.22		0.02 U
EP-65	2/23/01		0.006		0.005 U		0.01 U		0.025 U		0.21 J4		0.003 U		0.21		0.038 UJ1
EP-65	5/16/01		0.059		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.22		0.02 U
EP-65	7/30/01	0.006	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U,J4	0.35	0.003 U	0.003 U	0.26	0.25	0.02 U,UJ4	0.02 U,UJ4
EP-65	7/30/01	0.005	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U,J4	0.19	0.003 U	0.003 U	0.26	0.25	0.021 J4	0.02 U,UJ4
EP-66	8/8/97	13		0.005 U		0.011		0.025 U		0.1 U		0.003 U		0.26		0.046 J2	
EP-66	11/5/97	11		0.005 U		0.01 U		0.025 U		0.15		0.003 U		0.26		0.027	
EP-66	2/5/98	9.7		0.005 U		0.01 U		0.032		0.1 J4		0.003 U		0.26		0.024	
EP-66	5/8/98	10		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.25		0.059	
EP-66	8/10/98	11		0.007		0.01 U		0.025 U		0.1 U		0.003 U		0.3		0.092	
EP-66	11/9/98	8.6		0.078		0.01 U		0.066		0.1 U,UJ4		0.003 U		0.24		0.63	
EP-66	2/10/99	9.1		0.034		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.22	
EP-66	5/6/99	9.9		0.011		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.094	
EP-66	8/4/99	10	9.6	0.005 U	0.012	0.01 U	0.01 U,UJ4	0.025 U	0.026 J4	0.1 U	0.22 J4	0.003 U	0.004	0.28	0.28	0.022	0.045
EP-66	10/27/99		6.1		0.005 U		0.01 U		0.025 U		0.82 J2		0.004 UJ1		0.22 J2		0.03
EP-66	1/28/00		10		0.005 U		0.01 U		0.025 U		0.8		0.005		0.21		0.02 U
EP-66	5/3/00		8.8		0.005 U		0.01 U		0.025 U		0.3		0.003 U		0.28		0.022
EP-66	8/10/00		8.5		0.005 U		0.01 U		0.025 U		0.17		0.006 UJ1		0.29		0.021
EP-66	10/31/00		8.1		0.005 U		0.01 U		0.026		0.54 J4		0.005		0.31		0.065 UJ1,J4
EP-66	2/21/01		7.5		0.011		0.01 U		0.025 U		0.49		0.003		0.26		0.093 UJ1
EP-66	5/15/01		8.8		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.29		0.024
EP-66	7/27/01	8.6	8.4	0.005 U	0.005 U	0.01 U	0.01 U	0.026	0.029	0.1 U	0.1 U,J4	0.003 U	0.003 U	0.31	0.3	0.042	0.051
EP-67	8/12/97	0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.022	
EP-67	11/7/97	0.042		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.038	
EP-67	2/11/98	0.015 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.02	
EP-67	2/11/98	0.015 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.02 U	
EP-67	5/12/98	0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.028	
EP-67	8/13/98	0.013		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.031	
EP-67	11/10/98	0.021		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.08	
EP-67	2/10/99	0.016		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.043	
EP-67	5/7/99	0.02		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.031 J4	

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EP-67	8/5/99	0.02	0.023	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.21	0.003 U	0.003 U	0.12	0.11	0.037	0.023
EP-67	10/28/99		0.017		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.02 U
EP-67	1/24/00		0.009		0.005 U		0.01 U		0.025 U		0.12		0.011 UJ1		0.1		0.02 U
EP-67	4/24/00		0.02		0.005 U		0.01 U		0.025 U		0.12		0.009 UJ1		0.11		0.051
EP-67	8/2/00		0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.005 U		0.094		0.02 U
EP-67	8/2/00		0.011		0.005 U		0.01 U		0.025 U		0.1 U		0.009		0.097		0.02 U
EP-67	10/31/00		0.01		0.005 U		0.01 U		0.025 U		0.21 J4		0.003		0.1		0.057 UJ1,J4
EP-67	2/8/01		0.014		0.005 U		0.01 U		0.025 U		0.1		0.003 U		0.11		0.03 UJ1
EP-67	2/8/01		0.015		0.005 U		0.01 U		0.025 U		0.11		0.004		0.11		0.039 UJ1
EP-67	5/7/01		0.018		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.1		0.059
EP-67	7/17/01	0.026	0.028	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.096	0.09	0.02	0.025
EP-68	8/14/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.33		0.024	
EP-68	8/14/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.33		0.02 U	
EP-68	11/11/97	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.32		0.023	
EP-68	2/11/98	0.005 U,UJ4		0.005 U		0.016		0.025 U		0.1 U		0.003 U		0.28		0.02 U	
EP-68	5/13/98	0.009		0.005 U		0.012		0.025 U		0.1 U		0.003 U		0.33		0.02	
EP-68	5/13/98	0.01		0.005 U		0.012		0.025 U		0.1 U		0.003 U		0.34		0.02 U	
EP-68	8/13/98	0.007		0.005 U		0.016		0.025 U		0.1 U		0.003 U		0.25		0.031	
EP-68	11/9/98	0.009		0.005		0.012		0.025 U		0.1 U,UJ4		0.003 U		0.26		0.071	
EP-68	2/18/99	0.005 U		0.005 U		0.01		0.025 U		0.1 U		0.003 U		0.16		0.062	
EP-68	5/10/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.03 J4	
EP-68	8/5/99	0.005	0.005	0.005 U	0.005 U	0.013	0.01	0.025 U	0.025 U	0.1 U	0.42	0.003 U	0.003 U	0.25	0.24	0.02	0.02 U
EP-68	10/28/99		0.005 U		0.005 U		0.01 U		0.025 U		0.36		0.003 U		0.29		0.02 U
EP-68	1/25/00		0.005 U		0.005 U		0.014		0.025 U		2.5 J4		0.01 UJ1		0.27		0.02 U
EP-68	1/25/00		0.005		0.005 U		0.016		0.025 U		4.6 J4		0.01 UJ1		0.26		0.02 U
EP-68	4/24/00		0.005		0.005 U		0.012		0.025 U		0.25		0.003 U		0.27		0.025
EP-68	4/24/00		0.005		0.005 U		0.011		0.025 U		0.29		0.003 U		0.27		0.029
EP-68	8/2/00		0.005 U		0.005 U		0.01 U		0.025 U		0.47		0.005 U		0.23		0.02 U
EP-68	10/31/00		0.005 U		0.005 U		0.011		0.025 U		0.51 J4		0.003 U		0.21		0.057 UJ1,J4
EP-68	2/9/01		0.008		0.005 U		0.01 U		0.025 U		0.72		0.004		0.33 J4		0.054
EP-68	5/7/01		0.006		0.005 U		0.01 U		0.025 U		0.49		0.003 U		0.25		0.06
EP-68	7/17/01	0.011	0.013	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.44	0.003 U	0.003 U	0.28	0.28	0.02 U	0.02 U
EP-7	8/6/97	0.064		0.005 U		0.01 U		0.025 U		1		0.003 U		0.005 U		0.02 U	
EP-7	11/4/97	0.084		0.005 U		0.01 U		0.025 U		1.2		0.003 U		0.005 U		0.02 U	
EP-7	2/4/98	0.076		0.005 U		0.01 U		0.025 U,UJ4		1.7		0.003 U		0.005 U		0.02 U,UJ4	
EP-7	5/5/98	0.056		0.005 U		0.01 U		0.025 U		1.5		0.003 U		0.005 U		0.028	
EP-7	8/5/98	0.065		0.005 U		0.01 U		0.025 U		1.4		0.003 U		0.005 U		0.024	
EP-7	11/3/98	0.049 J4		0.005 U		0.01 U		0.025 U		0.74		0.003 U		0.005 U		0.02 U	
EP-7	2/3/99	0.044 J4		0.005 U		0.01 U		0.025 U		0.98		0.003 U		0.005 U		0.02 U	
EP-7	2/3/99	0.056 J4		0.005 U		0.01 U		0.025 U		0.85		0.003 U		0.005 U		0.02 U	
EP-7	5/5/99	0.065		0.005 U		0.01 U		0.025 U		1.4		0.003 U		0.005 U		0.025	
EP-7	8/2/99	0.064	0.063	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	1.5	1.6	0.003 U	0.003 U	0.005 U	0.005 U	0.02 U	0.02 U
EP-7	10/25/99		0.12		0.005 U		0.01 U		0.025 U		5.8 J2		0.003 U		0.005 U,UJ2		0.03
EP-7	10/25/99		0.12		0.005 U		0.01 U		0.025 U		5.5 J2		0.003 U		0.005 U,UJ2		0.02
EP-7	1/29/00		0.097		0.005 U		0.01 U		0.025 U		3.5		0.003 U		0.005 U		0.02 U
EP-7	1/29/00		0.095		0.005 U		0.01 U		0.025 U		3		0.005		0.005 U		0.02 U
EP-7	4/24/00		0.068		0.005 U		0.01 U		0.025 U		1.8		0.003 U		0.005 U		0.02
EP-7	8/1/00		0.069		0.005 U		0.01 U		0.025 U		1.3		0.006 UJ1		0.005 U		0.02 UJ1
EP-7	8/1/00		0.077		0.005 U		0.01 U		0.025 U		1.4		0.005 U		0.005 U		0.02 U
EP-7	10/30/00		0.077		0.005 U		0.01 U		0.025 U		1.3 J4		0.003 U,UJ4		0.006		0.045 UJ1,J4
EP-7	2/5/01		0.056		0.005 U		0.01 U		0.025 U		1.5		0.006		0.005 U		0.049 J4

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-7	2/5/01		0.066		0.005 U		0.01 U		0.025 U		1.6		0.003		0.005 U		0.02 U,UJ4
EP-7	5/4/01		0.075		0.005 U		0.01 U		0.025 U		2.5		0.003 U		0.005 U		0.029
EP-7	5/4/01		0.068		0.005 U		0.01 U		0.025 U		2.4		0.003 U		0.005 U		0.026
EP-7	7/16/01	0.058	0.076	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.98	2	0.003 U	0.004	0.005 U	0.005 U	0.02 U	0.041
EP-7	7/16/01	0.049	0.068	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.85	1.9	0.003 U	0.003 U	0.005 U	0.005 U	0.02 U	0.039
EP-70	8/12/97																
EP-70	8/26/97	2		0.01		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.15	
EP-70	8/26/97	1.9		0.01		0.01 U		0.025 U		0.1 U		0.003 U		0.26		0.13	
EP-70	11/7/97	1.7		0.013		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.18	
EP-70	2/11/98	1.4		0.014		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.2	
EP-70	5/12/98	1.2		0.012		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.19	
EP-70	8/13/98	1.2		0.013		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.21	
EP-70	11/10/98	1		0.015		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.23	
EP-70	11/10/98	1		0.014		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.23	
EP-70	2/10/99	0.83		0.014		0.01 U		0.025 U		0.1 U		0.003 U		0.18		0.24	
EP-70	5/7/99	0.83		0.009		0.01 U		0.025 U		0.1 U		0.003 U		0.19		0.14 J4	
EP-70	8/5/99	0.72	0.75	0.009	0.009	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.18	0.19	0.16	0.13
EP-70	10/28/99		0.8		0.009		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.14 J2
EP-70	1/24/00		0.63		0.007		0.01 U		0.025 U		0.1 U		0.01 UJ1		0.19		0.12
EP-70	1/24/00		0.64		0.008		0.01 U		0.025 U		0.1 U		0.009 UJ1		0.19		0.12
EP-70	4/25/00		0.59		0.007		0.01 U		0.025 U		0.12		0.003 U		0.2		0.12
EP-70	8/3/00		0.56		0.006		0.01 U		0.025 U		0.1 U		0.005 U		0.19		0.12
EP-70	11/1/00		0.57		0.006		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.15 UJ1
EP-70	11/1/00		0.58		0.006		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.16 UJ1
EP-70	2/9/01		0.56		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.22 J4		0.16
EP-70	5/7/01		0.6		0.005		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.17
EP-70	7/18/01	0.73	0.73	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.12	0.003 U	0.003 U	0.23	0.23	0.11	0.097
EP-71	8/12/97	0.16		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.28		0.02 U	
EP-71	11/7/97	0.19		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.32		0.027	
EP-71	2/11/98	0.14		0.005 U		0.01 U		0.025		0.1 U		0.012		0.26		0.027	
EP-71	5/12/98	0.13		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.27		0.023	
EP-71	8/13/98	0.14		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.29		0.028	
EP-71	11/10/98	0.13		0.006		0.01 U		0.025 U		0.1 U		0.003 U		0.23		0.081	
EP-71	2/10/99	0.12		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.025	
EP-71	8/5/99	0.13	0.12	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.24	0.24	0.026	0.02
EP-71	10/28/99		0.12		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.23		0.02 U
EP-71	1/24/00		0.11		0.005 U		0.01 U		0.025 U		0.1 U		0.008 UJ1		0.2		0.02 U
EP-71	4/24/00		0.11		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.026
EP-71	8/3/00		0.11		0.005 U		0.01 U		0.025 U		0.1		0.005 U		0.21		0.02 U
EP-71	8/3/00		0.11		0.005 U		0.01 U		0.025 U		0.1 U		0.005 U		0.21		0.02 U
EP-71	11/1/00		0.11		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.23		0.035 UJ1
EP-71	2/9/01		0.093		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.19 J4		0.022
EP-71	2/9/01		0.11		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24 J4		0.032
EP-71	5/7/01		0.11		0.005 U		0.04 U		0.025 U		0.14		0.003 U		0.24		0.044
EP-71	7/18/01	0.11	0.12	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.24	0.26	0.02 U	0.02
EP-71	7/18/01	0.12	0.12	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.25	0.25	0.02 U	0.021
EP-72	8/12/97	0.48		0.21		0.01 U		0.025 U		0.1 U		0.003 U		0.51		0.45	
EP-72	11/7/97	0.49		0.2		0.01 U		0.025 U		0.1 U		0.003 U		0.38		0.47	
EP-72	2/11/98	0.5		0.21		0.01 U		0.025 U		0.1 U		0.003 U		0.36		0.53	
EP-72	5/13/98	0.5		0.22		0.01 U		0.025 U		0.1 U		0.003 U		0.39		0.54	
EP-72	8/13/98	0.49		0.2		0.01 U		0.025 U		0.1 U		0.003 U		0.43		0.54	

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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-72	11/10/98	0.45		0.2		0.01 U		0.025 U		0.1 U		0.003 U		0.42		0.47	
EP-72	1/24/00		0.065		0.005 U		0.01 U		0.025 U		0.86		0.011 UJ1		1.8		0.053
EP-72	4/25/00		0.069		0.005 U		0.01 U		0.025 U		0.28		0.003		6		0.056
EP-72	8/3/00		0.05 U		0.005 U		0.01 U		0.025 U		0.19		0.005 U		6		0.044
EP-72	11/1/00		0.14		0.005 U		0.01 U		0.025 U		0.22		0.007		5.2		0.068 UJ1
EP-72	2/9/01		0.14		0.006		0.01 U		0.025 U		0.12		0.003 U		4.1		0.11
EP-72	5/7/01		0.093		0.005 U		0.01 U		0.034		0.14		0.003 U		9.4		0.13
EP-72	7/18/01	0.094	0.17	0.005 U	0.005 U	0.01 U	0.01 U	0.041	0.035	0.1 U	0.1 U	0.003 U	0.003 U	16	15	0.078	0.074
EP-73	8/12/97	0.031		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.1		0.03	
EP-73	11/13/97	0.033		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.1		0.033	
EP-73	2/12/98	0.023 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.004		1.2		0.022	
EP-73	5/11/98	0.11		0.01		0.01 U		0.025 U		0.1 U		0.003 U		1.3		0.15	
EP-73	8/17/98	0.031		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1.2		0.043	
EP-73	11/5/98	0.039 J4		0.012		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		1.1		0.19	
EP-73	2/9/99	0.038		0.005		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.93		0.067	
EP-73	5/7/99	0.037		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1		0.04 J4	
EP-73	5/7/99	0.034		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		1		0.038 J4	
EP-73	8/5/99	0.027	0.026	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.15	0.003 U	0.003 U	1.1	0.96	0.029	0.024
EP-73	10/29/99		0.061		0.005 U		0.01 U		0.025 U		0.1 U		0.039		1.1		0.054
EP-73	1/26/00		0.019		0.005 U		0.01 U		0.025 U		0.28		0.003 U		0.91		0.02 U
EP-73	4/28/00		0.1		0.005		0.01 U		0.025 U		0.1 J4		0.003 U		0.95		0.14 J2
EP-73	8/7/00		0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.84		0.025
EP-73	11/7/00		0.023		0.005 U		0.01 U,UJ4		0.025 U		0.38 J4		0.003 U		0.87		0.028
EP-73	2/16/01		0.03		0.005 U		0.01 U		0.025 U		0.46		0.003		1		0.06 UJ1
EP-73	5/9/01		0.031		0.005 U		0.01 U		0.025 U		0.5		0.003 U		0.93		0.08
EP-73	7/20/01	0.041	0.054	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.35	0.003 U	0.004	0.89	0.9	0.031	0.034
EP-73	7/20/01	0.041	0.055	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.32	0.003 U	0.004	0.89	0.9	0.031	0.035
EP-74	8/13/97	0.12		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.44		0.02	
EP-75	8/12/97	12		0.036		0.01 U		0.054		0.1 U		0.003		5.3		0.15	
EP-75	11/13/97	21		0.019		0.01 U		0.051		0.1 U		0.003		4		0.16	
EP-75	2/6/98	18		0.022		0.01 U		0.086		0.3 J4		0.003 U		4.49		0.14	
EP-75	5/11/98	17		0.041		0.01 U		0.1		0.1 U		0.005		5.1		0.15	
EP-75	8/17/98	18		0.005 U		0.01 U		0.042		0.1 U		0.003 U		3.7		0.14	
EP-75	11/5/98	18 J4		0.025		0.01 U		0.058		0.13 J4		0.007		5.4		0.44	
EP-75	2/22/99	17		0.01		0.01 U		0.061		0.1 U		0.003		3.8		0.21	
EP-75	5/10/99	18		0.009		0.01 U		0.075		1.2		0.003 U		4		0.062 J4	
EP-75	8/6/99	17	16	0.005	0.005	0.01 U	0.01 U	0.066	0.066	0.1 U	0.37	0.003	0.01	3.8	3.6	0.11	0.094
EP-75	1/26/00		14		0.005 U		0.01 U		0.051		1.5		0.023		3.3		0.084
EP-75	4/28/00		16		0.007		0.01 U		0.069		0.87 J4		0.006		4.8		0.15 J2
EP-75	8/7/00		11		0.005		0.01 U		0.049		0.47		0.006		3.4		0.1
EP-75	11/7/00		9.4		0.009		0.01 U,UJ4		0.062		0.63 J4		0.018		2.7		0.1
EP-75	2/14/01		13		0.007		0.01 U		0.025		0.45		0.003		4.4		0.14
EP-75	5/9/01		14		0.006		0.01 U		0.028		0.49		0.003		4.7		0.15
EP-75	7/20/01	15	15	0.006	0.006	0.01 U	0.01 U	0.066	0.062	0.1 U	0.56	0.003 U	0.016	4.2	4.2	0.077	0.086
EP-76	8/12/97	0.48		0.005 U		0.01 U		0.025 U		0.1 U		0.007		0.14		0.16	
EP-76	11/11/97	0.48		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.17		0.078	
EP-76	2/6/98	0.54		0.005 U		0.01 U		0.025 U		0.1 J4		0.005		0.13		0.07	
EP-76	5/11/98	0.41		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.085	
EP-76	8/17/98	0.42		0.005 U		0.01 U		0.025 U		0.1 U		0.008		0.16		0.073	
EP-76	11/5/98	2.3 J4		0.01		0.01 U		0.05		0.1 U,UJ4		0.023		0.51		0.15	
EP-76	2/22/99	0.77		0.005 U		0.01 U		0.025 U		0.1 U		0.005		0.16		0.054	

Cummulative List of Groundwater Quality Results (Metal Analysis)
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Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-76	5/10/99	1.7		0.005 U		0.01 U		0.025 U		0.56		0.004		0.26		0.057 J4	
EP-76	1/26/00		1.3		0.005 U		0.01 U		0.025 U		0.1 U		0.011		0.18		0.052
EP-76	4/28/00		0.92		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.01		0.16		0.077 J2
EP-76	8/7/00		1.1		0.005 U		0.01 U		0.025 U		0.3		0.007		0.15		0.084
EP-76	11/7/00		1.4		0.005 U		0.01 U,UJ4		0.025 U		0.17 J4		0.01		0.21		0.055
EP-76	2/14/01		1.5		0.005 U		0.01 U		0.025 U		0.18		0.014		0.22		0.12
EP-76	5/9/01		1.3		0.005 U		0.01 U		0.025 U		0.1 U		0.006		0.19		0.11
EP-76	7/20/01	1.1	1	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003	0.007	0.17	0.17	0.045	0.054
EP-77	8/12/97	5.6		0.012		0.01 U		0.025 U		0.1 U		0.006		0.034		0.025	
EP-77	11/13/97	6		0.013		0.01 U		0.025 U		0.1 U		0.005		0.019		0.022	
EP-77	11/13/97	5.7		0.012		0.01 U		0.025 U		0.1 U		0.005		0.024		0.022	
EP-77	2/12/98	5.7		0.015		0.01 U		0.025 U		0.1 U		0.005		0.007		0.024	
EP-77	5/13/98	5.4		0.016		0.01 U		0.025 U		0.1 U		0.005		0.018		0.031	
EP-77	8/17/98	6.1		0.018		0.01 U		0.025 U		0.1 U		0.005		0.019		0.037	
EP-77	11/11/98	6.8		0.02		0.01 U		0.025 U		0.1 U		0.003 U		0.014		0.063	
EP-77	2/11/99	6.2		0.016		0.01 U		0.025 U		0.1 U		0.005		0.025		0.025	
EP-77	5/7/99	7.6		0.011		0.01 U		0.025 U		0.1 U		0.004		0.015		0.025 J4	
EP-77	8/5/99	7.2	6	0.01	0.01	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.55	0.003	0.011	0.025	0.023	0.024	0.036
EP-77	10/29/99		5.8		0.008		0.01 U		0.029		7.4 J2		0.015		0.022		0.03
EP-77	10/29/99		6		0.008		0.01 U		0.025 U		6.2 J2		0.012		0.022		0.027
EP-77	1/25/00		7.7		0.012		0.01 U		0.025 U		0.51 J4		0.012 UJ1		0.023		0.02 U
EP-77	4/28/00		6.5		0.009		0.01 U		0.027		4.5 J4		0.01		0.031		0.11 J2
EP-77	4/28/00		6.6		0.009		0.01 U		0.025 U		3.4 J4		0.008		0.028		0.081 J2
EP-77	8/4/00		6.4		0.007		0.01 U		0.025 U		3.7		0.008		0.015		0.022
EP-77	11/3/00		6.2		0.008		0.01 U		0.025 U		0.46		0.003		0.021		0.025 UJ1
EP-77	2/12/01		3.3		0.005 U		0.01 U		0.025 U		3.8		0.007		0.013		0.05
EP-77	5/9/01		1.5		0.005 U		0.01 U		0.025 U		6.6		0.008		0.013 J4		0.065
EP-77	5/9/01		1.5		0.005 U		0.01 U		0.025 U		8		0.008		0.01 J4		0.059
EP-77	7/19/01	5.4	5.5	0.005 U	0.005	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.74	0.003 U	0.004 J4	0.022	0.018	0.02 U	0.025
EP-78	8/13/97	6.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.35		0.023	
EP-78	11/18/97	5.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.02 U	
EP-78	11/18/97	5.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.02 U	
EP-78	2/6/98	5.9		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.22		0.02 U	
EP-78	5/14/98	5.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.02 U	
EP-78	8/19/98	5.4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.25		0.025	
EP-78	11/11/98	6.4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.74		0.033	
EP-78	2/18/99	4.7		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.2		0.029	
EP-78	5/11/99	5.5		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.026	
EP-78	5/11/99	5.9		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.028	
EP-78	8/9/99	5.9	5.2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.26	0.003 U	0.007 J4	0.68	0.57 J4	0.02 U	0.03
EP-78	10/31/99		4.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.3		0.02 U
EP-78	1/28/00		4.8		0.005 U		0.01 U		0.025 U		0.62		0.009		0.24		0.036
EP-78	5/2/00		4		0.005 U		0.01 U		0.025 U		0.21		0.004		0.2		0.022
EP-78	8/9/00		3.5		0.005 U		0.01 U		0.025 U		0.49		0.006		0.47		0.033
EP-78	11/9/00		3.8		0.005 U		0.01 U		0.025 U		0.1 U		0.013		0.22		0.02 U
EP-78	2/15/01		3.7		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.21		0.048
EP-78	5/14/01		3.9		0.005 U		0.01 U		0.025 U		0.91 J4		0.012		0.16		0.06
EP-78	7/25/01	3.4	3.5	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.52 J4	0.003 U	0.007	0.27	0.23	0.02 U	0.043
EP-79	8/13/97	0.011		0.005 U		0.012		0.025 U		0.1 U		0.003 U		0.17		0.02 U	
EP-79	11/18/97	0.01 UJ1		0.005 U		0.012		0.025 U		0.1 U		0.003 U		0.19		0.02 U	
EP-79	2/6/98	0.007		0.005 U		0.01		0.025 U		0.1 J4		0.003 U		0.18		0.02 U	

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EP-79	5/14/98	0.008		0.005 U		0.011		0.025 U		0.1 U		0.003 U		0.17		0.02 U	
EP-79	8/19/98	0.01		0.005 U		0.012		0.025 U		0.1 U		0.003 U		0.17		0.026	
EP-79	11/11/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.05	
EP-79	2/18/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.092		0.041	
EP-79	5/11/99	0.026		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.024	
EP-79	8/9/99	0.008	0.007	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U,UJ4	0.14	0.12 J4	0.02 U	0.02 U
EP-79	10/31/99		0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.12		0.02 U
EP-79	1/28/00		0.006		0.005 U		0.01		0.025 U		0.8		0.004		0.11		0.024
EP-79	1/28/00		0.006		0.005 U		0.011		0.025 U		0.9		0.006		0.11		0.025
EP-79	5/2/00		0.008 UJ1		0.005 U		0.011		0.025 U		0.13		0.003 U		0.12		0.02 U
EP-79	8/9/00		0.007		0.005 U		0.01 U		0.025 U		0.32		0.003 U		0.11		0.02 U
EP-79	11/9/00		0.014		0.005 U		0.01 U		0.025 U		0.19		0.003		0.094		0.02 U
EP-79	2/15/01		0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.042
EP-79	5/14/01		0.008		0.005 U		0.01 U		0.025 U		3.2		0.003 U		0.092		0.02 U
EP-79	7/25/01	0.02	0.024	0.005 U	0.005 U	0.01 U	0.011	0.025 U	0.025 U	0.1 U	1.3 J4	0.003 U	0.003 U	0.11	0.1	0.02 U	0.023
EP-80	8/13/97	0.019		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.017		0.02 U	
EP-80	11/17/97	0.018		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.041		0.02 U	
EP-80	2/5/98	0.018		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.039		0.02 U	
EP-80	5/13/98	0.02		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.039		0.023	
EP-80	8/19/98	0.014		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.03	
EP-80	11/11/98	0.016		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.022		0.08	
EP-80	2/18/99	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.046		0.052	
EP-80	5/11/99	0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.039		0.022	
EP-80	8/9/99	0.016	0.015	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.46	0.003 U	0.003 U,UJ4	0.006	0.005 U,UJ4	0.027	0.02 U
EP-80	10/27/99		0.015		0.005 U		0.01 U		0.025 U		0.54 J2		0.003 U		0.032 J2		0.02 U
EP-80	1/28/00		0.016		0.005 U		0.01 U		0.025 U		0.38		0.004		0.024		0.02 U
EP-80	5/2/00		0.017 UJ1		0.005 U		0.01 U		0.025 U		0.67		0.006		0.017		0.023
EP-80	8/10/00		0.013		0.005 U		0.01 U		0.025 U		0.26		0.003 U		0.005 U		0.02 U
EP-80	11/9/00		0.02		0.005 U		0.01 U		0.025 U		0.15		0.003 U		0.021		0.024
EP-80	2/16/01		0.025		0.005 U		0.01 U		0.025 U		0.47		0.003 U		0.015		0.082 UJ1
EP-80	5/14/01		0.015		0.005 U		0.01 U		0.025 U		0.79 J4		0.003 U		0.007		0.027
EP-80	7/25/01	0.021	0.02	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.27 J4	0.003 U	0.003 U	0.009	0.01	0.023	0.027
EP-81	8/13/97	0.21		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.02 U	
EP-81	11/17/97	0.19		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.025	
EP-81	2/5/98	0.32		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.21		0.025	
EP-81	5/14/98	0.24		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.021	
EP-81	8/19/98	0.25		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.26		0.038	
EP-81	11/11/98	0.089		0.006		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.11	
EP-81	2/18/99	0.21		0.007		0.01 U		0.025 U		0.1 U		0.003 U		0.19		0.11	
EP-81	5/11/99	0.24		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.071	
EP-81	8/9/99	0.4	0.36	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.15	0.003 U	0.005 J4	0.25	0.26 J4	0.045	0.032
EP-81	10/27/99		0.26		0.005 U		0.01 U		0.025 U		0.38 J2		0.003 U		0.21 J2		0.02 U
EP-81	1/28/00		0.64		0.005 U		0.011		0.025 U		2.1		0.006		0.26		0.032
EP-81	5/2/00		0.58		0.005 U		0.01 U		0.025 U		2.3		0.01		0.27		0.067
EP-81	8/9/00		0.78		0.005 U		0.01 U		0.025 U		0.32		0.003 U		0.28		0.024
EP-81	11/9/00		0.31		0.005 U		0.01 U		0.025 U		0.59		0.003 U		0.26		0.045
EP-81	2/16/01		0.53		0.006		0.01 U		0.025 U		0.58		0.003 U		0.29		0.11 UJ1
EP-81	5/14/01		0.33		0.005 U		0.01 U		0.025 U		0.61 J4		0.003		0.29		0.047
EP-81	7/25/01	0.55	0.48	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U,J4	0.003 U	0.003 U	0.31	0.28	0.05	0.054
EP-82	8/13/97	0.016		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.27		0.02 U	
EP-82	11/18/97	0.011 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.21		0.02 U	

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EP-82	2/11/98	0.006 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.024	
EP-82	5/14/98	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.18		0.022	
EP-82	8/19/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.18		0.027	
EP-82	11/11/98	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.042	
EP-82	2/18/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.038	
EP-82	5/11/99	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.18		0.058	
EP-82	8/9/99	0.01	0.009	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U,UJ4	0.17	0.15 J4	0.022	0.02 U
EP-82	10/31/99		0.011		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.02 U
EP-82	1/27/00		0.006		0.005 U		0.01 U		0.025 U		0.33		0.004		0.12		0.02 U
EP-82	5/2/00		0.009 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.13		0.02 U
EP-82	8/9/00		0.009		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.058		0.02 U
EP-82	11/9/00		0.008		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.11		0.02 U
EP-82	2/15/01		0.01		0.005 U		0.01 U		0.025 U		0.1		0.003 U		0.12		0.03
EP-82	5/14/01		0.009		0.005 U		0.01 U		0.025 U		0.11 J4		0.003 U		0.11		0.022
EP-82	7/25/01	0.014	0.019	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U,J4	0.003 U	0.003 U	0.14	0.13	0.023	0.026
EP-83	8/13/97	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.053		0.021	
EP-83	11/18/97	0.005 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.037		0.02 U	
EP-83	2/6/98	0.006		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.044		0.02 U	
EP-83	5/13/98	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.054		0.02 U	
EP-83	8/19/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.044		0.026	
EP-83	11/12/98	0.008		0.009		0.01 U		0.025 U		0.1 U		0.003 U		0.038		0.14	
EP-83	2/22/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.039		0.035	
EP-83	2/22/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.04		0.033	
EP-83	5/11/99	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.045		0.026	
EP-83	8/9/99	0.006	0.005	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U,UJ4	0.047	0.042 J4	0.02	0.02 U
EP-83	10/30/99		0.007		0.005 U		0.01 U		0.025 U		1.8		0.003		0.044		0.02 U
EP-83	10/30/99		0.008		0.005 U		0.01 U		0.025 U		2		0.003		0.046		0.023 J2
EP-83	1/27/00		0.006		0.005 U		0.01 U		0.025 U		0.25		0.003 U		0.046		0.02 U
EP-83	1/27/00		0.005		0.005 U		0.01 U		0.025 U		0.27		0.003		0.04		0.02 U
EP-83	5/1/00		0.008		0.005 U		0.01 U		0.025 U		0.37		0.003 UJ1		0.048		0.02 UJ1,J2
EP-83	8/9/00		0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.042		0.02 U
EP-83	11/8/00		0.017		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.043		0.027 UJ1
EP-83	11/8/00		0.016		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.041		0.028 UJ1
EP-83	2/14/01		0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.039		0.053
EP-83	5/11/01		0.01		0.005 U		0.01 U		0.025 U		0.33		0.003 U		0.041		0.027 UJ1
EP-83	7/24/01	0.014	0.014	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.25	0.003 U	0.012	0.04	0.041	0.02 U	0.02 U
EP-84	8/13/97	0.1		0.007		0.01 U		0.026		0.1 U		0.009		0.036		0.042	
EP-84	11/18/97	0.041 UJ1		0.007		0.01 U		0.025 U		0.1 U		0.01		0.031		0.035	
EP-84	2/6/98	0.035		0.007		0.01 U		0.037		0.1 J4		0.018		0.024		0.048	
EP-84	5/13/98	0.034		0.006		0.01 U		0.025 U		0.1 U		0.006		0.029		0.052	
EP-84	8/19/98	0.03		0.006		0.01 U		0.025 U		0.1 U		0.027		0.024		0.046	
EP-84	11/12/98	0.031		0.009		0.01 U		0.025 U		0.1 U		0.016		0.021		0.096	
EP-84	2/22/99	0.022		0.008		0.01 U		0.025 U		0.1 U		0.013		0.021		0.046	
EP-84	5/11/99	0.024		0.006		0.01 U		0.025 U		0.1 U		0.013		0.024		0.044	
EP-84	8/9/99	0.097	0.095	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025	0.1 U	0.11	0.008	0.025 J4	0.019	0.017 J4	0.025	0.02 U
EP-84	10/30/99		0.031		0.006		0.01 U		0.025 U		0.1 U		0.027		0.026		0.035 J2
EP-84	1/27/00		0.029		0.007		0.01 U		0.046		0.5		0.087		0.023		0.047
EP-84	5/1/00		0.04		0.005		0.01 U		0.025 U		0.1 U		0.017 UJ1		0.029		0.066 UJ1,J2
EP-84	5/1/00		0.041		0.006		0.01 U		0.025 U		0.1 U		0.02 UJ1		0.029		0.07 UJ1,J2
EP-84	8/9/00		0.036		0.013		0.01 U		0.025 U		0.1 U		0.026		0.018		0.081
EP-84	8/9/00		0.035		0.013		0.01 U		0.025 U		0.1 U		0.02		0.019		0.068

Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-84	11/8/00		0.079		0.01		0.01 U		0.054		0.42		0.067		0.011		0.062 UJ1
EP-84	2/14/01		0.025		0.005		0.01 U		0.025 U		0.1 U		0.029		0.016		0.059
EP-84	5/11/01		0.043		0.008		0.01 U		0.025 U		0.1 U		0.02 UJ1		0.019		0.074 UJ1
EP-84	5/11/01		0.041		0.008		0.01 U		0.025 U		0.1 U		0.019 UJ1		0.019		0.072 UJ1
EP-84	7/24/01	0.026	0.027	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.013	0.019	0.02	0.02	0.031	0.04
EP-85	8/13/97	3.1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.22		0.02 U	
EP-85	11/17/97	3.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.19		0.02 U	
EP-85	2/5/98	2.9		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.15		0.02 U	
EP-85	5/14/98	2.8		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.025	
EP-85	8/19/98	2.7		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.019	
EP-85	8/19/98	2.7		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.032	
EP-85	11/11/98	3.1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.24		0.033	
EP-85	2/18/99	2.5		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.029	
EP-85	2/18/99	2.6		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.16		0.044	
EP-85	5/11/99	2.9		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.02 U	
EP-85	8/9/99	2.8	2.6	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.015 J4	0.2	0.18 J4	0.02	0.02 U
EP-85	8/9/99	2.8	2.6	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.004 J4	0.2	0.46 J4	0.02 U	0.023
EP-85	10/27/99		2.4		0.005 U		0.01 U		0.025 U		0.1 U		0.004 UJ1		0.18 J2		0.02 U
EP-85	10/27/99		2.5		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.19 J2		0.02 U
EP-85	1/28/00		2.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003		0.15		0.02 U
EP-85	5/2/00		2.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.021
EP-85	5/2/00		2.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.14		0.02 U
EP-85	8/9/00		2.6		0.005 U		0.01 U		0.025 U		0.44		0.006		0.18		0.02 U
EP-85	11/9/00		2.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.02 U
EP-85	11/9/00		2.2		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.02 U
EP-85	2/16/01		2.3		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.15		0.039 UJ1
EP-85	2/16/01		2.3		0.005 U		0.01 U		0.025 U		0.11		0.004		0.16		0.051 UJ1
EP-85	5/14/01		2.1		0.005 U		0.01 U		0.025 U		0.12 J4		0.004		0.13		0.02 U
EP-85	7/25/01	2.1	2.2	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.13	0.14 J4	0.02 U	0.02 U,UJ4
EP-86	8/13/97	0.011		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.043		0.02 U	
EP-86	11/18/97	0.007 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.038		0.02 U	
EP-86	2/6/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 J4		0.003 U		0.029		0.02 U	
EP-86	5/14/98	0.008		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.041		0.02	
EP-86	8/19/98	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.038		0.025	
EP-86	11/12/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.033		0.038	
EP-86	11/12/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.027		0.039	
EP-86	2/18/99	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.02		0.049	
EP-86	5/11/99	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.031		0.025	
EP-86	8/9/99	0.008	0.007	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.41	0.003 U	0.004 J4	0.034	0.03 J4	0.02 U	0.02 U
EP-86	10/31/99		0.005 U		0.005 U		0.01 U		0.025 U		0.17		0.003 U		0.033		0.02 U
EP-86	10/31/99		0.005 U		0.005 U		0.01 U		0.025 U		0.16		0.003 U		0.034		0.02 U
EP-86	1/27/00		0.005		0.005 U		0.01 U		0.025 U		0.66		0.006		0.031		0.02 U
EP-86	5/2/00		0.008 UJ1		0.005 U		0.01 U		0.025 U		0.22		0.005		0.03		0.02 U
EP-86	8/9/00		0.005 U		0.005 U		0.01 U		0.025 U		0.21		0.003 U		0.028		0.02 U
EP-86	11/9/00		0.007		0.005 U		0.01 U		0.025 U		0.2		0.003 U		0.027		0.02 U
EP-86	2/15/01		0.009		0.005 U		0.01 U		0.025 U		0.21		0.003 U		0.029		0.027
EP-86	2/15/01		0.01		0.005 U		0.01 U		0.025 U		0.23		0.003 U		0.029		0.047
EP-86	5/14/01		0.006		0.005 U		0.01 U		0.025 U		0.7 J4		0.004		0.027		0.02 U
EP-86	7/25/01	0.013	0.011	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.2	0.003 U	0.003 U	0.031	0.032 J4	0.02 U	0.023 J4
EP-86	7/25/01	0.014	0.012	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.17	0.003 U	0.003 U	0.031	0.033 J4	0.02 U	0.02 U,UJ4
EP-87	9/15/97	0.054		0.005 U		0.016		0.033		0.1 U		0.006		0.005 U		0.03	

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-87	11/18/97	0.033 UJ1		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.005 U		0.02 U	
EP-87	8/10/99	0.029	0.027	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	3 J4	0.003 U	0.007	0.005 U	0.005 U	0.032 UJ1	0.02 U
EP-88	8/12/97	0.02		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.094		0.025	
EP-88	11/11/97	0.017		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.029		0.026	
EP-88	2/12/98	0.017 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.011		0.031	
EP-88	5/11/98	0.032		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.029		0.027	
EP-88	8/17/98	0.027		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.024		0.036	
EP-88	11/11/98	0.016		0.012		0.01 U		0.025 U		0.1 U		0.003 U		0.055		0.17	
EP-88	2/11/99	0.028		0.008		0.01 U		0.025 U		0.1 U		0.003 U		0.018		0.077	
EP-88	5/7/99	0.017		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.032		0.037 J4	
EP-88	8/5/99	0.021	0.024	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.7	0.003 U	0.01	0.038	0.035	0.025	0.062
EP-88	10/30/99		0.022		0.005 U		0.01 U		0.025 U		0.51		0.003 U		0.055		0.021 J2
EP-88	1/26/00		0.012		0.005 U		0.01 U		0.025 U		0.69		0.004		0.06		0.022
EP-88	1/26/00		0.013		0.005 U		0.01 U		0.025 U		0.75		0.004		0.057		0.021
EP-88	4/28/00		0.053		0.004		0.01 U		0.025 U		1.8 J4		0.012		0.046		0.066 J2
EP-88	8/4/00		0.027		0.005 U		0.01 U		0.025 U		0.1		0		0.041		0.02 U
EP-88	11/7/00		0.025		0.005 U		0.01 U,UJ4		0.025 U		0.16 J4		0.004		0.045		0.024
EP-88	2/14/01		0.021		0.005 U		0.01 U		0.025 U		0.91		0.004		0.067		0.056
EP-88	5/9/01		0.028		0.005 U		0.01 U		0.025 U		0.21		0.003 U		0.047		0.067
EP-88	7/19/01	0.025	0.024	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.95	0.003 U	0.004 J4	0.09	0.087	0.02 U	0.026 J4
EP-89	8/12/97	0.01		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.029		0.02	
EP-89	11/13/97	0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.018		0.02 U	
EP-89	2/11/98	0.005 U,UJ4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.013		0.02 U	
EP-89	5/13/98	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.026		0.02 U	
EP-89	8/13/98	0.009		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.028		0.038	
EP-89	11/10/98	0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.015		0.046	
EP-89	2/10/99	0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.023		0.037	
EP-89	5/7/99	0.006		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.016		0.022 J4	
EP-89	8/5/99	0.009	0.012	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.005	0.02	0.024	0.026	0.029
EP-89	8/5/99	0.009	0.011	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.004	0.019	0.024	0.022	0.025
EP-89	10/28/99		0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.016 J2		0.02 U
EP-89	10/28/99		0.007		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.016 J2		0.02 U
EP-89	1/24/00		0.007		0.005 U		0.01 U		0.025 U		0.12		0.015 UJ1		0.019 UJ1		0.02 U
EP-89	4/25/00		0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.004		0.018		0.041
EP-89	4/25/00		0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.005		0.017		0.023
EP-89	8/2/00		0.005 U		0.005 U		0.01 U		0.025 U		0.1 U		0.019		0.017		0.02 U
EP-89	10/31/00		0.005 U		0.005 U		0.01 U		0.025 U		0.16 J4		0.006		0.019		0.038 UJ1,J4
EP-89	10/31/00		0.007		0.005 U		0.01 U		0.025 U		0.11 J4		0.007		0.024		0.049 UJ1,J4
EP-89	2/8/01		0.005		0.005 U		0.01 U		0.025 U		0.1 U		0.005		0.018		0.046 UJ1
EP-89	5/7/01		0.005		0.005 U		0.01 U		0.025 U		0.14		0.003		0.017		0.04
EP-89	5/7/01		0.005		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.016		0.038
EP-89	7/17/01	0.012	0.012	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.016	0.017	0.02 U	0.023
EP-9	5/7/98	0.39		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.17		0.022	
EP-90	12/12/97	0.15		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.69		0.19	
EP-90	2/17/98	0.18		0.005 U		0.01 U		0.025 U		0.1 U,UJ4		0.003 U		0.75		0.02 U,UJ4	
EP-90	5/13/98	0.17		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.86		0.027	
EP-90	8/17/98	0.21		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.51		0.04	
EP-90	11/5/98	0.17 J4		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.61		0.054	
EP-90	2/11/99	0.15		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.42		0.02 U	
EP-90	5/10/99	0.13		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.86		0.038 J4	
EP-90	8/5/99	0.16	0.17	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.048	0.1 U	1.4	0.003 U	0.019	1.1	1	0.025	0.054

Cummulative List of Groundwater Quality Results (Metal Analysis)
El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-90	10/30/99		0.14		0.005 U		0.01 U		0.025 U		0.22		0.003 U		1.1		0.02 U
EP-90	1/24/00		0.12		0.005 U		0.01 U		0.025 U		2		0.011 UJ1		1.2		0.02 U
EP-90	4/26/00		0.12		0.006		0.01 U		0.025 U		3.2		0.005		1.2		0.028
EP-90	8/4/00		0.13		0.01		0.01 U		0.025 U		1.6		0.003		1.2		0.02 U
EP-90	11/3/00		0.14		0.008		0.01 U		0.025 U		0.97		0.003 U		1.5		0.027 UJ1
EP-90	11/3/00		0.14		0.008		0.01 U		0.025 U		0.98		0.003 U		1.5		0.025 UJ1
EP-90	2/12/01		0.14		0.005 U		0.01 U		0.025 U		1.4		0.006		1.4		0.038
EP-90	5/8/01		0.14		0.016		0.01 U		0.025 U		5.4		0.004		1.2 J4		0.068
EP-90	7/19/01	0.14	0.15	0.01	0.011	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	6.2	0.003 U	0.014 J4	1.1	1.1	0.023	0.037
EP-90	7/19/01	0.14	0.14	0.01	0.011	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	5.7	0.003 U	0.003 U,UJ4	1.1	1.1	0.023	0.035
EP-93	10/13/99		0.005		0.005 U		0.01 U		0.025 U		11		0.008		0.017		0.053
EP-93	1/27/00		0.031		0.005 U		0.14		0.044		61		0.033		0.044		0.1
EP-93	5/1/00		0.017		0.005 U		0.013		0.025 U		3.1		0.006 UJ1		0.037		0.048 UJ1,J2
EP-93	8/9/00		0.01		0.005 U		0.016		0.025 U		9.3		0.009		0.029		0.041
EP-93	11/8/00		0.022		0.005 U		0.026		0.025 U		5.2		0.006		0.031		0.038 UJ1
EP-93	2/14/01		0.015		0.005 U		0.01 U		0.025 U		3.9		0.005		0.041		0.072
EP-93	5/11/01		0.019		0.005 U		0.01 U		0.025 U		5.1		0.005 UJ1		0.034		0.063 UJ1
EP-93	7/24/01	0.033	0.03	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	4.3	0.003 U	0.012	0.04	0.038	0.029	0.044
EP-94	10/13/99		0.007		0.005 U		0.01 U		0.025 U		2.2		0.008		0.027		0.075
EP-94	1/27/00		0.014		0.005 U		0.01 U		0.025 U		0.5		0.007		0.021		0.028
EP-94	5/1/00		0.014		0.005 U		0.01 U		0.025 U		0.21		0.026		0.035		0.034 UJ1,J2
EP-94	8/9/00		0.009		0.005 U		0.01 U		0.025 U		0.11		0.003 U		0.026		0.028
EP-94	11/8/00		0.015		0.005 U		0.01 U		0.025 U		0.18		0.003		0.025		0.033 UJ1
EP-94	2/14/01		0.013		0.005 U		0.01 U		0.025 U		0.19		0.003 U		0.029		0.048
EP-94	5/11/01		0.016		0.005 U		0.01 U		0.025 U		0.25		0.005		0.026		0.054 UJ1
EP-94	7/24/01	0.015	0.015	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.2	0.003 U	0.003 U	0.029	0.03	0.021	0.026
EP-95	10/26/99		0.006 J4		0.005 U		0.01 U,UJ4		0.025 U		1.2 J2,J4		0.003 J4		0.022 J2,J4		0.02 U
EP-95	1/27/00		0.009		0.005 U		0.01 U		0.025 U		0.13		0.003 U		0.031		0.02 U
EP-95	5/1/00		0.014		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.035		0.03 UJ1,J2
EP-95	8/9/00		0.011		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.027		0.02 U
EP-95	11/8/00		0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.029		0.02 U
EP-95	2/14/01		0.015		0.005 U		0.01 U		0.025 U		0.1 U		0.003 U		0.028		0.031
EP-95	5/11/01		0.013		0.005 U		0.01 U		0.025 U		0.14		0.003 U		0.026		0.02 U
EP-95	7/24/01	0.017	0.017	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.003 U	0.029	0.03	0.02 U	0.02 U
EP-95	7/24/01	0.017	0.018	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.004	0.029	0.03	0.02 U	0.02 U
EP-96	10/13/99		0.005		0.005 U		0.01 U		0.025 U		12		0.017		0.019		0.053
EP-96	1/27/00		0.007		0.005 U		0.021		0.025 U		8.6		0.01		0.015		0.042
EP-96	5/1/00		0.012		0.005 U		0.011		0.025 U		7.4		0.014 UJ1		0.019		0.056 UJ1,J2
EP-96	8/9/00		0.008		0.005 U		0.01 U		0.025 U		4.2		0.007		0.017		0.034
EP-96	11/8/00		0.019		0.005 U		0.01 U		0.025 U		3.2		0.005		0.015		0.032 UJ1
EP-96	2/14/01		0.014		0.005 U		0.01 U		0.025 U		1.3		0.003 U		0.025		0.095
EP-96	5/11/01		0.023		0.005 U		0.01 U		0.025 U		1.4		0.006 UJ1		0.024		0.078 UJ1
EP-96	7/24/01	0.044	0.039	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	2.4	0.003 U	0.007	0.027	0.025	0.02 U	0.03
EP-97	10/18/99		0.16		0.019		0.01 U		0.23		8.3		0.085		0.02		0.16
EP-97	1/27/00		0.14		0.013		0.01 U		0.19		4.7		0.13		0.008		0.16
EP-97	5/1/00		0.11		0.008		0.01 U		0.11		1.4		0.054		0.015		0.11 UJ1,J2
EP-97	8/9/00		0.15		0.009		0.01 U		0.19		0.45		0.024		0.009		0.095
EP-97	11/8/00		0.16		0.008		0.01 U		0.34		5.3		0.15		0.005 U		0.13 UJ1
EP-97	2/14/01		0.12		0.012		0.01 U		0.22		4.3		0.18		0.006		0.21
EP-97	5/14/01		0.2		0.023		0.015		0.32		22		0.69		0.005 U		0.31
EP-97	7/24/01	0.14	0.15	0.011	0.012	0.01 U	0.01 U	0.29	0.32	0.1 U	0.51	0.017	0.035	0.093	0.096	0.11	0.14

Cummulative List of Groundwater Quality Results (Metal Analysis)

El Paso Asarco Smelter, Remedial Investigation

Sample ID	Sample Date	As Dis mg/l	As T mg/l	Cd Dis mg/l	Cd T mg/l	Cr Dis mg/l	Cr T mg/l	Cu Dis mg/l	Cu T mg/l	Fe Dis mg/l	Fe T mg/l	Pb Dis mg/l	Pb T mg/l	Se Dis mg/l	Se T mg/l	Zn Dis mg/l	Zn T mg/l
EP-98	10/18/99		0.018		0.005 U		0.01 U		0.035		11		0.026		0.36		0.044
EP-98	1/27/00		0.027		0.005 U		0.01 U		0.044		3.9		0.027		0.65		0.048
EP-98	5/1/00		0.037		0.005 U		0.01 U		0.029		0.43		0.003 UJ1		0.97		0.041 UJ1,J2
EP-98	8/9/00		0.021		0.005 U		0.01 U		0.025 U		0.3		0.004		0.46		0.032
EP-98	11/8/00		0.027		0.005 U		0.01 U		0.025 U		0.13		0.003 U		0.28		0.026 UJ1
EP-98	2/14/01		0.022		0.005 U		0.01 U		0.025 U		0.29		0.006		0.47		0.07
EP-98	5/14/01		0.031		0.005 U		0.01 U		0.031		0.61 J4		0.01		0.69		0.066
EP-98	5/14/01		0.032		0.005 U		0.01 U		0.032		0.38 J4		0.008		0.69		0.073
EP-98	7/24/01	0.037	0.037	0.005 U	0.005 U	0.01 U	0.01 U	0.025 U	0.025 U	0.1 U	0.1 U	0.003 U	0.006	0.5	0.5	0.023	0.023
EP-99	10/18/99		5.4		0.005 U		0.01 U		0.042		13		0.15		0.99		0.29
EP-99	8/9/00		6.5		0.005 U		0.01 U		0.058		2.2		0.036		1.1		0.095
EP-99	11/8/00		3.7		0.005 U		0.01 U		0.032		0.83		0.011		1.2		0.062 UJ1
EP-99	2/22/01		6.5		0.007		0.016		0.36		22		0.3		1.1		0.73
EP-99	5/9/01																
EP-99	7/26/01																

Note:

J The associated numerical value is an estimated quantity because quality control criteria were not met
J2 calibration range exceeded or significant deviation from known values. Possible bias.
J3 Holding time not met. Indicates low bias.
J4 Other QC outside control limits

U Undetected. Below method detection limits.

UJ The material was analyzed for, but was not detected above the associated value.
UJ1 Blank contamination. Indicates possible high bias and/or false positive.
UJ2 Calibration range exceeded or significant deviation from known value.
UJ3 Holding times not met. Indicates low bias.
UJ4 Other QC outside control limits.

R Quality control indicates that the data are unusable (compound may or may not be present). Resampling and/or reanalysis is necessary for verification.
A Anomalous data. No apparent explanation for discrepancy in data. (Not an EPA code).

Dis Dissolved Metals
T Total Metals

APPENDIX F

PHASE III SURFACE WATER AND GROUNDWATER ANALYTICAL REPORTS

APPENDIX F

PHASE III SURFACE WATER AND GROUNDWATER ANALYTICAL REPORTS

APPENDIX F

PHASE III SURFACE WATER AND GROUNDWATER ANALYTICAL REPORTS

SECTION F-1

LAB REPORTS FOR WATER SAMPLES, SPRING 2000

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-002	24-APR-00	EPRI-0005-135	AS	0.020	ppm	KB	04-MAY-00	180	6020M
			CA	367.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	365.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	4370.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.75	ppm	BD	01-MAY-00	28	340.2
			FE	0.12	ppm	MK	03-MAY-00	180	6010
			HCO3	211.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	10.	ppm	MK	03-MAY-00	180	6010
			MG	114.	ppm	MK	03-MAY-00	180	6010
			NA	377.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	17.	ppm	JN	12-MAY-00	28	353.2
			PB	0.009	ppm	KB	04-MAY-00	180	6020M
			PH	7.4	pH	DC	27-APR-00		150.1
			SE	0.11	ppm	KB	04-MAY-00	180	6020M
			SO4=	2063.	ppm	JN	03-MAY-00	28	9036
			TDS	3818.	ppm	BD	28-APR-00	7	160.1
			TSS	3.4	ppm	BD	27-APR-00		160.2
			ZN	0.051	ppm	KB	04-MAY-00	180	6020M
L000620-003	24-APR-00	EPRI-0005-138	AS	0.11	ppm	KB	04-MAY-00	180	6020M
			CA	316.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	450.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	5840.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.86	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	239.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	15.	ppm	MK	03-MAY-00	180	6010
			MG	150.	ppm	MK	03-MAY-00	180	6010
			NA	787.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	65.	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-003	24-APR-00	EPRI-0005-138	PH	7.4	pH	DC	27-APR-00		150.1
			SE	0.22	ppm	KB	04-MAY-00	180	6020M
			SO4=	2316.	ppm	JN	03-MAY-00	28	9036
			TDS	4802.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	27-APR-00		160.2
			ZN	0.026	ppm	KB	04-MAY-00	180	6020M
L000620-004	24-APR-00	EPRI-0005-136	AS	0.005	ppm	KB	04-MAY-00	180	6020M
			CA	266.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	615.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	4920.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	0.012	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.72	ppm	BD	01-MAY-00	28	340.2
			FE	0.25	ppm	MK	03-MAY-00	180	6010
			HCO3	206.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	13.	ppm	MK	03-MAY-00	180	6010
			MG	119.	ppm	MK	03-MAY-00	180	6010
			NA	714.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	33.	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.5	pH	DC	27-APR-00		150.1
			SE	0.27	ppm	KB	04-MAY-00	180	6020M
			SO4=	1860.	ppm	JN	03-MAY-00	28	9036
			TDS	3691.	ppm	BD	28-APR-00	7	160.1
			TSS	11.	ppm	BD	27-APR-00		160.2
			ZN	0.025	ppm	KB	04-MAY-00	180	6020M
L000620-005	24-APR-00	EPRI-0005-219	AS	0.005	ppm	KB	04-MAY-00	180	6020M
			CA	270.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	586.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	4960.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	0.011	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.73	ppm	BD	01-MAY-00	28	340.2

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-005	24-APR-00	EPRI-0005-219	FE	0.29	ppm	MK	03-MAY-00	180	6010
			HCO3	208.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	14.	ppm	MK	03-MAY-00	180	6010
			MG	120.	ppm	MK	03-MAY-00	180	6010
			NA	733.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	35.	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.6	pH	DC	27-APR-00		150.1
			SE	0.27	ppm	KB	04-MAY-00	180	6020M
			SO4=	1805.	ppm	JN	03-MAY-00	28	9036
			TDS	3795.	ppm	BD	28-APR-00	7	160.1
			TSS	12.	ppm	BD	27-APR-00		160.2
			ZN	0.029	ppm	KB	04-MAY-00	180	6020M
L000620-006	24-APR-00	EPRI-0005-100	AS	0.12	ppm	KB	04-MAY-00	180	6020M
			CA	107.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	258.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	2300.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	0.14	ppm	MK	03-MAY-00		6010
			F-	0.98	ppm	BD	01-MAY-00	28	340.2
			FE	10.	ppm	MK	03-MAY-00	180	6010
			HCO3	485.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	14.	ppm	MK	03-MAY-00	180	6010
			MG	30.	ppm	MK	03-MAY-00	180	6010
			NA	307.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	0.11	ppm	JN	15-MAY-00	28	353.2
			PB	0.077	ppm	KB	04-MAY-00	180	6020M
			PH	8.0	pH	DC	27-APR-00		150.1
			SE	<0.005	ppm	KB	04-MAY-00	180	6020M
			SO4=	615.	ppm	JN	03-MAY-00	28	9036
			TDS	1531.	ppm	BD	28-APR-00	7	160.1
			TSS	290.	ppm	BD	27-APR-00		160.2
			ZN	0.098	ppm	KB	04-MAY-00	180	6020M
L000620-007	24-APR-00	EPRI-0005-101	AS	0.044	ppm	KB	04-MAY-00	180	6020M
			CA	167.	ppm	MK	03-MAY-00	180	6010

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-007	24-APR-00	EPRI-0005-101	CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	729.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	5250.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	0.13	ppm	MK	03-MAY-00		6010
			F-	2.2	ppm	BD	01-MAY-00	28	340.2
			FE	0.19	ppm	MK	03-MAY-00	180	6010
			HCO3	617.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	12.	ppm	MK	03-MAY-00	180	6010
			MG	64.	ppm	MK	03-MAY-00	180	6010
			NA	856.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	0.18	ppm	JN	15-MAY-00	28	353.2
			PB	0.009	ppm	KB	04-MAY-00	180	6020M
			PH	7.9	pH	DC	27-APR-00		150.1
			SE	0.027	ppm	KB	04-MAY-00	180	6020M
			SO4=	1288.	ppm	JN	04-MAY-00	28	9036
			TDS	3659.	ppm	BD	28-APR-00	7	160.1
			TSS	13.	ppm	BD	27-APR-00		160.2
			ZN	0.030	ppm	KB	04-MAY-00	180	6020M
L000620-008	24-APR-00	EPRI-0005-102	AS	0.022	ppm	KB	04-MAY-00	180	6020M
			CA	320.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	852.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	6920.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	1.4	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	391.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	20.	ppm	MK	03-MAY-00	180	6010
			MG	114.	ppm	MK	03-MAY-00	180	6010
			NA	1124.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	3.4	ppm	JN	15-MAY-00	28	353.2
			PB	0.004	ppm	KB	04-MAY-00	180	6020M
			PH	7.8	pH	DC	27-APR-00		150.1
			SE	0.054	ppm	KB	04-MAY-00	180	6020M

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ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-008	24-APR-00	EPRI-0005-102	SO4=	2872.	ppm	JN	04-MAY-00	28	9036
			TDS	5399.	ppm	BD	28-APR-00	7	160.1
			TSS	6.4	ppm	BD	27-APR-00		160.2
			ZN	0.029	ppm	KB	04-MAY-00	180	6020M
L000620-009	24-APR-00	EPRI-0005-103	AS	0.068	ppm	KB	04-MAY-00	180	6020M
			CA	79.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	343.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	3110.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	2.1	ppm	BD	01-MAY-00	28	340.2
			FE	1.8	ppm	MK	03-MAY-00	180	6010
			HCO3	318.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	6.1	ppm	MK	03-MAY-00	180	6010
			MG	28.	ppm	MK	03-MAY-00	180	6010
			NA	476.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	0.16	ppm	JN	15-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.9	pH	DC	27-APR-00		150.1
			SE	<0.005	ppm	KB	04-MAY-00	180	6020M
			SO4=	898.	ppm	JN	03-MAY-00	28	9036
			TDS	2047.	ppm	BD	28-APR-00	7	160.1
			TSS	23.	ppm	BD	27-APR-00		160.2
			ZN	0.020	ppm	KB	04-MAY-00	180	6020M
L000620-010	24-APR-00	EPRI-0005-220	AS	<0.005	ppm	KB	04-MAY-00	180	6020M
			CA	<1.0	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	<1.0	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	19.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.73	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	10.	ppm CaCO3	BD	27-APR-00	14	310.1

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El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-010	24-APR-00	EPRI-0005-220	K	<2.0	ppm	MK	03-MAY-00	180	6010
			MG	<1.0	ppm	MK	03-MAY-00	180	6010
			NA	2.5	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	<0.050	ppm	JN	12-MAY-00	28	353.2
			PB	0.006	ppm	KB	04-MAY-00	180	6020M
			PH	8.8	pH	DC	27-APR-00		150.1
			SE	<0.005	ppm	KB	04-MAY-00	180	6020M
			SO4=	<2.0	ppm	JN	03-MAY-00	28	9036
			TDS	15.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	27-APR-00		160.2
			ZN	<0.020	ppm	KB	04-MAY-00	180	6020M
L000620-011	25-APR-00	EPRI-0005-155	AS	0.005	ppm	KB	04-MAY-00	180	6020M
			CA	149.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	304.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	2800.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.75	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	224.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	16.	ppm	MK	03-MAY-00	180	6010
			MG	60.	ppm	MK	03-MAY-00	180	6010
			NA	330.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	7.8	ppm	JN	12-MAY-00	28	353.2
			PB	0.004	ppm	KB	04-MAY-00	180	6020M
			PH	7.8	pH	DC	27-APR-00		150.1
			SE	0.018	ppm	KB	04-MAY-00	180	6020M
			SO4=	886.	ppm	JN	03-MAY-00	28	9036
			TDS	1984.	ppm	BD	28-APR-00	7	160.1
			TSS	3.0	ppm	BD	27-APR-00		160.2
			ZN	0.041	ppm	KB	04-MAY-00	180	6020M
L000620-012	25-APR-00	EPRI-0005-221	AS	0.005	ppm	KB	04-MAY-00	180	6020M
			CA	144.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	320.	ppm	JN	05-MAY-00	28	325.2

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Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-012	25-APR-00	EPRI-0005-221	CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	2840.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.74	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	222.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	15.	ppm	MK	03-MAY-00	180	6010
			MG	59.	ppm	MK	03-MAY-00	180	6010
			NA	319.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	7.9	ppm	JN	12-MAY-00	28	353.2
			PB	0.005	ppm	KB	04-MAY-00	180	6020M
			PH	7.7	pH	DC	27-APR-00		150.1
			SE	0.017	ppm	KB	04-MAY-00	180	6020M
			SO4=	882.	ppm	JN	03-MAY-00	28	9036
			TDS	1982.	ppm	BD	28-APR-00	7	160.1
			TSS	2.8	ppm	BD	27-APR-00		160.2
			ZN	0.023	ppm	KB	04-MAY-00	180	6020M
L000620-013	25-APR-00	EPRI-0005-174	AS	0.006	ppm	KB	04-MAY-00	180	6020M
			CA	134.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	293.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	2780.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.79	ppm	BD	01-MAY-00	28	340.2
			FE	0.38	ppm	MK	03-MAY-00	180	6010
			HCO3	224.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	17.	ppm	MK	03-MAY-00	180	6010
			MG	58.	ppm	MK	03-MAY-00	180	6010
			NA	333.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	7.9	ppm	JN	12-MAY-00	28	353.2
			PB	0.008	ppm	KB	04-MAY-00	180	6020M
			PH	7.7	pH	DC	27-APR-00		150.1
			SE	0.016	ppm	KB	04-MAY-00	180	6020M
			SO4=	877.	ppm	JN	03-MAY-00	28	9036
			TDS	1957.	ppm	BD	28-APR-00	7	160.1

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El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-013	25-APR-00	EPRI-0005-174	TSS	17.	ppm	BD	27-APR-00		160.2
			ZN	0.028	ppm	KB	04-MAY-00	180	6020M
L000620-014	25-APR-00	EPRI-0005-139	AS	0.069	ppm	KB	04-MAY-00	180	6020M
			CA	257.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	554.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	7180.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	1.2	ppm	BD	01-MAY-00	28	340.2
			FE	0.28	ppm	MK	03-MAY-00	180	6010
			HCO3	286.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	14.	ppm	MK	03-MAY-00	180	6010
			MG	215.	ppm	MK	03-MAY-00	180	6010
			NA	977.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	34.	ppm	JN	12-MAY-00	28	353.2
			PB	0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.8	pH	DC	27-APR-00		150.1
			SE	6.0	ppm	KB	04-MAY-00	180	6020M
			SO4=	3904.	ppm	JN	03-MAY-00	28	9036
			TDS	6065.	ppm	BD	28-APR-00	7	160.1
			TSS	3.1	ppm	BD	27-APR-00		160.2
			ZN	0.056	ppm	KB	04-MAY-00	180	6020M
L000620-015	25-APR-00	EPRI-0005-137	AS	0.59	ppm	KB	04-MAY-00	180	6020M
			CA	276.	ppm	MK	03-MAY-00	180	6010
			CD	0.007	ppm	KB	04-MAY-00	180	6020M
			CL-	530.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	6110.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	1.0	ppm	BD	01-MAY-00	28	340.2
			FE	0.12	ppm	MK	03-MAY-00	180	6010
			HCO3	250.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	17.	ppm	MK	03-MAY-00	180	6010
			MG	146.	ppm	MK	03-MAY-00	180	6010

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El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-015	25-APR-00	EPRI-0005-137	NA	874.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	45.	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.6	pH	DC	27-APR-00		150.1
			SE	0.20	ppm	KB	04-MAY-00	180	6020M
			SO4=	3038.	ppm	JN	03-MAY-00	28	9036
			TDS	4922.	ppm	BD	28-APR-00	7	160.1
			TSS	7.7	ppm	BD	27-APR-00		160.2
			ZN	0.12	ppm	KB	04-MAY-00	180	6020M
L000620-016	25-APR-00	EPRI-0005-171	AS	0.022	ppm	KB	04-MAY-00	180	6020M
			CA	345.	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	695.	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	5770.	umhos/cm2	BD	27-APR-00	28	120.1
			CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	1.1	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	158.	ppm CaCO3	BD	27-APR-00	14	310.1
			K	16.	ppm	MK	03-MAY-00	180	6010
			MG	162.	ppm	MK	03-MAY-00	180	6010
			NA	673.	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	64.	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	7.6	pH	DC	27-APR-00		150.1
			SE	0.44	ppm	KB	04-MAY-00	180	6020M
			SO4=	2041.	ppm	JN	03-MAY-00	28	9036
			TDS	4482.	ppm	BD	28-APR-00	7	160.1
			TSS	3.4	ppm	BD	27-APR-00		160.2
			ZN	0.029	ppm	KB	04-MAY-00	180	6020M
L000620-017	25-APR-00	EPRI-0005-222	AS	<0.005	ppm	KB	04-MAY-00	180	6020M
			CA	<1.0	ppm	MK	03-MAY-00	180	6010
			CD	<0.005	ppm	KB	04-MAY-00	180	6020M
			CL-	<1.0	ppm	JN	05-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	18.	umhos/cm2	BD	27-APR-00	28	120.1

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000620

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000620-017	25-APR-00	EPRI-0005-222	CR	<0.010	ppm	MK	03-MAY-00	180	6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	0.73	ppm	BD	01-MAY-00	28	340.2
			FE	<0.10	ppm	MK	03-MAY-00	180	6010
			HCO3	6.0	ppm CaCO3	BD	27-APR-00	14	310.1
			K	<2.0	ppm	MK	03-MAY-00	180	6010
			MG	<1.0	ppm	MK	03-MAY-00	180	6010
			NA	2.5	ppm	MK	03-MAY-00	180	6010
			NO2/NO3	<0.050	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	04-MAY-00	180	6020M
			PH	8.5	pH	DC	27-APR-00		150.1
			SE	<0.005	ppm	KB	04-MAY-00	180	6020M
			SO4=	<2.0	ppm	JN	03-MAY-00	28	9036
			TDS	22.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	27-APR-00		160.2
			ZN	<0.020	ppm	KB	04-MAY-00	180	6020M

PH is a field parameter therefore holding time cannot be met by the laboratory.
Digestion Methods for totals --- 3010 and 6020M.

Approved

Ken Bilak
Reviewer

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: WG000340

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
WG000340-1		Matrix Spike	AS	94	%Recovery	KB	04-MAY-00		6020M
			CD	93	%Recovery	KB	04-MAY-00		6020M
			CL-	110	%Recovery	JN	05-MAY-00		325.2
			CR	85	%Recovery	MK	03-MAY-00		6010
			CU	92	%Recovery	MK	03-MAY-00		6010
			F-	99	%Recovery	BD	01-MAY-00		340.2
			FE	90	%Recovery	MK	03-MAY-00		6010
			NO2/NO3	97	%Recovery	JN	12-MAY-00		353.2
			PB	96	%Recovery	KB	04-MAY-00		6020M
			SE	94	%Recovery	KB	04-MAY-00		6020M
			SO4=	106	%Recovery	JN	03-MAY-00		9036
			ZN	84	%Recovery	KB	04-MAY-00		6020M
WG000340-2		Prep Blank	AS	<0.005	ppm	KB	04-MAY-00		6020M
			CA	<1.0	ppm	MK	03-MAY-00		6010
			CD	<0.005	ppm	KB	04-MAY-00		6020M
			CL-	<1.0	ppm	JN	05-MAY-00		325.2
			CO3	<1.0	ppm CaCO3	DC	27-APR-00		310.1
			COND.	<5.0	umhos/cm2	BD	27-APR-00		120.1
			CR	<0.010	ppm	MK	03-MAY-00		6010
			CU	<0.025	ppm	MK	03-MAY-00		6010
			F-	<0.050	ppm	BD	01-MAY-00		340.2
			FE	<0.10	ppm	MK	03-MAY-00		6010
			HCO3	<1.0	ppm CaCO3	BD	27-APR-00		310.1
			K	<2.0	ppm	MK	03-MAY-00		6010
			MG	<1.0	ppm	MK	03-MAY-00		6010
			NA	<2.0	ppm	MK	03-MAY-00		6010
			NO2/NO3	<0.050	ppm	JN	12-MAY-00		353.2
			PB	<0.003	ppm	KB	04-MAY-00		6020M
			SE	<0.005	ppm	KB	04-MAY-00		6020M
			SO4=	<2.0	ppm	JN	03-MAY-00		9036
			TDS	<10.	ppm	BD	28-APR-00		160.1
			TSS	<1.0	ppm	BD	27-APR-00		160.2
			ZN	<0.020	ppm	KB	04-MAY-00		6020M
WG000340-3		Lab Control Sample	AS	111	%Recovery	KB	04-MAY-00		6020M
			CA	90	%Recovery	MK	03-MAY-00		6010
			CD	108	%Recovery	KB	04-MAY-00		6020M
			CL-	92	%Recovery	JN	05-MAY-00		325.2

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: WG000340

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
WG000340-3		Lab Control Sample	COND.	108	%Recovery	BD	27-APR-00		120.1
			CR	87	%Recovery	MK	03-MAY-00		6010
			CU	90	%Recovery	MK	03-MAY-00		6010
			F-	92	%Recovery	BD	01-MAY-00		340.2
			FE	94	%Recovery	MK	03-MAY-00		6010
			HCO3	100	%Recovery	BD	27-APR-00		310.1
			K	85	%Recovery	MK	03-MAY-00		6010
			MG	90	%Recovery	MK	03-MAY-00		6010
			NA	88	%Recovery	MK	03-MAY-00		6010
			NO2/NO3	100	%Recovery	JN	12-MAY-00		353.2
			PB	104	%Recovery	KB	04-MAY-00		6020M
			SE	118	%Recovery	KB	04-MAY-00		6020M
			SO4=	105	%Recovery	JN	03-MAY-00		9036
			TDS	102	%Recovery	BD	28-APR-00		160.1
			TSS	98	%Recovery	BD	27-APR-00		160.2
			ZN	119	%Recovery	KB	04-MAY-00		6020M
WG000340-4		Duplicate	AS	11	% RPD	KB	04-MAY-00		6020M
			CA	11	% RPD	MK	03-MAY-00		6010
			CD	<1	% RPD	KB	04-MAY-00		6020M
			CL-	1.9	% RPD	JN	05-MAY-00		325.2
			CO3	<1	% RPD	DC	27-APR-00		310.1
			COND.	<1	% RPD	BD	27-APR-00		120.1
			CR	<1	% RPD	MK	03-MAY-00		6010
			CU	<1	% RPD	MK	03-MAY-00		6010
			F-	1.0	% RPD	BD	01-MAY-00		340.2
			FE	+/-prdl	% RPD	MK	03-MAY-00		6010
			HCO3	<1	% RPD	BD	27-APR-00		310.1
			K	9.5	% RPD	MK	03-MAY-00		6010
			MG	8.4	% RPD	MK	03-MAY-00		6010
			NA	5.4	% RPD	MK	03-MAY-00		6010
			NO2/NO3	2.9	% RPD	JN	12-MAY-00		353.2
			PB	7.1	% RPD	KB	04-MAY-00		6020M
			SE	<1	% RPD	KB	04-MAY-00		6020M
			SO4=	2.2	% RPD	JN	03-MAY-00		9036
			TDS	4.4	% RPD	BD	28-APR-00		160.1
			TSS	4.4	% RPD	BD	27-APR-00		160.2
			ZN	6.1	% RPD	KB	04-MAY-00		6020M

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: WG000340

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
WG000340-5		Reporting Limit	AS	0.005	ppm				6020M
			CA	1.0	ppm				6010
			CD	0.005	ppm				6020M
			CL-	1.0	ppm				325.2
			CO3	1.0	ppm CaCO3				310.1
			COND.	5.0	umhos/cm2				120.1
			CR	0.010	ppm				6010
			CU	0.025	ppm				6010
			F-	0.050	ppm				340.2
			FE	0.10	ppm				6010
			HCO3	1.0	ppm CaCO3				310.1
			K	2.0	ppm				6010
			MG	1.0	ppm				6010
			NA	2.0	ppm				6010
			NO2/NO3	0.050	ppm				353.2
			PB	0.003	ppm				6020M
			SE	0.005	ppm				6020M
			SO4=	2.0	ppm				9036
			TDS	10.	ppm				160.1
			TSS	1.0	ppm				160.2
			ZN	0.020	ppm				6020M

Approved

Ken Bilak
Reviewer

Hydrometrics, Inc.

3275 W. Ina Rd., Ste. 205 • Tucson, AZ 85741 • (520) 544-3150 • FAX (520) 544-3190
P.O. Box 220182, El Paso, TX 79913 • (915) 532-3489 • FAX (915) 532-4897

CHAIN OF CUSTODY RECORD

PROJ. NO.: 093102
PROJECT NAME: ASARCO - El Paso
SAMPLERS: (Signature) Douglas M Sotor

DATE	TIME	COMP.	GRAB	SAMPLE NUMBER	NO. OF CONTAINERS	Commons UF/RAW	Nutrients UF/H_2SO_4	Diss. Metal F/HNO_3	CN UF/NaOH	Total Metals UF/HNO_3	Total Recoverable Metals UF/HNO_3	BTEX	TPH	REMARKS
4-24-00	1015			EPRI-0005-135	3	X	X			X				
	1045			EPRI-0005-138	3	X	X			X				
	1140			EPRI-0005-136	3	X	X			X				
	1145			EPRI-0005-219	3	X	X			X				
	1400			EPRI-0005-100	3	X	X			X				
	1425			EPRI-0005-101	3	X	X			X				
	1445			EPRI-0005-102	3	X	X			X				
	1510			EPRI-0005-103	3	X	X			X				
	1540			EPRI-0005-220	3	X	X			X				

Relinquished (Signature)	Date/Time	Received by: (Signature)	Lab	P.O. #	Shipped via: Bus, Fed Ex, UPS
[signature]	4/25/00 16:00		TSC - SLC, UT		Other ___ Air Bill # ___
Relinquished (Signature)	Date/Time	Received by: (Signature)	Remarks		
Relinquished (Signature)	Date/Time	Received for Laboratory by: (Signature) [signature]	Date/Time 4.26.00 1030		

Enclosed: ☒ Parameter sheet w/detection limits
☐ QA/QC standard mixing instructions ☒ Cover letter
☐ Other ___

Split Samples:
[] Accepted [] Declined ___

Return results & electronic copy to:

HFORM-[illegible]5

CHAIN OF CUSTODY RECORD

Hydrometrics, Inc.
3275 W. Ina Rd., Ste. 205 • Tucson, AZ 857… (520) 544-3150 • FAX (520) 544-3190
P.O. Box 220182, El Paso, TX 79913 • (915) 532-3489 • FAX (915) 532-4897

PROJ. NO.	PROJECT NAME
①931V2	ASARCO · El Paso, TX

SAMPLERS: (Signature) Douglas M. Solon

DATE	TIME	COMP.	GRAB	SAMPLE NUMBER	NO. OF CON-TAINERS	Commons UF/RAW	Nutrients UF/H_2SO_4	Diss. Metal F/HNO_3	CN UF/NaOH	Total Metals UF/HNO_3	Total Recoverable Metals UF/HNO_3	BTEX	TPH	REMARKS
4·25·00	1300			EPRI·0005·155	3	X	X			X				
↓	1305			EPRI·0005-221	3	X	X			X				
	1330			EPRI·0005-174	3	X	X			X				
	1400			EPRI·0005·139	3	X	X			X				
	1430			EPRI·0005-137	3	X	X			X				
	1515			EPRI·0005-171	3	X	X			X				
	1545			EPRI·0005-222	3	X	X			X				

Relinquished (Signature)	Date/Time	Received by: (Signature)	Lab	P.O. #	Shipped via: Bus, ~~Fed Ex~~, UPS
[signature]	4/25/00 16:00		TSC - SLC, UT		Other ____ Air Bill # ____

Relinquished (Signature)	Date/Time	Received by: (Signature)	Remarks

Relinquished (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Enclosed:
		[signature]	4.26.00 1030	☒ Parameter sheet w/detection limits ☐ QA/QC standard mixing instructions ☒ Cover letter ☐ Other ____

HFORM-1-4/95

Return results & electronic copy to:

Split Samples:
[] Accepted [] Declined ____ Signature

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000629

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000629-001	26-APR-00	EPRI-0005-197	AS	0.010	ppm	KB	09-MAY-00	180	6020M
			CA	309.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	2488.	ppm	JN	09-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	8600.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.2	ppm	BD	05-MAY-00	28	340.2
			FE	<0.10	ppm	MK	05-MAY-00	180	6010
			HCO3	117.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	22.	ppm	MK	05-MAY-00	180	6010
			MG	137.	ppm	MK	05-MAY-00	180	6010
			NA	1088.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	0.29	ppm	JN	15-MAY-00	28	353.2
			PB	<0.003	ppm	KB	09-MAY-00	180	6020M
			PH	7.0	pH	DC	01-MAY-00		150.1
			SE	<0.005	ppm	KB	09-MAY-00	180	6020M
			SO4=	510.	ppm	MK	03-MAY-00	28	9036
			TDS	5159.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	0.023	ppm	KB	09-MAY-00	180	6020M
L000629-002	26-APR-00	EPRI-0005-223	AS	0.010	ppm	KB	09-MAY-00	180	6020M
			CA	283.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	2640.	ppm	JN	09-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	8550.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.1	ppm	BD	05-MAY-00	28	340.2
			FE	<0.10	ppm	MK	05-MAY-00	180	6010
			HCO3	120.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	21.	ppm	MK	05-MAY-00	180	6010
			MG	127.	ppm	MK	05-MAY-00	180	6010
			NA	982.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	0.26	ppm	JN	15-MAY-00	28	353.2
			PB	<0.003	ppm	KB	09-MAY-00	180	6020M

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000629

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000629-002	26-APR-00	EPRI-0005-223	PH	7.1	pH	DC	01-MAY-00		150.1
			SE	<0.005	ppm	KB	09-MAY-00	180	6020M
			SO4=	497.	ppm	MK	03-MAY-00	28	9036
			TDS	4912.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	0.021	ppm	KB	09-MAY-00	180	6020M
L000629-003	26-APR-00	EPRI-0005-196	AS	0.80	ppm	KB	09-MAY-00	180	6020M
			CA	236.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	544.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	5070.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.3	ppm	BD	05-MAY-00	28	340.2
			FE	0.23	ppm	MK	05-MAY-00	180	6010
			HCO3	284.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	14.	ppm	MK	05-MAY-00	180	6010
			MG	89.	ppm	MK	05-MAY-00	180	6010
			NA	705.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	43.	ppm	JN	12-MAY-00	28	353.2
			PB	0.004	ppm	KB	09-MAY-00	180	6020M
			PH	7.7	pH	DC	01-MAY-00		150.1
			SE	0.12	ppm	KB	09-MAY-00	180	6020M
			SO4=	1958.	ppm	MK	03-MAY-00	28	9036
			TDS	3856.	ppm	BD	28-APR-00	7	160.1
			TSS	8.8	ppm	BD	28-APR-00		160.2
			ZN	0.023	ppm	KB	09-MAY-00	180	6020M
L000629-004	26-APR-00	EPRI-0005-106	AS	1.3	ppm	KB	09-MAY-00	180	6020M
			CA	349.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	509.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	5080.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.6	ppm	BD	05-MAY-00	28	340.2

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000629

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000629-004	26-APR-00	EPRI-0005-106	FE	0.12	ppm	MK	05-MAY-00	180	6010
			HCO3	308.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	49.	ppm	MK	05-MAY-00	180	6010
			MG	91.	ppm	MK	05-MAY-00	180	6010
			NA	704.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	18.	ppm	JN	12-MAY-00	28	353.2
			PB	0.005	ppm	KB	09-MAY-00	180	6020M
			PH	7.6	pH	DC	01-MAY-00		150.1
			SE	0.19	ppm	KB	09-MAY-00	180	6020M
			SO4=	2223.	ppm	MK	03-MAY-00	28	9036
			TDS	4008.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	0.028	ppm	KB	09-MAY-00	180	6020M
L000629-005	26-APR-00	EPRI-0005-105	AS	32.	ppm	MK	05-MAY-00	180	6010
			CA	294.	ppm	MK	05-MAY-00	180	6010
			CD	0.57	ppm	KB	09-MAY-00	180	6020M
			CL-	659.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	9150.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.3	ppm	BD	05-MAY-00	28	340.2
			FE	0.25	ppm	MK	05-MAY-00	180	6010
			HCO3	320.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	64.	ppm	MK	05-MAY-00	180	6010
			MG	54.	ppm	MK	05-MAY-00	180	6010
			NA	2108.	ppm	MK	15-MAY-00	180	6010
			NO2/NO3	88.	ppm	JN	12-MAY-00	28	353.2
			PB	0.008	ppm	KB	09-MAY-00	180	6020M
			PH	7.8	pH	DC	01-MAY-00		150.1
			SE	5.3	ppm	KB	09-MAY-00	180	6020M
			SO4=	4291.	ppm	MK	04-MAY-00	28	9036
			TDS	7339.	ppm	BD	28-APR-00	7	160.1
			TSS	6.1	ppm	BD	28-APR-00		160.2
			ZN	0.028	ppm	KB	09-MAY-00	180	6020M
L000629-006	26-APR-00	EPRI-0005-165	AS	6.3	ppm	MK	05-MAY-00	180	6010
			CA	186.	ppm	MK	05-MAY-00	180	6010

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000629

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
L000629-006	26-APR-00	EPRI-0005-165	CD	1.1	ppm	KB	09-MAY-00	180	6020M
			CL-	827.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	8770.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.5	ppm	BD	05-MAY-00	28	340.2
			FE	0.64	ppm	MK	05-MAY-00	180	6010
			HCO3	260.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	55.	ppm	MK	05-MAY-00	180	6010
			MG	61.	ppm	MK	05-MAY-00	180	6010
			NA	1902.	ppm	MK	15-MAY-00	180	6010
			NO2/NO3	90.	ppm	JN	12-MAY-00	28	353.2
			PB	0.033	ppm	KB	09-MAY-00	180	6020M
			PH	7.7	pH	DC	01-MAY-00		150.1
			SE	3.5	ppm	KB	09-MAY-00	180	6020M
			SO4=	3608.	ppm	MK	03-MAY-00	28	9036
			TDS	6554.	ppm	BD	28-APR-00	7	160.1
			TSS	14.	ppm	BD	28-APR-00		160.2
			ZN	0.10	ppm	KB	09-MAY-00	180	6020M
L000629-007	26-APR-00	EPRI-0005-166	AS	0.26	ppm	KB	09-MAY-00	180	6020M
			CA	116.	ppm	MK	05-MAY-00	180	6010
			CD	0.095	ppm	KB	09-MAY-00	180	6020M
			CL-	213.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	2790.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	1.4	ppm	BD	05-MAY-00	28	340.2
			FE	1.4	ppm	MK	05-MAY-00	180	6010
			HCO3	272.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	120.	ppm	MK	05-MAY-00	180	6010
			MG	25.	ppm	MK	05-MAY-00	180	6010
			NA	343.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	9.0	ppm	JN	12-MAY-00	28	353.2
			PB	0.012	ppm	KB	09-MAY-00	180	6020M
			PH	7.7	pH	DC	01-MAY-00		150.1
			SE	3.7	ppm	KB	09-MAY-00	180	6020M

ASARCO TECHNICAL SERVICES CENTER

ANALYTICAL DATA REPORT

El Paso

Water and Solid Waste (Project 3220)

Batch No: L000629

LAB NO	DATE COLLECTED	DESCRIPTION	PARAMETER	VALUE	UNITS	ANALYST	DATE ANALYZED	HOLD DAYS	METHOD
			SO4=	925.	ppm	MK	04-MAY-00	28	9036
L000629-007	26-APR-00	EPRI-0005-166	TDS	1879.	ppm	BD	28-APR-00	7	160.1
			TSS	6.1	ppm	BD	28-APR-00		160.2
			ZN	0.069	ppm	KB	09-MAY-00	180	6020M
			AS	0.12	ppm	KB	09-MAY-00	180	6020M
L000629-008	26-APR-00	EPRI-0005-156	CA	216.	ppm	MK	05-MAY-00	180	6010
			CD	0.006.	ppm	KB	09-MAY-00	180	6020M
			CL-	549.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	5160.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	0.49	ppm	BD	05-MAY-00	28	340.2
			FE	3.2	ppm	MK	05-MAY-00	180	6010
			HCO3	304.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	10.	ppm	MK	05-MAY-00	180	6010
			MG	113.	ppm	MK	05-MAY-00	180	6010
			NA	735.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	34.	ppm	JN	12-MAY-00	28	353.2
			PB	0.005	ppm	KB	09-MAY-00	180	6020M
			PH	7.8	pH	DC	01-MAY-00		150.1
			SE	1.2	ppm	KB	09-MAY-00	180	6020M
			SO4=	2024.	ppm	MK	03-MAY-00	28	9036
			TDS	3930.	ppm	BD	28-APR-00	7	160.1
			TSS	199.	ppm	BD	28-APR-00		160.2
			ZN	0.028	ppm	KB	09-MAY-00	180	6020M
			AS	0.016	ppm	KB	09-MAY-00	180	6020M
L000629-009	26-APR-00	EPRI-0005-167	CA	62.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	190.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	1540.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	0.61	ppm	BD	05-MAY-00	28	340.2
			FE	1.3	ppm	MK	05-MAY-00	180	6010
			HCO3	155.	ppm CaCO3	DC	01-MAY-00	14	310.1

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L000629-009	26-APR-00	EPRI-0005-167	K	5.6	ppm	MK	05-MAY-00	180	6010
			MG	20.	ppm	MK	05-MAY-00	180	6010
			NA	198.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	2.1	ppm	JN	15-MAY-00	28	353.2
			PB	0.010	ppm	KB	09-MAY-00	180	6020M
			PH	7.9	pH	DC	01-MAY-00		150.1
			SE	0.19	ppm	KB	09-MAY-00	180	6020M
			SO4=	411.	ppm	MK	03-MAY-00	28	9036
			TDS	980.	ppm	BD	28-APR-00	7	160.1
			TSS	20.	ppm	BD	28-APR-00		160.2
			ZN	0.036	ppm	KB	09-MAY-00	180	6020M
L000629-010	26-APR-00	EPRI-0005-107	AS	0.007	ppm	KB	09-MAY-00	180	6020M
			CA	209.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	554.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	4560.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	0.75	ppm	BD	05-MAY-00	28	340.2
			FE	2.8	ppm	MK	05-MAY-00	180	6010
			HCO3	310.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	11.	ppm	MK	05-MAY-00	180	6010
			MG	73.	ppm	MK	05-MAY-00	180	6010
			NA	671.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	21.	ppm	JN	12-MAY-00	28	353.2
			PB	0.004	ppm	KB	09-MAY-00	180	6020M
			PH	7.7	pH	DC	01-MAY-00		150.1
			SE	0.13	ppm	KB	09-MAY-00	180	6020M
			SO4=	1765.	ppm	MK	03-MAY-00	28	9036
			TDS	3342.	ppm	BD	28-APR-00	7	160.1
			TSS	135.	ppm	BD	28-APR-00		160.2
			ZN	0.029	ppm	KB	09-MAY-00	180	6020M
L000629-011	26-APR-00	EPRI-0005-169	AS	0.051	ppm	KB	09-MAY-00	180	6020M
			CA	125.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	468.	ppm	JN	08-MAY-00	28	325.2

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L000629-011	26-APR-00	EPRI-0005-169	CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	3440.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	5.2	ppm	BD	05-MAY-00	28	340.2
			FE	0.57	ppm	MK	05-MAY-00	180	6010
			HCO3	85.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	17.	ppm	MK	05-MAY-00	180	6010
			MG	43.	ppm	MK	05-MAY-00	180	6010
			NA	588.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	0.17	ppm	JN	15-MAY-00	28	353.2
			PB	0.011	ppm	KB	09-MAY-00	180	6020M
			PH	8.2	pH	DC	01-MAY-00		150.1
			SE	<0.005	ppm	KB	09-MAY-00	180	6020M
			SO4=	1230.	ppm	MK	03-MAY-00	28	9036
			TDS	2361.	ppm	BD	28-APR-00	7	160.1
			TSS	10.	ppm	BD	28-APR-00		160.2
			ZN	0.049	ppm	KB	09-MAY-00	180	6020M
L000629-012	26-APR-00	EPRI-0005-170	AS	<0.005	ppm	KB	09-MAY-00	180	6020M
			CA	252.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	474.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	4960.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	0.89	ppm	BD	05-MAY-00	28	340.2
			FE	0.40	ppm	MK	05-MAY-00	180	6010
			HCO3	252.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	13.	ppm	MK	05-MAY-00	180	6010
			MG	115.	ppm	MK	05-MAY-00	180	6010
			NA	681.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	9.4	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	09-MAY-00	180	6020M
			PH	7.8	pH	DC	01-MAY-00		150.1
			SE	0.10	ppm	KB	09-MAY-00	180	6020M
			SO4=	2301.	ppm	MK	04-MAY-00	28	9036
			TDS	3951.	ppm	BD	28-APR-00	7	160.1

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L000629-012	26-APR-00	EPRI-0005-170	TSS	18.	ppm	BD	28-APR-00		160.2
			ZN	<0.020	ppm	KB	09-MAY-00	180	6020M
L000629-013	26-APR-00	EPRI-0005-168	AS	0.072	ppm	KB	09-MAY-00	180	6020M
			CA	146.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	468.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	4620.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	2.0	ppm	BD	05-MAY-00	28	340.2
			FE	2.2	ppm	MK	05-MAY-00	180	6010
			HCO3	330.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	19.	ppm	MK	05-MAY-00	180	6010
			MG	79.	ppm	MK	05-MAY-00	180	6010
			NA	744.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	13.	ppm	JN	12-MAY-00	28	353.2
			PB	0.015	ppm	KB	09-MAY-00	180	6020M
			PH	8.1	pH	DC	01-MAY-00		150.1
			SE	0.085	ppm	KB	09-MAY-00	180	6020M
			SO4=	1615.	ppm	MK	04-MAY-00	28	9036
			TDS	3303.	ppm	BD	28-APR-00	7	160.1
			TSS	78.	ppm	BD	28-APR-00		160.2
			ZN	0.043	ppm	KB	09-MAY-00	180	6020M
L000629-014	26-APR-00	EPRI-0005-198	AS	2.3	ppm	KB	09-MAY-00	180	6020M
			CA	41.	ppm	MK	05-MAY-00	180	6010
			CD	0.009	ppm	KB	09-MAY-00	180	6020M
			CL-	271.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	2130.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	0.028	ppm	MK	05-MAY-00		6010
			F-	6.1	ppm	BD	05-MAY-00	28	340.2
			FE	0.60	ppm	MK	05-MAY-00	180	6010
			HCO3	140.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	19.	ppm	MK	05-MAY-00	180	6010
			MG	9.7	ppm	MK	05-MAY-00	180	6010

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L000629-014	26-APR-00	EPRI-0005-198	NA	341.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	0.18	ppm	JN	15-MAY-00	28	353.2
			PB	0.013	ppm	KB	09-MAY-00	180	6020M
			PH	8.1	pH	DC	01-MAY-00		150.1
			SE	<0.005	ppm	KB	09-MAY-00	180	6020M
			SO4=	597.	ppm	MK	04-MAY-00	28	9036
			TDS	1367.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	0.062	ppm	KB	09-MAY-00	180	6020M
L000629-015	26-APR-00	EPRI-0005-199	AS	0.022	ppm	KB	09-MAY-00	180	6020M
			CA	102.	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	412.	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	4060.	umhos/cm2	BD	28-APR-00	28	120.1
			CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	0.035	ppm	MK	05-MAY-00		6010
			F-	1.8	ppm	BD	05-MAY-00	28	340.2
			FE	<0.10	ppm	MK	05-MAY-00	180	6010
			HCO3	308.	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	9.9	ppm	MK	05-MAY-00	180	6010
			MG	61.	ppm	MK	05-MAY-00	180	6010
			NA	637.	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	6.8	ppm	JN	12-MAY-00	28	353.2
			PB	0.005	ppm	KB	09-MAY-00	180	6020M
			PH	8.0	pH	DC	01-MAY-00		150.1
			SE	0.068	ppm	KB	09-MAY-00	180	6020M
			SO4=	1466.	ppm	MK	04-MAY-00	28	9036
			TDS	2877.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	0.037	ppm	KB	09-MAY-00	180	6020M
L000629-016	26-APR-00	EPRI-0005-224	AS	<0.005	ppm	KB	09-MAY-00	180	6020M
			CA	<1.0	ppm	MK	05-MAY-00	180	6010
			CD	<0.005	ppm	KB	09-MAY-00	180	6020M
			CL-	<1.0	ppm	JN	08-MAY-00	28	325.2
			CO3	<1.0	ppm CaCO3	DC	01-MAY-00		310.1
			COND.	18.	umhos/cm2	BD	28-APR-00	28	120.1

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L000629-016	26-APR-00	EPRI-0005-224	CR	<0.010	ppm	MK	05-MAY-00	180	6010
			CU	<0.025	ppm	MK	05-MAY-00		6010
			F-	0.75	ppm	BD	05-MAY-00	28	340.2
			FE	<0.10	ppm	MK	05-MAY-00	180	6010
			HCO3	4.8	ppm CaCO3	DC	01-MAY-00	14	310.1
			K	<2.0	ppm	MK	05-MAY-00	180	6010
			MG	<1.0	ppm	MK	05-MAY-00	180	6010
			NA	2.7	ppm	MK	05-MAY-00	180	6010
			NO2/NO3	<0.050	ppm	JN	12-MAY-00	28	353.2
			PB	<0.003	ppm	KB	09-MAY-00	180	6020M
			PH	7.3	pH	DC	01-MAY-00		150.1
			SE	<0.005	ppm	KB	09-MAY-00	180	6020M
			SO4=	<2.0	ppm	MK	04-MAY-00	28	9036
			TDS	22.	ppm	BD	28-APR-00	7	160.1
			TSS	<1.0	ppm	BD	28-APR-00		160.2
			ZN	<0.020	ppm	KB	09-MAY-00	180	6020M

PH is a field parameter therefore holding time cannot be met
by the laboratory.
Digestion Methods for totals --- 3010 and 6020M.

Approved

Reviewer