

Investigation Area 13 - EP-13 Sample Mill Area

As recommended in the Phase I RI Report, five additional soil borings were advanced in IA-13, three of which were completed as monitor wells. The purpose of this investigation was to further characterize possible elevated concentrations of COCs in soil and groundwater in this area. No additional investigations are presently recommended.

Investigation Area 14 - South Terrace Area

As recommended in the Phase I RI Report, eight additional soil borings were advanced in IA-14. The purpose of this investigation was to characterize possible elevated concentrations of COCs in soil in this area. Most of IA-14 is presently capped, remediating any Category II materials. Additional investigations consisting of three shallow borings to verify the extent of Category I areas are recommended.

SECTION 5.0

SUMMARY AND CONCLUSIONS

5.0 SUMMARY AND CONCLUSIONS

The following conclusions are based on the results of the Phase I and Phase II RIs:

General

1. Site characterization activities at the subject Facility for this Phase II RI are based on the results of the Phase I RI pursuant to the Agreed Order. The Phase II RI included 14 IAs expanded from the 10 IAs identified in the Phase I RI based on comments received from TNRCC subsequent to submittal of the Phase I RI Report.
2. The results of the Risk Evaluation conclude while elevated metals concentrations exist in soil and groundwater, no imminent health threats exist at the Facility because worker risks from exposure to soil are appropriately managed through an OSHA mandated program, and there is no exposure to groundwater.
3. Corrective action objectives are as follows:
 - Reduce the potential for metals exposure to Facility workers and the public.
 - Minimize the potential for transport of metals to groundwater.
 - Prevent increases in metal concentrations in the American Canal and Rio Grande.
4. Two diesel remedial projects identified in the Phase I RI Report (Diesel No. 1 and Diesel No. 2 Remedial Areas) are being successfully continued through the Phase II RI period. Diesel No. 1 is being successfully remediated, with closure being pursued at this time. Diesel No. 2 is being successfully remediated as a voluntary effort.

5. The Facility is underlain by arroyos that have been backfilled with soil, slag, and other materials. The arroyos appear to channel and control the flow of groundwater and migration of COCs beneath the Facility. The RIs and associated corrective action measures evaluation focus on the arroyos as having primary influence for impacts to groundwater.
6. Additional soil and groundwater investigations are recommended to better define and evaluate some remaining source areas.
7. Review of AOC guidance indicates that this concept is appropriate for use to construct on-site repositories for containment of Category I materials at the Facility.

Soils

8. Arsenic, cadmium, and lead are the predominant COCs in soil at the Facility. These COCs can be associated with historic smelter operations, and to some extent, occur naturally in the soils in the general area. Materials associated with potential source areas are separated into three Categories (I, II and III) based on metal concentrations, distribution and volume of materials, associated Facility processes, visual characteristics, impacts to water resources, and degree of potential toxicity.
 - 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 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.

- Category III materials are copper and lead slag, and other basically inert materials.
9. Near surface source materials were further delineated during the Phase II RI in the 14 IAs. These materials occur primarily near the surface and are not in direct contact with groundwater. The strong spatial correlation between arsenic concentrations in near surface soil and groundwater suggests that COC migration within the aquifer is minimal.
10. Additional soil characterization is recommended in IA-2, IA-8, IA-9, IA-11, IA-12 and IA-14.

Groundwater and Surface Water

11. As concluded during the Phase I RI, data from the Phase II RI indicates 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 Facility, to about ten feet bgs in wells adjacent to the Rio Grande.
12. Groundwater underlying, and in the vicinity of, the Facility is not used for drinking water purposes. Asarco owns the property throughout impacted areas and controls future municipal access to groundwater. The nearest domestic well is approximately one-half mile north and upgradient from the Facility.
13. Elevated concentrations of arsenic, cadmium and lead were found in groundwater samples collected across the Facility. Groundwater from the Facility has not impacted water quality in the American Canal and the Rio Grande.

14. Some elevated metal concentrations were observed during Phase I of the RI in the American Canal. These exceedences were associated with abnormally low flow conditions, and are not indicative of typical conditions. No constituents were detected above MCLs during the Phase II RI in surface water samples collected from the Rio Grande.

15. Additional groundwater characterization is recommended in IA-2, IA-11 and IA-12.

Corrective Action Measures

16. Specific corrective action measures to remediate source areas were developed from corrective action alternatives. Corrective action alternatives were selected during the Phase I RI after an evaluation of corrective action Technology and Process Options based on effectiveness, implementability, and cost.

Corrective action alternatives consistent with a Risk Reduction Standard Number 3 approach (Closure/Remediation with controls) applicable to the Facility include the following:

- Institutional controls/deed restrictions (access restriction, worker health and safety programs).
- Containment (capping and surface control).
- Removal/disposal (excavation and on-site disposal).

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

18. 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.
19. Several IAs have benefited directly from the recent completion of the Storm Water Collection and Reuse System, since the Phase I RI Report. These upgrades and improvements, included implementation of surface drainage improvements, excavation and disposal of impacted soils, and patching and capping of selected areas. Therefore, partial implementation of proposed corrective action measures outlined in the Phase I RI Report, has subsequently occurred for IA-1, IA-10 and IA-14.
20. The storm water control upgrades associated with the recently completed Storm Water Collection and Reuse System at the Facility substantially minimizes the potential for Facility storm water runoff to impact nearby surface waters, the American Canal and Rio Grande.
21. Operational controls have been implemented which minimize discharges from Facility components.
22. Excavation of Category I materials has been performed in the Medford Sump (IA-1) and the Boneyard (IA-2).
23. Ponds 1, 5 and 6 are in the process of being decommissioned, and will no longer cause groundwater impacts. These Ponds are scheduled for use as repositories for the deposition of Category I material as per AOC Rules. Pond 5 is in the repository design phase.
24. Conceptual estimate, plus or minus 30 percent, for corrective action measures costs for Facility IAs is approximately \$16,400,000.

25. Corrective action measures costs for Investigation Areas 6 and 7 (long-term monitoring of groundwater and surface water respectively) are estimated at approximately \$2,920,000 over 15 years.

SECTION 6.0

REFERENCES

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6.0 REFERENCES

- Dames & Moore, 1998. Storm Water Collection and Reuse, Project No. ELP96005, Contract Documents and Technical Specifications. Prepared for ASARCO Incorporated, El Paso, Texas Facility. July 31, 1998.
- Fetter, C.W. 1994. Applied Hydrogeology. Merrill Publishing Company, Inc., Columbus, Ohio, p. 80.
- Geraghty and Miller, Inc., 1995. Aqtesolv, Version 2.01. Geraghty and Miller, Inc., Reston, Virginia. February 1995.
- Hydrometrics, 1995b. Demonstration of the Baker Plow as a Remediation Tool for the ASARCO, Inc., East Field. December 1995.
- Hydrometrics, Inc., 1996. Asarco El Paso Copper Smelter Remedial Investigation Work Plan, El Paso, Texas. Prepared for ASARCO Incorporated, El Paso, Texas. November 8, 1996.
- Hydrometrics, 1997a. Preliminary Evaluation of Sediment Quality in Ponds 1, 5, and 6 and Recommendations for Future Action, Asarco El Paso Copper Smelter. Prepared for ASARCO Incorporated. April 22, 1997.
- Hydrometrics, 1997b. Risk-Based Site Assessment for the Diesel No. 1 Site, Asarco El Paso Copper Smelter, El Paso, Texas. April 24, 1997.
- Hydrometrics, 1998. Asarco El Paso Copper Smelter Remedial Investigation Report, El Paso, Texas. October 1998.

Hydrometrics, 1998. Diesel No. 1 Remediation Site (LSPT I.D. No. 94594) 1997 Annual Report. Prepared for ASARCO Incorporated, El Paso, Texas. March 24, 1998.

Hydrometrics and Brown, McCarroll & Oaks Hartline, L.L.P., 2000. Area of Contamination at the ASARCO El Paso Copper Smelter, El Paso, Texas. May.

Hydro-Search, 1985. Regional and Local Hydrogeology of the El Paso Facility. September 27, 1985.

International Boundary Water Commission, 1999. Personal communication and public data files, including information for the American Canal, including Earthwork and Gravel Surfacing at American Dam and Canal, General Plan, May 28, 1938. American Canal Detail Sections, September 21, 1936.

Jaco, Hubert B., 1971. Soil Survey, El Paso County, Texas. U.S. Department of Agriculture, Soil and Conservation Service, November.

Lovejoy, Earl M.P. 1976a. Geology of Cerro de Cristo Rey Uplift, Chihuahua and New Mexico. New Mexico Bureau of Mines and Mineral Resources, Memoir 31. New Mexico Institute of Mining and Technology, Socorro, New Mexico.

Lovejoy, Earl M.P., 1976b. Neotectonics of the Southeast End of the Rio Grande Rift along the Mesilla Valley Fault Zone, and the Course of the Rio Grande, El Paso, Texas. Institute of Mining and Technology, Socorro, New Mexico.

Modrow, Doug, 1995. ASARCO, Incorporated, personal communication.

Sergent, Hauskins & Beckwith, 1984. Boring Locations and 1891 Contours, ASARCO, Inc., El Paso Facility. Prepared for ASARCO Incorporated.

Slichter, C.S., 1905. Observations of the Groundwaters of Rio Grande Valley. U.S. Geological Survey Water Supply and Irrigation Paper No. 141.

Texas Natural Resource Conservation Commission, 1996. Agreed Order, Docket No. 96-0212-MLM-E, August 29, 1996.

Texas Natural Resource Conservation Commission, 1997. Correspondence entitled, Remedial Investigation Work Plan, ASARCO Inc., El Paso Facility, 2301 West Paisano, El Paso, Texas 79922, Solid Waste Registration No. 31235, Water Quality Permit No. WQ 0002321, EPA Identification No. TXD990757668. Addressed to ASARCO, Inc., El Paso, Texas. February 24, 1997.

Texas Natural Resource Conservation Commission, 1998. Consistency Report. July.

Texas Natural Resource Conservation Commission, 1999. Correspondence entitled, Remedial Investigation Report, Agreed Order, TNRCC Industrial Solid Waste Registration No. 31235, EPA ID No. TXD990757668. Addressed to ASARCO, Inc., El Paso, Texas. June 25, 1999.

U.S. Environmental Protection Agency, 1992. Compilation of Current Practices at Land Disposal Facilities: Summary of Liner and Leak Detection Designs, Action Leakage Rates, Response Action Plans, and Management of Liquids in Landfills. EPA530-R-92-003, PB92-128 206, Washington, DC. January.

US EPA, 1994a. The Resource Conservation and Recovery Act (RCRA) Corrective Action Plan, Final, OSWER Directive 9902.3-2A, EPA530SW88028, May.

US EPA, 1994b. Guidance for the Data Quality Objectives Process. EPA QA/G-4, ORD, EPA600R96055.

US Geological Survey, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States. Hansford T. Shacklette and Josephine G. Boerngen, US Geological Survey Professional Paper 1270.

TABLES

Table 1-1
Summary of Historic Operations, Actions and Reports
ASARCO El Paso Smelter Phase II RI

Date	Action/Report
1887	Lead plant founded.
1910's	Copper smelter added.
1930's	Godfrey roaster for cadmium added.
1948	Zinc fuming furnace added.
1972	Acid Plant 1 constructed.
1976	Antimony plant added.
1978	Acid Plant 2 constructed.
1979	Sinter plant and unloading/bedding systems added.
1985	Lead plant closed. Currently being removed.
1985, August	Asarco/TNRCC compliance agreement to investigate potential leakage of Ponds 1 and 6.
1985, September 27	Hydro-Search, Inc. Report: Regional and Local Hydrology at the El Paso Plant. Prepared to comply with compliance agreement.
1985, October 10	Hydro-Search, Inc. Report: Groundwater Monitoring Plan, Asarco, Inc., El Paso Plant. Prepared to comply with compliance agreement.
1985, November 15	Hydro-Search, Inc. Report: Liner Investigation, ASARCO, Inc. El Paso Plant. Prepared to comply with compliance agreement.
1986	Antimony plant closed. Building has been remodeled.
1990, February 7	International Boundary and Water Commission workers noticed petroleum hydrocarbons seeping into the American Canal. Hydrometrics, Raba-Kistner Consultants and Applied Earth Science enlisted to investigate spill.
1990, March 14	State of Texas provides Asarco with Notice to Proceed regarding investigations of metals down gradient of Ponds 1 and 6.
1990, March 30	Hydrometrics began investigation activities for Diesel 2 spill.
1990, May 19	Nine monitoring wells were installed down gradient of Ponds 1 and 6, and quarterly monitoring began.
1992	Design and construction of Diesel Number 1 recovery system. Cadmium plant closed. Currently being removed. Zinc furnace closed. Currently being removed.
1993	CONTOP copper process added.
1994	Design and construction of Diesel Number 2 recovery system.
1996	Began design of storm water improvements.
1996, August 29	TNRCC issues Agreed Order requiring remedial investigation.
1997-1999	Remedial Investigation field activities conducted for Phases I and II.
1998	Submit results of RI Phase I investigation.
1998-1999	Lead plant demolished.
1998-1999	Design and build Diesel No. 2 improvements project.
1998-2000	Stormwater system constructed and placed in service.
2000	Lead baghouse demolished.

Table 1-2
Facility Regulatory Permit Information
ASARCO El Paso Smelter Phase II RI

Permit No.	Permit Type	Issuing Agency	Facility
20345	Air	TNRCC	Primary Copper Smelter (CONTOP Project)
4151	Air	TNRCC	Ore Unloading and Storage Facility
WQO2321	Water	TNRCC	Industrial Wastewater
TXR05A301	Water	EPA	Plant Storm Water
31235 ⁽¹⁾	Solid Waste	TNRCC	Solid Waste Generator

Notes: (1) TNRCC Notice of Registration Number

Table 1-3
Active Solid Waste Management Units
ASARCO El Paso Smelter Phase II RI

Unit Number	Unit Description
011	Bulk Pneumatic Trailer for Resource Conservation Company (RCC) Spray Dryer Solids (Acid Plant water treatment system)
012	Drum Management Area - fenced area used to accumulate miscellaneous storage containers
013	Paint shop satellite accumulation/storage area
014	Auto shop satellite accumulation storage area
015	Acid Plant accumulation area
016	Unloading/Bedding Wastewater Treatment Plant
017	PCB Storage Building
018	Container storage area for miscellaneous refuse containers
019	Container storage area - Security Building Bunker
020	Bulk Hopper for Spray Dryer Solids
021	Container Storage Area in Laboratory
022	Container Storage Area in Health Clinic
023	21 Hazardous trash hoppers in miscellaneous areas of plant site
024	55-gallon drum used at Laboratory for satellite accumulation of organic and inorganic lab waste liquids
025	Spent Anode/Converter brick piles located on paved concrete area west of the Unloading Building and Concrete Bunkers/paved concrete south of the Unloading Building
026	Concrete Bunker north of Medford Sump
027	55 gallon drum, auto, machine, paint and old electric shops, powerhouse north and south of converters
028	Auto shop metal container < 55 gallon

Table 1-4
General Description of Investigation Areas
ASARCO El Paso Smelter Phase II RI

Investigation Area (IA)	Description	Agreed Order Reference ⁽¹⁾	Status	Area Use
1	Converter Building/Baghouse Area	3(b) & 9(b),(c)	Active	Baghouse spill containment and abandoned, spent scrubber saddles noted by TNRCC.
2	Boneyard /Slag Area	3(d) & 9(d)	Active	Deposited slag, with equipment and debris storage in some slag areas.
3	Acid Plants 1 & 2 Area	3(e)	Active	Sulfuric acid production.
4	Front Slope/Western Plant Boundary Area	3(h)	Inactive	No particular use; historic stormwater runoff area.
5	Historic Smeltertown Area	Not specifically identified	Inactive	Presently occupied by diesel 2 recovery system.
6	Groundwater	8	Inactive	Resource not used for domestic water supply.
7	Surface Water	Not specifically identified	Inactive	Off-site downgradient water bodies include the American Canal and the Rio Grande. On-site ponding exists in slag area.
8 ⁽²⁾	Bedding and Unloading Buildings Area	From TNRCC Response to RI Work Plan Comments	Active	Receiving, handling and storage area for incoming smelter feed material.
9 ⁽²⁾	Ponds 1, 5, and 6	From TNRCC Response to RI Work Plan Comments	Active	Three ponds used for fresh water supply, process makeup water and firewater storage.
10 ⁽²⁾	Plant Entrance Area	From TNRCC Response to RI Work Plan Comments	Active	Plant entrance and former potential stormwater outfall to the American Canal.

Table 1-4
General Description of Investigation Areas
ASARCO El Paso Smelter Phase II RI

Investigation Area (IA)	Description	Agreed Order Reference ⁽¹⁾	Status	Area Use
11 ⁽²⁾	Arroyos East of I-10	Identified from Phase I RI as possible source	Inactive	Former material storage area, potential stormwater runoff source. Several Phase I RI monitor wells with elevated metal concentrations.
12 ⁽²⁾	Ephemeral Pond and Pond Sediment Storage Area	Identified from Phase I RI as possible source	Inactive	Former material storage area, potential stormwater runoff storage area. Several downgradient Phase I RI monitor wells with elevated metal concentrations.
13 ⁽²⁾	Sample Mill Area	Identified from Phase I RI as possible source	Inactive	Former leaching operation in conjunction with Sinter Plant Operations. Monitor Well EP-13 with elevated metal concentrations.
14 ⁽²⁾	South Terrace Area	Identified from Phase I RI as possible source	Inactive	Former material storage area. Several downgradient Phase I RI monitor wells with elevated metal concentrations.

Notes:

⁽¹⁾TNRCC, 1996.

⁽²⁾Includes areas added per TNRCC review of the Remedial Investigation Work Plan (TNRCC, 1997).

⁽³⁾Additional areas resulting from Phase I RI.

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Table 2-1
Summary of Facility RI Monitor Wells and Borings
ASARCO El Paso Smelter Phase II RI

IA/ Description	Phase I		Phase II		Total	
	Wells & Borings	Samples	Wells & Borings	Samples	Wells & Borings	Samples
IA-1	5	21	3	38	8	59
IA-2	3	19	7	35	10	54
IA-3	11	42	8	55	19	97
IA-4	30	121	11	66	41	187
IA-5	19	81	3	15	22	96
IA-6	NA	NA	NA	NA	NA	NA
IA-7	NA	NA	NA	NA	NA	NA
IA-8	31	110	9	136	40	246
IA-9	0	0	7	36	7	36
IA-10	9	34	1	7	10	41
IA-11	3	16	22	127	25	143
IA-12	4	27	11	41	15	68
IA-13	0	0	3	47	3	47
IA-14	0	0	3	52	3	52
Total for Phases I & II					203	1,104

Notes:

Phase I of the Remedial Investigation took place between January 1997 and June 1998.

Phase II of the Remedial Investigation took place between June 1998 and February 2000.

NA: Not applicable

Table 2-2
Reference List of Analytical Parameters
ASARCO El Paso Smelter Phase II RI

ANALYTICAL PARAMETERS FOR SURFACE AND GROUNDWATER		
Analytical Parameter	Unit of Measurement	Abbreviation
Biochemical Oxygen Demand	milligrams per liter (mg/l)	BOD
Fecal Coliform	colony-forming units per 100 ml	cfu/100 ml
Ammonia	milligrams per liter (mg/l)	NH ₃
Total Hardness	milligrams per liter (mg/l)	Tot Hardness
Turbidity	NTUs	Turb
Temperature	degrees centigrade	Temp
Dissolved Oxygen	milligrams per liter (mg/l)	O ₂ or DO
pH	units	pH
Electrical Conductivity	microsiemens	EC
Total Dissolved Solids	milligrams per liter (mg/l)	TDS
Total suspended solids	milligrams per liter (mg/l)	TSS
Calcium	milligrams per liter (mg/l)	Ca
Magnesium	milligrams per liter (mg/l)	Mg
Sodium	milligrams per liter (mg/l)	Na
Potassium	milligrams per liter (mg/l)	K
Total Alkalinity as CaCO ₃	milligrams per liter (mg/l)	NA
Bicarbonate	milligrams per liter (mg/l)	HCO ₃
Carbonate	milligrams per liter (mg/l)	CO
Sulfate	milligrams per liter (mg/l)	SO
Chloride	milligrams per liter (mg/l)	Cl
Fluoride	milligrams per liter (mg/l)	F
Nitrate and Nitrite as Nitrogen	milligrams per liter (mg/l)	NO ₃ + NO ₂ as N
Arsenic	milligrams per liter (mg/l)	As
Barium	milligrams per liter (mg/l)	Ba
Cadmium	milligrams per liter (mg/l)	Cd
Chromium	milligrams per liter (mg/l)	Cr
Copper	milligrams per liter (mg/l)	Cu
Iron	milligrams per liter (mg/l)	Fe
Lead	milligrams per liter (mg/l)	Pb
Manganese	milligrams per liter (mg/l)	Mn
Mercury	milligrams per liter (mg/l)	Hg
Selenium	milligrams per liter (mg/l)	Se
Silver	milligrams per liter (mg/l)	Ag
Zinc	milligrams per liter (mg/l)	Zn

Notes:

NA: Not applicable.

Table 2-2
Reference List of Analytical Parameters
ASARCO El Paso Smelter Phase II RI

ANALYTICAL PARAMETERS FOR SOILS AND SEDIMENTS		
Analytical Parameter	Unit of Measurement	Abbreviation
Arsenic	Milligrams per kilogram (mg/kg)	As
Cadmium	Milligrams per kilogram (mg/kg)	Cd
Chromium	Milligrams per kilogram (mg/kg)	Cr
Copper	Milligrams per kilogram (mg/kg)	Cu
Iron	Milligrams per kilogram (mg/kg)	Fe
Lead	Milligrams per kilogram (mg/kg)	Pb
Selenium	Milligrams per kilogram (mg/kg)	Se
Zinc	Milligrams per kilogram (mg/kg)	Zn

Notes:

NA: Not applicable.

Table 2-3
Summary of Soil Sample Result Statistics
ASARCO El Paso Smelter Phase II RI

	ARSENIC	CADMIUM	CHROMIUM	COPPER	IRON	LEAD	SELENIUM	ZINC
Minimum	<20	<10	<30	<20	3,000	<10	<10	<10
Maximum	18,000	14,000	2,000	150,000	140,000	54,000	2,400	44,000
STD	1,648.7	908.5	104.4	10,552.9	14,617.0	5,355.7	111.3	3,684.8
Average ⁽¹⁾	482.8	202.0	89.7	2,668.9	25,222.4	1,730.6	26.5	1,341.5
Average ⁽²⁾	7.2	NA	54	25	26,000	19	0	60

Notes:

(1) Phase II Remedial Investigation average, calculated from all soil samples collected in Phase I and II RIs.

(2) Average concentration of soils in the United States (USGS, 1984).

(<) Less than; concentration is less than the detection limit indicated.

NA: Not applicable

STD: Standard deviation

All concentrations in milligrams per kilogram (mg/kg).

Table 2-4
IBWC Río Grande Water Quality Data 1998 Through 1999 At Courchesne Bridge
ASARCO El Paso Smelter Phase II RI

DATE	D.O.	pH	BOD	FECAL COLIFORM	CHLORIDE	TDS	SULFATE	SC (µS/cm)	TOTAL HARDNESS	AMMONIA	TURBIDITY (NTUs)	TEMP (F)
6/4/1998	10.2	7.9	2	170	85	662	280	1026	248	0.08	97	69
6/11/1998	8.6	7.3	8	390	145	570	127	893	236	0.1	96	63
6/18/1998	10.0	7.7	4	360	90	596	237	990	252	0.19	81	69
6/25/1998	11.4	8.0	3	330	75	558	240	976	236	0.12	64	75
7/2/1998	11.6	8.0	2	280	60	626	137	916	240	0.43	56	76
7/9/1998	12.0	7.6	3	960	75	598	237	979	252	0.15	134	77
7/16/1998	12.0	8.1	3	300	60	590	224	945	228	0.12	92	78
7/23/1998	11.4	7.8	2	320	65	592	237	944	228	0.07	102	77
7/30/1998	12.2	7.8	1	330	80	710	207	1043	244	0.05	226	78
8/6/1998	11.4	7.7	2	950	70	616	209	964	228	0.05	151	75
8/13/1998	12.0	7.5	3	150	70	558	198	955	240	0.06	112	78
8/20/1998	12.2	7.7	2	600	130	606	203	983	252	0.06	142	78
8/27/1998	12.2	7.5	2	1200	110	592	200	966	224	0.05	89	79
9/3/1998	10.9	7.8	2	1080	85	756	223	1046	256	0.07	72	73
9/10/1998	10.6	7.8	2	360	90	556	236	1113	268	0.07	58	72
9/17/1998	10.6	7.6	3	730	125	754	265	1153	260	0.03	57	73
9/24/1998	10.6	7.9	3	1070	150	898	257	1252	280	0.09	61	72
10/1/1998	8.6	8.0	5	20800	125	626	252	1191	256	0.20	78	72
10/8/1998	7.6	7.5	5	<1	125	900	310	1296	276	0.07	58	61
10/15/1998	8.6	7.8	4	1130	140	672	267	1270	308	0.18	77	65
10/22/1998	6.4	7.6	3	1130	210	1012	368	1647	388	0.38	37	55
10/29/1998	7.4	7.7	3	2070	245	1232	424	1714	392	0.14	92	60
11/5/1998	6.0	7.9	1	450	210	1238	424	1682	416	0.14	30	53
11/12/1998	6.0	7.8	3	410	240	1278	457	1754	392	0.13	15	53
11/19/1998	NR	8.0	2	580	200	1368	440	1763	400	0.13	16	54
12/3/1998	10.3	7.7	5	250	235	1226	429	1769	400	0.15	19	49
12/10/1998	11.1	7.9	2	300	270	1274	496	1823	412	0.17	12	42
12/17/1998	10.5	7.5	2	80	220	1306	440	1807	424	0.25	16	46
1/7/1999	11.4	7.8	2	80	260	1272	450	1814	444	0.41	13.4	41
1/14/1999	11.0	8.0	2	150	260	1406	493	1895	412	0.18	20.2	43
1/21/1999	10.8	7.8	2	230	255	1348	540	1893	440	0.25	18.6	48
1/28/1999	11.1	8.0	1	990	265	1376	462	1891	428	0.25	14.8	44
2/4/1999	11.1	8.0	3	170	160	720	210	1090	264	0.23	89.0	45
2/11/1999	11.1	7.9	3	230	190	928	308	1396	320	0.20	49.0	43
2/18/1999	10.5	7.8	4	100	278	1364	473	1819	428	0.67	47.0	47
2/25/1999	9.8	8.1	5	340	150	592	231	1116	280	0.38	217	51
3/4/1999	10.0	8.1	2	130	150	598	238	1020	268	0.14	55	52
3/11/1999	9.8	7.8	4	2440	160	570	180	868	244	0.27	174	56
3/17/1999	10.0	8.1	2	110	200	518	202	780	200	0.26	161	50
3/25/1999	9.2	7.9	3	140	160	564	165	806	216	0.07	955	57
4/1/1999	9.4	7.8	3	100	155	NR	230	906	232	0.11	133	57
4/8/1999	9.8	7.9	2	330	160	634	214	912	260	0.09	81	53
4/15/1999	9.2	7.9	7	3200	145	724	233	1063	288	0.12	82	54
4/22/1999	9.0	8.0	2	4850	245	886	333	1227	312	0.27	58	60
4/29/1999	9.0	8.0	1	2050	160	708	206	1074	264	0.25	67	60
5/6/1999	9.2	8.1	1	700	130	684	240	1021	248	0.23	71	58
5/13/1999	8.6	7.9	2	1980	115	840	229	1136	288	0.36	48	66
5/20/1999	8.6	8.1	3	830	115	676	258	1105	264	0.23	52	66
5/27/1999	9.4	7.7	3	720	135	704	236	988	248	0.22	540	69

Table 2-4
IBWC Rio Grande Water Quality Data 1998 Through 1999 At Courchesne Bridge
ASARCO El Paso Smelter Phase II RI

DATE	D.O.	pH	BOD	FECAL COLIFORM	CHLORIDE	TDS	SULFATE	SC (µS/cm)	TOTAL HARDNESS	AMMONIA	TURBIDITY (NTUs)	TEMP (F)
6/3/1999	9.2	8.0	4	410	120	518	214	983	236	0.15	81	68
6/10/1999	9.6	7.9	2	1000	210	622	297	918	228	0.15	53	70
6/17/1999	10.4	7.9	4	770	85	808	203	895	220	0.21	68	73
7/1/1999	12.0	7.8	3	1340	80	460	215	917	240	0.24	151	79
7/8/1999	11.6	7.7	2	2320	80	630	259	NR	224	0.38	1148	78
7/15/1999	11.0	7.9	5	390	105	606	189	868	236	0.39	95	76
7/29/1999	12.0	8.1	2	990	100	524	193	872	248	0.09	220	79
8/5/1999	10.8	8.0	1	3000	35	224	129	553	184	0.23	NR	74
8/12/1999	12.2	7.7	2	530	85	568	170	770	220	0.06	303	80
8/26/1999	4.6	8.4	6	1390	80	380	188	855	252	0.20	248	78
9/2/1999	7.3	8.2	2	3000	NR	526	297	913	236	0.21	149	75
9/9/1999	7.0	8.2	1	2120	85	474	205	930	260	0.03	245	73
9/16/1999	NR	8.3	3	890	90	490	228	967	260	0.02	330	NR
9/23/1999	6.8	8.3	3	2400	120	738	279	1029	320	0.17	107	70
9/30/1999	7.5	8.0	4	2440	125	740	335	1196	284	0.21	122	63
10/7/1999	7.3	8.1	4	2560	160	608	211	1137	300	0.03	99	66
10/14/1999	7.9	7.8	2	2480	120	734	175	1076	288	0.02	83	58
10/21/1999	8.8	7.8	3	1490	175	982	440	1740	400	0.11	62	55
10/28/1999	8.7	7.4	4	1280	190	1054	399	1750	384	0.19	50	59
11/18/1999	9.0	7.8	2	2880	230	1106	346	1520	388	0.14	50	55
12/2/1999	NR	7.7	2	330	230	1150	460	1950	412	0.31	19.2	48
12/9/1999	10.6	7.8	3	1840	215	1462	565	2110	NR	0.38	18.7	40
12/19/1999	11.1	8.5	4	3500	250	1394	515	2150	424	0.88	NR	37
AVERAGE	9.8	7.8	3	1352	149	801	287	1222	293	0.19	128.4	62.6
MEDIAN	10.0	7.8	3	730	140	684	238	1063	260	0.15	81.0	63.0
STD	1.7	0.2	1	2555	65	306	111	390	74	0.15	186.3	12.4
MAXIMUM	12.2	8.5	8	20800	278	1462	565	2150	444	0.88	1148.0	80.1
MINIMUM	4.6	7.3	1	80	35	224	127	553	184	0.02	12.0	37.4

Notes:

NR: Not Reported.

All concentrations in milligrams per liter (mg/l) unless otherwise indicated.

Fecal Coliform reported in cfu/100 ml units.

Courchesne Bridge is located 9.5 Miles above Haskell R. Street Wastewater Treatment Plant.

See Figure 2-2 for sample locations.

Table 2-5
IBWC Rio Grande Water Quality, 1998 Through 1999
Across From Bowie High School Football Field
ASARCO El Paso Smelter Phase II RI

DATE	D.O.	pH	BOD	FECAL COLIFORM	CHLORIDE	TDS	SULFATE	SC (μ S/cm)	TOTAL HARDNESS	AMMONIA	TURBIDITY (NTUs)	TEMP (F)
6/4/1998	9.6	7.9	4	1050	75	606	238	970	244	0.08	65	67
6/11/1998	9.0	7.7	5	7900	100	530	126	825	212	0.09	136	65
6/18/1998	9.0	8.1	4	300	125	636	235	1031	260	0.16	38	65
6/25/1998	10.8	8.1	3	640	70	572	252	946	240	0.13	33	72
7/2/1998	11.6	8.2	3	80	60	532	118	830	224	0.10	83	76
7/9/1998	11.6	7.6	4	10000	55	522	209	869	248	0.12	97	76
7/16/1998	11.2	8.3	4	360	55	572	216	922	216	0.07	53	75
7/23/1998	11.8	7.9	2	840	70	558	223	885	220	0.06	99	77
7/30/1998	12.0	7.9	2	2120	80	602	207	998	244	0.05	152	77
8/6/1998	11.4	7.8	1	3780	65	586	198	928	224	0.04	186	75
8/13/1998	12.2	7.7	3	20400	70	492	178	910	228	0.04	134	78
8/20/1998	11.8	7.9	2	700	110	600	208	990	244	0.06	151	76
8/27/1998	11.8	7.7	2	860	120	574	187	929	212	0.08	76	77
9/3/1998	10.6	7.8	3	780	85	770	191	963	236	0.05	53	72
9/10/1998	10.4	8.0	4	450	95	496	215	1050	252	0.04	43	71
9/17/1998	9.8	7.7	3	600	115	816	264	1197	272	0.02	32	69
9/24/1998	10.4	7.9	3	820	160	998	264	1258	276	0.06	41	71
10/1/1998	8.6	8.0	5	20800	125	626	252	1191	256	0.20	78	72
10/8/1998	7.6	7.5	2	<1	125	900	310	1296	276	0.07	58	61
10/15/1998	8.6	7.8	4	1130	140	672	267	1270	308	0.18	77	65
10/22/1998	6.4	7.6	3	1130	210	1012	368	1647	388	0.38	37	55
10/29/1998	7.4	7.7	3	2070	245	1232	424	1714	392	0.14	92	60
11/5/1998	6.2	8.0	2	580	210	1154	396	1643	400	0.09	31	53
11/12/1998	6.2	7.9	3	270	225	1252	431	1722	400	0.12	20	54
11/19/1998	6.4	8.0	2	270	215	1230	422	1677	388	0.06	21	55
12/3/1998	10.2	7.8	3	500	215	1218	410	1711	380	0.14	16	45
12/10/1998	11.1	8.0	2	230	280	1226	457	1861	420	0.21	11	42
12/17/1998	10.5	7.9	3	100	250	1374	452	1871	396	0.24	14	46
1/7/1999	11.1	7.9	3	240	270	1288	450	1615	312	0.29	12.9	43
1/14/1999	10.5	8.0	2	170	285	1392	471	1935	436	0.18	12.5	45
1/21/1999	10.0	7.8	3	540	260	1418	460	1923	400	0.28	16.4	49
1/28/1999	10.8	7.9	3	270	275	1382	462	1930	404	0.23	14.5	43
2/4/1999	10.5	8.0	5	50	140	632	207	1050	260	0.11	82.0	47
2/11/1999	10.8	8.2	2	60	175	808	272	1275	304	0.10	55.0	40
2/18/1999	10.3	8.2	4	150	250	1316	427	1851	408	0.39	23.0	48
2/25/1999	10.0	8.2	7	210	185	714	233	1161	272	0.16	102	51
3/4/1999	10.0	8.2	2	80	185	700	216	1077	272	0.12	27	50
3/11/1999	9.8	8.0	4	1680	160	616	193	918	280	0.21	73	54
3/17/1999	10.3	8.1	2	80	175	564	169	831	216	0.32	48	47
3/25/1999	9.6	8.1	3	140	150	520	173	849	216	0.04	32	55
4/1/1999	9.4	7.9	4	80	195	640	206	939	232	0.05	46	56
4/8/1999	10.3	8.1	4	440	195	650	204	945	268	0.06	34	47
4/15/1999	10.3	8.1	6	220	110	646	222	988	268	0.05	19	48
4/22/1999	9.6	8.2	3	230	155	716	253	1024	260	0.12	25	54
4/29/1999	9.4	8.1	1	760	150	590	208	946	240	0.16	17	58
5/6/1999	9.8	8.1	3	230	125	632	230	1017	252	0.18	20	53
5/13/1999	8.6	7.9	3	3130	130	788	268	1139	248	0.11	11	63
5/20/1999	9.0	8.0	4	960	110	628	240	1050	220	0.14	23	60
5/27/1999	9.0	8.1	4	250	170	706	236	1053	236	0.08	17	69
6/3/1999	9.2	7.9	2	550	145	492	199	926	220	0.11	11	67
6/10/1999	8.4	7.9	1	390	220	540	213	861	212	0.07	10	65
6/17/1999	9.4	8.0	2	180	60	688	231	845	216	0.04	16	69
7/1/1999	10.0	7.9	2	930	95	534	203	900	232	0.06	38	71

Table 2-5
IBWC Rio Grande Water Quality, 1998 Through 1999
Across From Bowie High School Football Field
ASARCO El Paso Smelter Phase II RI

DATE	D.O.	pH	BOD	FECAL COLIFORM	CHLORIDE	TDS	SULFATE	SC (µS/cm)	TOTAL HARDNESS	AMMONIA	TURBIDITY (NTUs)	TEMP (F)
7/8/1999	11.6	7.8	1	300	65	590	163	NR	220	0.24	171	78
7/15/1999	9.6	8.2	2	430	90	NR	181	866	232	0.80	19	34
7/29/1999	11.4	8.1	3	1600	80	544	176	842	228	0.09	207	77
8/5/1999	10.8	8.0	2	5500	10	382	147	652	184	0.25	9950	76
8/12/1999	12.2	7.9	2	760	85	460	245	817	240	0.02	846	81
8/26/1999	6.0	8.7	3	480	80	390	181	817	224	0.12	86	77
9/2/1999	10.0	8.6	3	350	NR	610	256	930	240	0.06	32	73
9/9/1999	8.5	8.1	2	610	80	486	250	852	248	0.03	197	72
9/16/1999	NR	8.4	3	1200	80	564	249	906	264	0.02	254	NR
9/23/1999	7.4	8.5	2	1200	115	664	233	1110	316	0.14	154	70
9/30/1999	9.2	8.1	5	1360	185	840	424	1453	312	0.57	85	57
10/7/1999	8.1	8.1	3	580	175	804	217	1380	300	0.04	55	50
10/14/1999	8.0	8.1	3	930	120	770	198	1110	284	0.15	100	64
10/21/1999	8.9	8.1	3	550	185	1090	352	1800	380	0.29	46	57
10/28/1999	8.4	7.6	5	980	200	1034	385	1810	368	0.10	44	61
11/18/1999	9.0	7.8	2	2880	230	1106	346	1520	388	0.14	50	55
12/2/1999	NR	7.7	2	350	245	1110	454	2040	312	0.29	14.9	51
12/9/1999	10.6	8.1	3	80	250	1234	543	2180	NR	0.38	14.8	42
12/16/1999	11.6	8.5	3	190	260	1266	501	2200	408	0.07	NR	38
AVERAGE	9.8	8.0	3.0	1564.9	150.1	787.4	275.9	1217.4	282.9	0.14	218.8	60.7
MEDIAN	10.3	7.9	3.0	550.0	140.0	650.0	235.5	1050.0	260.0	0.1	43.5	60.8
STD	1.6	0.2	1.2	3656.2	69.1	294.4	105.4	404.8	68.3	0.1	1202.7	12.4
MAXIMUM	12.2	8.7	7.0	20800	285.0	1418.0	543.0	2200.0	436.0	0.57	9950.0	81.0
MINIMUM	6.2	7.5	1.0	50.0	10.0	382.0	118.0	652.0	184.0	0.02	10.0	34.0

Notes:

NR: Not Reported.

All concentrations in milligrams per liter (mg/l) unless otherwise indicated.

Fecal Coliform reported in cfu/100 ml units.

Bowie High School Football Field is located 1.5 Miles above Haskell R. Street Wastewater Treatment Plant.

See Figure 2-2 for sample locations.

Table 2-6
IBWC Average Concentrations of Rio Grande Surface Water Samples
 January 1997 Through December 1999
ASARCO El Paso Smelter Phase II RI

Parameter	Courchesne Bridge	Bowie High School
D.O.	9.8	9.8
pH	7.8	8.0
BOD	3.1	3.2
Fecal Coliform (cfu/100 ml)	1352.0	1564.9
Chloride	149.0	150.1
TDS	801.0	787.4
Sulfate	287.0	275.9
SC (μ S/cm)	1222.0	1217.4
Total Hardness	293.0	282.9
Ammonia	0.2	0.1
Turbidity (NTUs)	128.4	218.8
Temperature ($^{\circ}$ F)	62.6	60.7

Notes:

See Figure 2-2 for sample locations.

All concentrations in milligrams per liter (mg/l) unless otherwise indicated.

Average concentrations derived from weekly sampling efforts.

Table 2-7
Summary of Hydrometrics Analytical Results August 1997 Through February 2000
Surface Water Samples
ASARCO El Paso Smelter Phase II RI

Parameter	Rio Grande			American Canal		
	Min	Max	Ave	Min	Max	Ave
DO	3.70	11.40	7.38	3.60	16.50	6.67
pH	6.84	8.86	8.22	7.54	8.79	8.23
SC ($\mu\text{S}/\text{cm}$)	197.70	2390.00	1367.98	249.00	6200.00	1436.60
TDS	526.00	2069.00	988.51	582.00	3979.00	1072.23
TSS	7.50	500.00	121.77	12.00	565.00	140.50
Ca	58.00	117.00	85.19	60.00	225.00	89.58
Mg	12.00	32.00	20.81	12.00	94.00	24.04
Na	97.00	334.00	204.26	101.00	965.00	227.19
K	6.60	16.00	10.13	6.00	54.00	12.15
Total Alkalinity	162.00	180.00	173.43	172.00	180.00	176.00
HCO ₃	178.00	306.00	240.82	204.00	342.00	242.46
CO ₃	<1.00	17.00	4.78	1.00	11.00	2.65
SO ₄	131.00	598.00	301.36	156.00	1839.00	377.69
Cl	67.00	315.00	170.86	64.00	679.00	193.12
F	0.57	0.90	0.72	0.64	2.10	0.79
NO ₃ + NO ₂	0.10	6.50	1.36	0.13	12.00	1.67
<i>Dissolved Metals</i>						
As	<0.005	0.011	0.006	<0.005	0.810	0.073
Cd	<0.005	<0.005	<0.005	<0.005	0.008	<0.005
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Fe	<0.1	0.180	0.101	<0.1	<0.1	<0.1
Pb	<0.003	<0.003	<0.003	<0.003	0.004	<0.003
Se	<0.005	<0.005	<0.005	<0.005	0.200	0.020
Zn	<0.02	0.035	0.021	<0.02	0.024	0.021
<i>Total Metals</i>						
As	0.006	0.020	0.014	0.005	0.007	0.006
Cd	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Fe	0.170	0.790	0.537	0.190	1.200	0.660
Pb	<0.003	0.013	0.005	<0.003	0.006	0.004
Se	<0.005	0.006	<0.005	<0.005	0.005	<0.005
Zn	<0.02	0.079	0.033	<0.02	0.067	0.044
<i>Total Recoverable Metals</i>						
As	<0.005	0.015	0.007	0.005	1.600	0.112
Cd	<0.005	<0.005	<0.005	<0.005	0.019	0.006
Cr	<0.01	0.012	<0.01	<0.01	0.011	<0.01
Cu	<0.025	<0.025	<0.025	<0.025	0.043	0.026
Fe	0.150	15.000	3.118	<0.1	14.000	3.585
Pb	<0.003	0.014	0.005	<0.003	0.015	0.006
Se	<0.005	0.006	0.005	<0.005	0.360	0.028
Zn	<0.02	0.051	0.027	<0.02	0.044	0.028

Notes:

All concentrations in milligrams per liter (mg/l) unless otherwise indicated.

(<) Less than; concentration is less than the detection limit indicated.

See Table 2-3 for explanations of analytical parameter, including measurement units.

See appendix D for a full tabulation of analytical results.

Table 2-8
Hydrometrics On-Site Pond and Surface Water Sampling Results, August 1997 Through February 2000
ASARCO El Paso Smelter Phase II RI

Sample Location	Ph	SC (μ S/cm)	TDS	Temp (degrees C)	Sulfate	Chloride
SEP-1	8.2	2021	1386	22.8	556	203
SEP-2	8.4	1497	953	19.9	286	165
SEP-3	8.5	1975	1377	24.4	555	209
SEP-4	8.4	1441	984	19.5	280	154
SEP-6	8.4	1155	659	23.4	243	111
SEP-7	8.4	1421	917	21.6	279	204
SEP-8	8.3	958	677	26.0	190	85
SEP-9	8.3	1525	975	21.7	303	183
SEP-10	8.4	1361	883	22.0	272	147
SEP-11	8.4	1436	937	21.1	285	157
SEP-12	8.4	1490	951	20.4	299	166
SEP-13	8.4	1392	889	20.0	271	149
SEP-14	8.4	216	143	22.3	43	4
Rio Grande	8.0	1243	778	60.9	264	145

Notes:

See Exhibit 1 for all sample locations.

All concentrations in milligrams per liter (mg/l) unless otherwise indicated.

(<) Less than; concentration is less than the detection limit indicated

Table 2-9
Summary of Streambed Sediment Sample Results
ASARCO El Paso Smelter Phase II RI

Site	Date	Type Name	Arsenic		Cadmium		Lead
SEP-2	8/20/1999	SEDIMENT/SOIL	10	U	12		160
SEP-2	11/2/1999	SEDIMENT/SOIL	10	U	10	U	57
SEP-2	2/14/2000	SEDIMENT/SOIL	10	U	15		48
Average			10.0		12.3		88.3
Median			10.0		12.0		57.0
Standard Deviation			0.0		2.5		62.2
Minimum			10.0		10.0		48.0
Maximum			10.0		15.0		160.0
SEP-4	8/20/1999	SEDIMENT/SOIL	10	U	10	U	28
SEP-4	11/2/1999	SEDIMENT/SOIL	10	U	10	U	66
SEP-4	2/14/2000	SEDIMENT/SOIL	10	U	10	U	19
Average			10.0		10.0		37.7
Median			10.0		10.0		28.0
Standard Deviation			0.0		0.0		24.9
Minimum			10.0		10.0		19.0
Maximum			10.0		10.0		66.0
SEP-9	8/20/1999	SEDIMENT/SOIL	10	U	10	U	29
SEP-9	11/2/1999	SEDIMENT/SOIL	10	U	10	U	64
SEP-9	2/14/2000	SEDIMENT/SOIL	10	U	10	U	20
Average			10.0		10.0		37.7
Median			10.0		10.0		29.0
Standard Deviation			0.0		0.0		23.2
Minimum			10.0		10.0		20.0
Maximum			10.0		10.0		64.0
SEP-10	8/20/1999	SEDIMENT/SOIL	10	U	10	U	21
SEP-10	11/2/1999	SEDIMENT/SOIL	21		10	U	35
SEP-10	2/14/2000	SEDIMENT/SOIL	10		10	U	12
Average			13.7		10.0		22.7
Median			10.0		10.0		21.0
Standard Deviation			6.4		0.0		11.6
Minimum			10.0		10.0		12.0
Maximum			21.0		10.0		35.0

Table 2-9
Summary of Streambed Sediment Sample Results
ASARCO El Paso Smelter Phase II RI

Site	Date	Type Name	Arsenic		Cadmium		Lead
SEP-11	8/20/1999	SEDIMENT/SOIL	10	U	10	U	40
SEP-11	11/2/1999	SEDIMENT/SOIL	11		10	U	140
SEP-11	2/14/2000	SEDIMENT/SOIL	10	U	10	U	34
Average			10.3		10.0		71.3
Median			10.0		10.0		40.0
Standard Deviation			0.6		0.0		59.5
Minimum			10.0		10.0		34.0
Maximum			11.0		10.0		140.0
SEP-12	8/20/1999	SEDIMENT/SOIL	17		10	U	24
SEP-12	11/2/1999	SEDIMENT/SOIL	10	U	10	U	54
SEP-12	2/14/2000	SEDIMENT/SOIL	12		12		23
Average			13.0		10.7		33.7
Median			12.0		10.0		24.0
Standard Deviation			3.6		1.2		17.6
Minimum			10.0		10.0		23.0
Maximum			17.0		12.0		54.0
SEP-13	8/20/1999	SEDIMENT/SOIL	10	U	10	U	31
SEP-13	11/2/1999	SEDIMENT/SOIL	21		13		51
SEP-13	2/14/2000	SEDIMENT/SOIL	10	U	12		66
Average			13.7		11.7		49.3
Median			10.0		12.0		51.0
Standard Deviation			6.4		1.5		17.6
Minimum			10.0		10.0		31.0
Maximum			21.0		13.0		66.0

Notes:

Only Phase II soil sample results are included in this table.

See Exhibit 1 for all sample locations.

All concentrations in milligrams per kilogram (mg/kg).

(U) Concentration is less than the detection limit indicated

See Table 2-3 for explanations of analytical parameter, including measurement units.

See appendix D for a full tabulation of analytical results.

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
6/1/1998	6.26	26	19.9
6/2/1998	6.02	25.4	19.9
6/3/1998	5.84	25.7	19.6
6/4/1998	5.76	26.4	20.4
6/5/1998	5.92	26.7	20.6
6/6/1998	6.23	30.2	23.1
6/7/1998	7.72	34.7	26.8
6/8/1998	7.94	34.6	27.3
6/9/1998	7.01	34.2	27.2
6/10/1998	8.7	36.1	26.9
6/11/1998	13.6	40	26
6/12/1998	8.89	32.7	24.4
6/13/1998	6.64	23.8	18.3
6/14/1998	6.99	19.8	14.2
6/15/1998	6.98	20.8	16
6/16/1998	6.5	21.1	16.4
6/17/1998	6.6	21.1	16.3
6/18/1998	6.69	24	20.6
6/19/1998	6.52	26.3	23.1
6/20/1998	6.31	25.8	21.9
6/21/1998	6.3	27.7	24.5
6/22/1998	6.21	28.6	25.8
6/23/1998	6.2	27.6	23.7
6/24/1998	6.24	25.4	20.5
6/25/1998	6.34	25.6	20
6/26/1998	6.32	25.8	19.2
6/27/1998	6.6	28.3	23.7
6/28/1998	8.26	33.7	29
6/29/1998	10.5	38	30.1
6/30/1998	10.7	39	29.4
7/1/1998	9.65	38.3	27.3
7/2/1998	11.8	43.2	26.6
7/3/1998	14.1	48.2	25.6
7/4/1998	8.34	35.3	24.4
7/5/1998	6.47	30.7	22
7/6/1998	6.68	35.1	26.6
7/7/1998	6.43	33.8	26
7/8/1998	7.6	36.2	27.2
7/9/1998	6.57	32.1	26.1
7/10/1998	6.61	30.1	23.8
7/11/1998	6.53	29.8	23.2
7/12/1998	6.51	27.6	20.8
7/13/1998	8.17	35.2	25.4
7/14/1998	6.9	34.2	26.2

Table 2-10
 Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
 June 1998 Through December 1999
 ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
7/15/1998	6.3	31.4	24.8
7/16/1998	7.7	34.9	26
7/17/1998	7.86	35.9	27.4
7/18/1998	6.54	33.4	27.3
7/19/1998	6.64	33.7	26.4
7/20/1998	9.44	38	28.3
7/21/1998	7.34	34.8	26.7
7/22/1998	7.61	35.2	26.6
7/23/1998	9.4	37.3	27.4
7/24/1998	12.6	39.6	26.7
7/25/1998	17.2	50.2	26.9
7/26/1998	11.4	39	27.4
7/27/1998	6.78	32.3	25.4
7/28/1998	6.6	31.4	24.3
7/29/1998	6.52	26.4	20.3
7/30/1998	7.18	28.3	21.2
7/31/1998	6.95	28.1	21.8
8/1/1998	6.86	29.8	23
8/2/1998	9.26	35.8	25.5
8/3/1998	9.58	37.4	27.3
8/4/1998	6.72	31.7	25.1
8/5/1998	6.69	32	25
8/6/1998	6.47	32.6	25.4
8/7/1998	6.58	28.6	22.3
8/8/1998	6.64	26.4	20.2
8/9/1998	6.52	25.1	18.3
8/10/1998	6.58	30	22
8/11/1998	6.4	30.3	22.8
8/12/1998	6.51	30.3	22.2
8/13/1998	6.69	33.4	24.9
8/14/1998	20.9	52.1	25.2
8/15/1998	10.3	34.7	25.5
8/16/1998	6.41	31.7	23.5
8/17/1998	6.3	28.7	20.9
8/18/1998	6.72	27.3	19.5
8/19/1998	6.83	25.8	18.3
8/20/1998	8.08	31.9	22.3
8/21/1998	6.9	26.5	19.2
8/22/1998	6.5	25.9	18.6
8/23/1998	6.77	30.4	21.6
8/24/1998	6.74	33	24.4
8/25/1998	6.54	31.5	23.6
8/26/1998	6.68	32.2	23.6
8/27/1998	6.55	31.5	22.8

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
8/28/1998	6.59	31.3	22.1
8/29/1998	6.57	33.4	23.9
8/30/1998	6.36	34.4	25
8/31/1998	4.46	32.2	24.9
9/1/1998	3.55	31.5	25.2
9/2/1998	3.58	30.7	25
9/3/1998	3.35	27.1	22.3
9/4/1998	3.24	24.4	19.8
9/5/1998	3.26	24.9	20
9/6/1998	3.2	27.7	22.2
9/7/1998	3.14	27.8	22.4
9/8/1998	3.14	28.1	22.7
9/9/1998	2.37	25.4	22.2
9/10/1998	1.64	21.7	19.7
9/11/1998	0.82	18.8	17.3
9/12/1998	0.63	19	17.5
9/13/1998	0.58	18.7	17.3
9/14/1998	0.63	20.1	18.3
9/15/1998	0.66	21	18.9
9/16/1998	0.63	18.6	17.1
9/17/1998	0.6	16.1	15
9/18/1998	0.59	14.4	13.4
9/19/1998	0.67	22	19.6
9/20/1998	0.69	24	21.8
9/21/1998	0.66	20.7	19.2
9/22/1998	0.66	19.7	18.1
9/23/1998	0.64	17.7	16.3
9/24/1998	0.61	16.7	15.5
9/25/1998	0.61	17.3	15.7
9/26/1998	0.62	17.8	15.9
9/27/1998	0.66	20.4	18.3
9/28/1998	0.64	19.7	17.9
9/29/1998	0.65	19.4	17.6
9/30/1998	0.71	17.1	15.9
10/1/1998	0.65	18.4	17.3
10/2/1998	0.6	15.3	14.5
10/3/1998	0.6	16.8	15.6
10/4/1998	0.61	19.6	18
10/5/1998	0.61	20	18.4
10/6/1998	0.59	20.4	19.2
10/7/1998	0.58	18.8	17.6
10/8/1998	0.58	14	13.3
10/9/1998	0.55	10.1	9.26
10/10/1998	0.54	9.37	8.84

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
10/11/1998	0.55	9.84	9.21
10/12/1998	0.57	14.6	14.1
10/13/1998	0.6	13	13
10/14/1998	11	13.8	4.24
10/15/1998	16.8	14.8	0.27
10/16/1998	17.2	15.5	0.27
10/17/1998	12.6	12.2	0.27
10/18/1998	10.6	10.5	0.27
10/19/1998	10	9.76	0.27
10/20/1998	11.3	10.6	0.27
10/21/1998	11.3	10.4	0
10/22/1998	10.5	9.55	0
10/23/1998	9.72	8.84	0
10/24/1998	9.05	8.38	0
10/25/1998	8.73	7.98	0
10/26/1998	8.4	7.68	0
10/27/1998	15.2	12.8	0
10/28/1998	12.9	11.6	0
10/29/1998	11.6	10.9	0.03
10/30/1998	12.5	11.5	0.06
10/31/1998	9.48	8.97	0.03
11/1/1998	8.58	8.27	0
11/2/1998	9.01	8.43	0
11/3/1998	8.57	7.66	0
11/4/1998	8.06	7.4	0
11/5/1998	7.7	7.27	0
11/6/1998	7.48	7.03	0
11/7/1998	7.49	6.95	0
11/8/1998	7.08	6.44	0
11/9/1998	6.75	6.15	0
11/10/1998	6.3	5.82	0
11/11/1998	6.28	5.82	0
11/12/1998	6.37	5.84	0
11/13/1998	6.42	5.73	0
11/14/1998	6.33	5.64	0
11/15/1998	6.44	5.68	0
11/16/1998	6.25	5.48	0
11/17/1998	6.12	5.36	0
11/18/1998	6.04	5.32	0
11/19/1998	5.94	5.25	0
11/20/1998	5.84	5.14	0
11/21/1998	5.72	4.99	0
11/22/1998	5.61	4.96	0
11/23/1998	5.61	4.91	0

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
11/24/1998	5.57	4.89	0
11/25/1998	5.47	4.75	0
11/26/1998	5.28	4.71	0
11/27/1998	5.25	4.63	0
11/28/1998	5.21	4.57	0
11/29/1998	5.76	5.07	0
11/30/1998	5.37	4.78	0
12/1/1998	5.1	4.64	0
12/2/1998	5.01	4.6	0
12/3/1998	5.08	4.69	0
12/4/1998	4.9	4.7	0
12/5/1998	4.8	4.67	0
12/6/1998	4.57	4.51	0
12/7/1998	4.44	4.31	0
12/8/1998	4.5	4.1	0
12/9/1998	4.53	4.01	0
12/10/1998	4.47	4	0
12/11/1998	4.24	3.79	0
12/12/1998	4.2	3.76	0
12/13/1998	4.16	3.68	0
12/14/1998	4.23	3.62	0
12/15/1998	4.33	3.64	0
12/16/1998	4.22	3.55	0
12/17/1998	4.28	3.76	0
12/18/1998	4.48	4.01	0
12/19/1998	4.35	3.9	0
12/20/1998	4.14	3.74	0
12/21/1998	4.05	3.71	0
12/22/1998	4.05	3.71	0
12/23/1998	4.04	3.61	0
12/24/1998	4.06	3.65	0
12/25/1998	3.91	3.55	0
12/26/1998	3.95	3.57	0
12/27/1998	3.89	3.51	0
12/28/1998	3.95	3.53	0
12/29/1998	4	3.55	0
12/30/1998	4.02	3.5	0
12/31/1998	4.02	3.51	0
1/1/1999	3.91	3.31	0
1/2/1999	3.73	3.14	0
1/3/1999	3.63	3.08	0
1/4/1999	3.52	3.01	0
1/5/1999	3.52	3.04	0
1/6/1999	3.61	3.05	0

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
1/7/1999	3.61	2.98	0
1/8/1999	3.69	3.02	0
1/9/1999	3.65	2.9	0
1/10/1999	3.69	2.83	0
1/11/1999	3.67	2.78	0
1/12/1999	3.68	2.74	0
1/13/1999	3.71	2.66	0
1/14/1999	3.69	2.55	0
1/15/1999	3.62	2.54	0
1/16/1999	3.59	2.48	0
1/17/1999	3.51	2.36	0
1/18/1999	3.43	2.23	0
1/19/1999	3.36	2.21	0
1/20/1999	3.34	2.21	0
1/21/1999	3.29	2.48	0
1/22/1999	3.26	2.47	0
1/23/1999	3.08	2.41	0
1/24/1999	2.97	2.48	0
1/25/1999	2.97	2.55	0
1/26/1999	3.06	2.67	0
1/27/1999	3.13	2.66	0
1/28/1999	3.13	2.6	0
1/29/1999	3.38	2.83	0
1/30/1999	5.01	5.17	0
1/31/1999	14.1	14.3	0
2/1/1999	15	14.9	0
2/2/1999	15.4	15.1	0
2/3/1999	15.6	15	0
2/4/1999	11.7	11.7	0
2/5/1999	11	10.7	0
2/6/1999	11.1	10.3	0
2/7/1999	9.7	9.18	0
2/8/1999	9.05	8.58	0
2/9/1999	9.1	8.32	0
2/10/1999	9.1	8.27	0
2/11/1999	8.04	7.1	0
2/12/1999	5.99	4.86	0
2/13/1999	5.11	4.02	0
2/14/1999	4.59	3.62	0
2/15/1999	4.32	3.37	0
2/16/1999	4.07	3.19	0
2/17/1999	3.84	2.93	0
2/18/1999	2.65	2.72	1.21
2/19/1999	1.15	2.51	2.44

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
2/20/1999	1.07	2.58	2.49
2/21/1999	0.95	2.57	2.32
2/22/1999	0.87	5.19	4.12
2/23/1999	0.93	12.9	10.4
2/24/1999	0.87	12.8	10
2/25/1999	5.82	15.5	7.86
2/26/1999	1.07	10.5	7.48
2/27/1999	0.97	10.7	7.59
2/28/1999	0.89	10.8	7.6
3/1/1999	0.86	14.5	11.8
3/2/1999	0.82	15.7	14
3/3/1999	0.84	15.2	14.7
3/4/1999	0.8	11.5	11.1
3/5/1999	0.76	10.6	10.3
3/6/1999	0.69	9.24	8.7
3/7/1999	0.66	11.3	10.5
3/8/1999	0.7	22.5	21.9
3/9/1999	1.9	27.2	25.6
3/10/1999	1.16	26.6	24.7
3/11/1999	1.08	25	23.7
3/12/1999	0.98	22.4	21.3
3/13/1999	1.01	22.1	21
3/14/1999	0.97	23.7	21.8
3/15/1999	1.62	31.3	27
3/16/1999	1.16	32.3	28.1
3/17/1999	2.6	30.7	25.5
3/18/1999	3.67	31.7	25.3
3/19/1999	4.89	33.7	26.1
3/20/1999	5.35	28	21.4
3/21/1999	5.39	24.1	17.7
3/22/1999	5.47	23	16.8
3/23/1999	5.41	23.4	16.9
3/24/1999	5.35	25	18.1
3/25/1999	5.34	26.1	18.7
3/26/1999	5.36	26.9	18.9
3/27/1999	5.5	28.4	19.6
3/28/1999	5.58	27.9	19.3
3/29/1999	5.58	25.4	17
3/30/1999	5.5	23.8	15.9
3/31/1999	5.47	21.6	14.4
4/1/1999	5.46	18.1	10.8
4/2/1999	5.63	15.4	8.74
4/3/1999	5.92	15.3	8.44
4/4/1999	5.96	20.2	12.6

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
4/5/1999	5.72	21.9	15.1
4/6/1999	5.27	22.2	15.4
4/7/1999	5.18	21.7	14.9
4/8/1999	5.15	21.4	14.5
4/9/1999	5.26	22.8	15.2
4/10/1999	5.32	23.2	15.7
4/11/1999	5.28	23	15.3
4/12/1999	5.25	22.7	15.1
4/13/1999	5.16	20.9	14
4/14/1999	5.36	20.3	13.5
4/15/1999	5.56	18.6	12.1
4/16/1999	5.53	17.5	11.1
4/17/1999	5.46	17.4	10.9
4/18/1999	5.41	19.3	12.7
4/19/1999	5.33	19.6	13.5
4/20/1999	5.29	19.2	13.6
4/21/1999	5.3	17.8	12
4/22/1999	5.36	15.3	9.09
4/23/1999	5.44	15.4	8.71
4/24/1999	5.42	16.2	9.09
4/25/1999	5.36	19.4	11.6
4/26/1999	5.34	20.2	12.9
4/27/1999	5.4	21.3	14.9
4/28/1999	5.36	21	13.9
4/29/1999	5.19	18.5	11.6
4/30/1999	3.43	16.8	11.8
5/1/1999	3.08	17.2	12.5
5/2/1999	2.46	20	15.4
5/3/1999	2.11	22.1	17.9
5/4/1999	2.29	22.6	18.4
5/5/1999	2.2	20.6	17.2
5/6/1999	2.19	17.9	14.8
5/7/1999	2.21	16.7	13.3
5/8/1999	2.24	16.4	13
5/9/1999	2.18	13.5	10.8
5/10/1999	2.21	14.3	11.6
5/11/1999	2.21	13.8	11.3
5/12/1999	2.2	13.4	11.1
5/13/1999	2.26	14.2	11.7
5/14/1999	2.24	15.4	12.6
5/15/1999	2.24	14.8	11.9
5/16/1999	2.25	15.3	12.4
5/17/1999	2.21	17.3	14.1
5/18/1999	2.24	17.5	14.1

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
5/19/1999	2.17	17.6	14
5/20/1999	2.19	16.6	12.6
5/21/1999	2.18	17.8	13.4
5/22/1999	2.15	17.6	12.9
5/23/1999	2.13	21.6	16.6
5/24/1999	2.19	25.3	19.8
5/25/1999	2.15	25.4	19.6
5/26/1999	2.21	26.1	20.3
5/27/1999	2.2	23.7	18.3
5/28/1999	2.18	24.8	19.1
5/29/1999	2.17	23.1	17.9
5/30/1999	2.28	20.2	15.4
5/31/1999	5.05	24.7	16.8
6/1/1999	6.34	27.5	18
6/2/1999	5.76	27.3	19.1
6/3/1999	5.6	24.9	17.5
6/4/1999	5.53	24.6	17.1
6/5/1999	5.79	27	19
6/6/1999	5.83	30.6	22.1
6/7/1999	5.71	34.2	25.3
6/8/1999	5.66	35.2	26
6/9/1999	5.6	33.7	24.6
6/10/1999	5.56	32.1	23.3
6/11/1999	5.74	32.9	23.7
6/12/1999	6	33.1	24.2
6/13/1999	6.19	32	24.2
6/14/1999	6.24	34.2	24.5
6/15/1999	5.87	32.3	24.4
6/16/1999	5.98	34.2	25.7
6/17/1999	6.13	32.1	24.3
6/18/1999	6.43	42.9	28.9
6/19/1999	6.15	43.3	31.2
6/20/1999	5.75	29.7	22.8
6/21/1999	7.32	35.9	24.5
6/22/1999	6.69	32.4	22.8
6/23/1999	7.59	33.6	22.9
6/24/1999	5.62	21.9	13.8
6/25/1999	5.74	19.7	12.3
6/26/1999	5.8	18	11.4
6/27/1999	5.85	19.4	12.5
6/28/1999	6	26.8	18.2
6/29/1999	5.88	26	18.3
6/30/1999	6.04	27	19.1
7/1/1999	6.32	28.4	20

Table 2-10
 Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
 June 1998 Through December 1999
 ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
7/2/1999	6.41	28.7	20.9
7/3/1999	6.55	28.9	20.9
7/4/1999	8.76	35.7	25
7/5/1999	13.5	37.6	24.8
7/6/1999	19.8	56.5	27
7/7/1999	17.7	49.4	27.8
7/8/1999	8.07	35.1	28.7
7/9/1999	6.87	31.3	25.7
7/10/1999	6.66	30.2	25.1
7/11/1999	6.69	27.2	23.8
7/12/1999	6.75	27.4	24.1
7/13/1999	6.54	24.5	22.2
7/14/1999	6.56	22.8	21.1
7/15/1999	6.7	25.7	23.2
7/16/1999	6.62	28	25.7
7/17/1999	10.6	36.2	26.5
7/18/1999	13	36.8	27.9
7/19/1999	22.5	50.4	29.8
7/20/1999	22.6	40.4	20
7/21/1999	28.8	58.7	27.6
7/22/1999	23.7	49	26.1
7/23/1999	9.97	32.4	26.1
7/24/1999	8.69	28.2	24.1
7/25/1999	7.55	27.4	22
7/26/1999	6.44	26.7	20.6
7/27/1999	6.36	26.1	20
7/28/1999	6.6	26.4	19.6
7/29/1999	6.73	32.8	24.5
7/30/1999	6.71	31.3	23.7
7/31/1999	6.57	29.3	22.4
8/1/1999	6.44	29.6	21.9
8/2/1999	7.23	36.5	26.1
8/3/1999	14.1	51.7	27.5
8/4/1999	74.3	96.5	28.4
8/5/1999	10.1	46.7	27.6
8/6/1999	7.42	39.2	27.4
8/7/1999	6.74	30.9	25
8/8/1999	6.72	23.6	17
8/9/1999	6.87	33.9	25.5
8/10/1999	6.34	32.2	25
8/11/1999	6.28	28.2	22.5
8/12/1999	6.72	33.7	25.7
8/13/1999	6.25	28	22
8/14/1999	6.25	26.7	21

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
8/15/1999	6.38	24.8	19.1
8/16/1999	6.43	25.7	19.6
8/17/1999	6.25	24.2	18.9
8/18/1999	6.29	23	17.7
8/19/1999	6.36	27.3	20
8/20/1999	6.34	29.4	22.3
8/21/1999	6.4	31.5	24
8/22/1999	6.26	32.8	24.6
8/23/1999	6.19	33.7	24.7
8/24/1999	6.32	34.4	24.8
8/25/1999	6.48	33.2	24.3
8/26/1999	6.4	30.1	22.6
8/27/1999	6.38	28	20.8
8/28/1999	6.44	26.4	19.5
8/29/1999	6.29	29.4	21.6
8/30/1999	6.27	30	22.9
8/31/1999	4.82	28.1	23.1
9/1/1999	3.59	26.2	22.6
9/2/1999	3.6	30.2	25.4
9/3/1999	4.92	31.3	25.6
9/4/1999	5.39	27	21.6
9/5/1999	5.42	26.9	20.6
9/6/1999	5.6	30.9	25.8
9/7/1999	5.45	28.9	23.6
9/8/1999	5.45	28.6	22.7
9/9/1999	4.94	24	19.8
9/10/1999	0.55	22	21.8
9/11/1999	0.49	18.9	19.4
9/12/1999	0.36	20.7	20.2
9/13/1999	0.3	22.6	21.8
9/14/1999	0.41	22.6	22.1
9/15/1999	0.42	22.3	21.8
9/16/1999	0.37	21	20.6
9/17/1999	0.38	20.1	20.1
9/18/1999	0.41	26	25.5
9/19/1999	0.39	25.1	24
9/20/1999	0.4	22.2	21.1
9/21/1999	0.43	21.6	20.5
9/22/1999	0.41	20.8	19.6
9/23/1999	0.39	18.4	17.8
9/24/1999	0.38	17.7	16.4
9/25/1999	0.37	16.4	15.8
9/26/1999	0.35	16.4	15.5
9/27/1999	0.33	16.7	15.9

Table 2-10
 Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
 June 1998 Through December 1999
 ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
9/28/1999	0.34	16.9	16.2
9/29/1999	0.35	14.8	14.4
9/30/1999	0.32	13.8	13.7
10/1/1999	0.31	13	13.1
10/2/1999	0.29	12.7	12.7
10/3/1999	0.29	15.2	15
10/4/1999	0.31	17.6	18.3
10/5/1999	0.31	16	17.2
10/6/1999	0.32	15.4	16.6
10/7/1999	0.34	13.3	14.2
10/8/1999	0.34	12.3	13
10/9/1999	0.34	13.5	14.2
10/10/1999	0.35	14.6	15.5
10/11/1999	0.36	16.7	17.2
10/12/1999	0.38	19.1	19.7
10/13/1999	0.37	16.6	17.9
10/14/1999	0.38	16.7	16.9
10/15/1999	0.37	16.1	16.2
10/16/1999	0.38	24.5	18.6
10/17/1999	0.36	17.2	18.8
10/18/1999	0.34	14	14
10/19/1999	0.32	12.5	12
10/20/1999	0.27	11.1	10.7
10/21/1999	0.24	10.3	9.99
10/22/1999	0.23	9.61	9.43
10/23/1999	0.22	8.99	9.04
10/24/1999	0.23	8.23	8.33
10/25/1999	0.23	8.09	8.33
10/26/1999	0.24	7.9	8.1
10/27/1999	0.23	7.53	7.93
10/28/1999	0.2	7.26	7.74
10/29/1999	0.19	6.86	7.39
10/30/1999	0.17	6.5	6.91
10/31/1999	0.16	6.48	6.96
11/1/1999	0.15	6.46	6.95
11/2/1999	0.15	6.43	6.64
11/3/1999	0.13	6.31	6.63
11/4/1999	0.12	6.05	6.4
11/5/1999	0.12	5.85	6.68
11/6/1999	0.12	5.75	6.66
11/7/1999	0.12	5.71	6.44
11/8/1999	0.12	5.56	6.49
11/9/1999	0.12	5.51	6.5
11/10/1999	0.12	5.46	6.28

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
11/11/1999	0.13	5.35	6.04
11/12/1999	0.13	5.25	5.96
11/13/1999	0.13	4.95	5.78
11/14/1999	0.13	4.72	5.63
11/15/1999	0.13	4.51	5.46
11/16/1999	0.14	4.42	5.46
11/17/1999	0.14	4.55	5.35
11/18/1999	0.14	4.67	5.41
11/19/1999	0.15	4.34	4.91
11/20/1999	0.15	4.22	4.75
11/21/1999	0.15	4.21	4.72
11/22/1999	0.15	4.11	4.57
11/23/1999	0.98	3.88	3.53
11/24/1999	0.24	3.96	3.91
11/25/1999	0.2	4.17	4.41
11/26/1999	0.19	3.61	3.45
11/27/1999	0.21	4.01	3.86
11/28/1999	0.21	4.06	3.88
11/29/1999	0.22	3.97	3.72
11/30/1999	0.22	4.77	4.35
12/1/1999	0.21	3.97	3.75
12/2/1999	0.2	4.49	4.55
12/3/1999	0.18	3.98	4.01
12/4/1999	0.15	3.75	3.68
12/5/1999	0.16	3.98	4.03
12/6/1999	0.15	3.86	3.85
12/7/1999	0.14	3.9	3.82
12/8/1999	0.14	3.85	3.67
12/9/1999	0.13	3.68	3.4
12/10/1999	0.16	3.76	3.44
12/11/1999	0.17	3.71	3.49
12/12/1999	0.18	3.64	3.43
12/13/1999	0.19	3.56	3.36
12/14/1999	0.19	3.58	3.36
12/15/1999	0.19	3.33	3.14
12/16/1999	0.19	3.31	3.04
12/17/1999	0.18	3.7	3.5
12/18/1999	0.18	3.43	3.29
12/19/1999	0.18	3.38	3.27
12/20/1999	0.17	3.3	3.19
12/21/1999	0.16	3.33	3.14
12/22/1999	0.15	3.28	3.17
12/23/1999	0.15	3.21	3.08
12/24/1999	0.17	3.83	3.73

Table 2-10
Rio Grande Daily Mean Flow Volumes at Three Measuring Locations in Cubic Meters per Second,
June 1998 Through December 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Pump House Below American Dam	Courchesne Bridge	Diversion at American Canal
12/25/1999	0.16	4.45	3.97
12/26/1999	0.16	4.05	3.67
12/27/1999	0.15	3.75	3.55
12/28/1999	0.14	3.75	3.48
12/29/1999	0.15	3.56	3.34
12/30/1999	0.15	3.4	3.28
12/31/1999	0.14	3.22	3.21
AVERAGE	4.77	18.62	13.49
MEDIAN	5.15	18.60	15.40
STD	4.91	12.39	9.71
MAXIMUM	74.30	96.50	31.20
MINIMUM	0.12	2.21	0.00

Note:

See Figure 2-2 for all sample locations.

Data from January 1995 through May 1998 is presented in the Phase I RI Report.

All flow volumes listed in cubic feet per second (cfs).

Table 2-11
Groundwater Elevations in Wells Adjacent to the Rio Grande
1995 Through 1999
ASARCO El Paso Smelter Phase II RI

Date Measured	Well Identifier										
	EP-4	EP-5	EP-6	EP-7	EP-60	EP-61	EP-62	EP-63	EP-64	EP-65	EP-66
February 1995	3709.62	3709.28	3708.21	3714.88	3712.07	3712.11	3711.98	3711.44	3712.50	3705.39	3711.36
May 1995	3710.73	3710.47	3709.41	3716.05	3713.27	3713.11	3713.29	3712.77	3713.77	3712.23	3712.63
August 1995	3711.41	3711.06	3710.37	3717.02	3714.41	3713.98	3713.95	3713.50	3715.00	3713.50	3713.67
November 1995	3709.78	3709.39	3708.45	3715.03	3712.45	3711.97	3712.04	3711.54	3712.67	3708.57	3715.50
February 1996	3709.63	3709.21	3708.09	3714.58	3712.15	3712.02	3711.94	3711.47	3712.44	3708.54	3711.33
May 1996	3710.43	3710.10	3708.93	3715.51	3713.18	3713.03	3713.00	3712.49	3713.48	3711.58	3712.45
August 1996	3710.66	3711.28	3709.45	3715.77	3713.34	NM	3713.18	3712.71	3713.69	NM	3712.65
November 1996	3710.56	3710.21	3708.21	3714.93	3712.32	3711.15	3711.08	3710.22	3711.85	3709.07	3710.90
February 1997	3709.40	3710.05	3708.28	3714.89	3712.25	3711.28	3711.05	3710.14	3711.76	3708.62	3710.98
May 1997	3710.41	3710.04	3708.92	3715.42	3713.02	3713.27	3713.29	3712.64	3713.74	3713.15	3712.60
August 1997	3710.68	3710.39	3709.52	3716.08	3713.52	3713.37	3713.32	3712.90	3713.82	3713.14	3712.86
November 1997	3709.64	3710.35	3708.42	3714.45	3712.50	3711.15	3711.09	3710.22	3711.95	3710.42	3711.03
February 1998	3710.96	3710.66	3708.61	3714.10	3712.35	3711.11	3711.00	3710.10	3711.73	3710.66	3711.67
May 1998	3710.21	3709.86	3708.74	3715.16	3713.30	3712.22	3713.02	3712.57	3713.55	3712.87	3712.51
August 1998	3710.75	3710.39	3709.68	3716.23	3713.48	3712.74	3713.33	3712.85	3713.80	3713.07	3712.79
November 1998	3710.99	3710.57	3709.54	3716.10	3713.16	3712.25	3712.93	3712.42	3713.34	3712.80	3712.44
February 1999	3709.72	3711.07	3710.24	3716.92	3713.42	3712.20	3713.34	3712.94	3713.66	3712.72	3712.89
May 1999	3707.79	3709.89	3708.94	3713.38	3713.14	3712.44	3713.19	3712.69	3713.65	3712.85	3713.46
August 1999	3711.28	3710.45	3709.69	3716.31	3713.43	3713.68	3713.60	3713.12	3716.11	3713.59	3712.92
November 1999	3710.04	3709.15	3708.18	3714.57	3712.32	3711.81	3712.12	3711.65	3712.74	3711.86	3711.58

Notes:

NM: Not Measured.

All values are feet above mean sea level.

See Exhibit 1 for well locations.

Depth to water measurements are not adjusted for hydrocarbon occurrence, which depresses water level elevations.

Table 2-12
Summary of Groundwater Analytical Results for August 1997 through February 2000
ASARCO El Paso Smelter Phase II RI

Parameter	Groundwater		
	Min	Max	Ave
DO	0.03	12.1	2.3
pH	5.30	8.68	7.1
EC	170	23900	6036.4
TDS	78	20923	4661.8
TSS	<1	30410	134.0
Ca	8.3	960	259.0
Mg	1.1	501	116.1
Na	14	5246	1024.2
K	2	858	66.2
Total Alkalinity	37	1900	364.0
HCO ₃	1	2684	498.6
CO ₃	<1	64.8	1.2
SO ₄	26	13167	2048.9
Cl	5.3	3600	623.1
F	0.47	33	3.0
NO ₃ + NO ₂	0.05	294	28.6

Parameter	Groundwater		
	Min	Max	Ave
<i>Dissolved Metals</i>			
As	<0.005	464	8.155
Cd	<0.005	43	0.550
Cr	<0.01	0.24	0.011
Cu	<0.025	5.6	0.058
Fe	<0.10	2381	22.387
Pb	<0.003	0.13	0.005
Se	<0.005	7	0.407
Zn	<0.02	1900	15.462
<i>Total Metals</i>			
As	<0.005	221	5.515
Cd	<0.005	13	0.153
Cr	<0.01	0.24	0.011
Cu	<0.025	11	0.159
Fe	<0.1	868	13.260
Pb	<0.003	10	0.142
Se	<0.005	5.7	0.346
Zn	<0.01	420	3.068

Notes:

See Exhibit 1 for all sample locations.

(<) = Result is less than the value indicated, which is the detection limit for this method.

See Table 2-3 for explanations of analytical parameters, including measurement units.

See Appendix D for a full tabulation of analytical results.

All results in milligrams per liter except pH.

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TABLE 3-1
Summary of Remedial Investigation and Feasibility Study Information
Asarco El Paso Copper Smelter
Phase II RI Report

Investigation Area (IA)	Reference Figure	Groundwater Primary COCs	Soil Primary COCs	Source Material	Preliminary Soil Impact Summary			Remediation Status	Comments
					CAT. I (cy) Volume	CAT. 2 (sf) Area	CAT. 3 (sf) Area		
1. CONVERTER BUILDING/BAGHOUSE AREA	3-1	Arsenic Cadmium Lead	Arsenic Lead	Previously Ponded Fluids and Smelter Byproducts	444	23,196	NA	<ul style="list-style-type: none"> *Institutional controls implemented⁽¹⁾ *Operational controls implemented⁽²⁾ *Existing roads and buildings contribute to Cat II cap *Leaks fixed, or improvements implemented before potential operation *Storm water control elements implemented *444 cy Cat I materials removed 	*Slag underlies portions of the area at depth
2. BONEYARD/SLAG AREA	3-2	Arsenic	Arsenic Cadmium	Acid Plants sludge	23,712	NA	277,578	<ul style="list-style-type: none"> *1,119 cy Cat I materials removed from top of slag 	<ul style="list-style-type: none"> *Slag underlies the area with thicknesses of 8 to 63 feet *Additional Investigations required to delineate extent of Cat. I materials
3. ACID PLANT 1 AND 2 AREA	3-3	Arsenic Cadmium Lead	Arsenic Cadmium Lead	Previously Ponded Fluids and Smelter Byproducts	NA	143,255	NA	<ul style="list-style-type: none"> *Institutional controls implemented⁽¹⁾ *Operational controls implemented⁽²⁾ *Existing roads and buildings contribute to Cat II cap *Paving in potential spill areas *Repair of leaks and operation improvements *Storm water control elements implemented 	*Slag underlies the area at depth, with thicknesses of 14 to 40 feet

TABLE 3-1
Summary of Remedial Investigation and Feasibility Study Information
Asarco El Paso Copper Smelter
Phase II RI Report

Investigation Area (IA)	Reference Figure	Groundwater Primary COCs	Soil Primary COCs	Source Material	Preliminary Soil Impact Summary			Remediation Status	Comments
					CAT. 1 (cy) Volume	CAT. 2 (sf) Area	CAT. 3 (sf) Area		
4. FRONT SLOPE/WESTERN PLANT BOUNDARY AREA (General)	3-4			Historic Fugitive Dust Spills of Process Fluids Plant Runoff	23,989 cy Total Cat. 1 for IA-4	NA	148,515	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾ *Storm water control elements implemented	*Additional investigation needed in all slope areas of IA-4 *Actual areas of category materials are smaller than shown on figure *Slag underlies portions of area at depth *Upgradient impacts to Groundwater
* Flat area at base of slope not included in other sub- areas	3-4	Arsenic Cadmium Lead	Arsenic Lead		6,074	NA	NA		
* Downslope of Acid Plants 1 & 2 (IA4.1)	3-4	Arsenic Cadmium Lead	Arsenic Lead		513	NA	NA		
* Downslope of Medford Sump (IA4.2)	3-4	Arsenic Cadmium	Arsenic Lead		2,038	NA	NA		
* Downslope of Closed Lead Plant Bighouse (IA4.3)	3-4	Arsenic Lead	Arsenic Lead		7,554	NA	NA		
* Downslope of Sinter Plant Gas Cleaning & Sample Mill (IA4.4)	3-4	Arsenic Lead	Arsenic Lead		4,103	NA	NA		
* Downslope of (Diesel 1) Pond 1 (IA4.5)	3-4	Arsenic	Arsenic Lead		937	NA	NA		
* Downslope of the South Terrace (IA4.6)	3-4	Arsenic Cadmium	Arsenic Lead		2,770	NA	NA		
5. HISTORIC SMELTERTOWN AREA	3-5	Arsenic Lead	Lead	Historic Material Staging in Area	2,150	312,190	NA	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾	*Also site of Diesel remediation *Confirmation sampling required for former Category II areas

TABLE 3-1
Summary of Remedial Investigation and Feasibility Study Information
Asarco El Paso Copper Smelter
Phase II RI Report

Investigation Area (IA)	Reference Figure	Groundwater Primary COCs	Soil Primary COCs	Source Material	Preliminary Soil Impact Summary			Remediation Status	Comments
					CAT. I (cy) Volume	CAT. 2 (sf) Area	CAT. 3 (sf) Area		
6. GROUNDWATER	NA	NA	NA		NA	NA	NA	<ul style="list-style-type: none"> *Storm water control elements implemented *Remedial Activities associated with other IAs 	*See IAs 1-5, 8-14 for groundwater discussions
7. SURFACE WATER	NA	NA	NA		NA	NA	NA	<ul style="list-style-type: none"> *Institutional controls implemented⁽¹⁾ *Operational controls implemented⁽²⁾ *Implementing site-wide stormwater controls *Remedial Activities associated with other IAs *Storm water control elements implemented 	*No impacts from facility operations occur to the Rio Grande or American Canal
8. BIDDING AND UNLOADING BUILDINGS AREA	3-6	Arsenic, Lead	Arsenic, Cadmium, Lead	<ul style="list-style-type: none"> *Ore unloading spillage *Previous watering for dust control 	24,574	273,579	NA	<ul style="list-style-type: none"> *Institutional controls implemented⁽¹⁾ *Operational controls implemented⁽²⁾ *Existing roads and buildings contribute to Cat II cap *Pump and drainage control upgrade 	*Slag underlies portions of the area at depth, with thicknesses of 3 to 33 feet where present.
9. PONDS 1, 5 AND 6 (General)	3-7				26,443 cy Total Cat. I for Ponds 1, 5 and 6	NA	NA	<ul style="list-style-type: none"> *Institutional controls implemented⁽¹⁾ *Operational controls implemented⁽²⁾ *Existing roads and buildings contribute to Cat II cap *Storm water control elements implemented 	*Pond areas are planned to be used for onsite deposit of Category I materials

TABLE 3-1
Summary of Remedial Investigation and Feasibility Study Information
Asarco El Paso Copper Smelter
Phase II RI Report

Investigation Area (IA)	Reference Figure	Groundwater Primary COCs	Soil Primary COCs	Source Material	Preliminary Soil Impact Summary			Remediation Status	Comments
					CAT. I (cy) Volume	CAT. 2 (sf) Area	CAT. 3 (sf) Area		
*Pond 1		Arsenic	Arsenic Cadmium Lead ⁽¹⁾	Pond Sediments	9,765	NA	NA	*Institutional controls implemented ⁽⁶⁾ *Operational controls implemented ⁽²⁾	
*Ponds 5 & 6 and Canal Area associated with Pond 6		Arsenic Lead	Arsenic ⁽¹⁾ Cadmium Lead	Pond Sediments	Pond 5: 4,903 Pond 6: 11,634 Canal Area: 1,543	NA	NA	*Institutional controls implemented ⁽³⁾ *Operational controls implemented ⁽³⁾ *Planned to remove sediments and line for use as Category I material contaminant *Ponds 5 & 6 taken out of service as part of stormwater controls	*Pond 5 is first area scheduled for Category I material containment
10. PLANT ENTRANCE AREA	3-8	NA	Arsenic Cadmium Lead	Plant stormwater transported sediments and fugitive dust	NA	29,658	NA	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾ *Existing roads and buildings contribute to Cat II cup *Storm water control elements implemented *Drainage and stormwater collection sump upgrades	*Slag underlies portions of the area at depth *LA-10 was capped with the implementation of stormwater control improvements
11. ARROYOS EAST OF I-10	3-9	Arsenic Lead	Arsenic Lead	Storage of plant debris native geologic formations	1,620	304,467	NA	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾ *Planned consolidation and capping of debris	*Additional investigation in southern arroyo in vicinity of RP-97 *Slag underlies portions of the area at depth
12. EPHEMERAL POND AND POND SEDIMENT STORAGE AREA	3-10	Arsenic	Arsenic Cadmium Lead	Pond sediments storage from Pond 6	15,599	NA	774,204	*Planned sediment removal *Planned lining of Pond	*Slag underlies the area with thicknesses of 2 to 33 feet *Additional investigation of soils and groundwater in vicinity of RIB111

TABLE 3-1
Summary of Remedial Investigation and Feasibility Study Information
Asarco El Paso Copper Smelter
Phase II RI Report

Investigation Area (IA)	Reference Figure	Groundwater Primary COCs	Soil Primary COCs	Source Material	Preliminary Soil Impact Summary			Remediation Status	Comments
					CAT. 1 (cy) Volume	CAT. 2 (sf) Area	CAT. 3 (sf) Area		
13. SAMPLE MILL AREA	3-11	Arsenic Cadmium Lead	Arsenic Cadmium Lead	Ore processing spillage	7,873	NA	NA	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾ *Existing roads and buildings contribute to Cat II cap *Storm water control elements implemented	*Slag underlies portions of the area at depth *Further investigation of potential source areas
14. SOUTH TERRACE AREA	3-12	Arsenic	Lead	Ore storage and handling upgradient impact to groundwater	732	317,898	NA	*Institutional controls implemented ⁽¹⁾ *Operational controls implemented ⁽²⁾ *Storm water control elements implemented *Existing surface improvements (new pond, roads) function as cap for Category II materials	*Slag underlies portions of the area at depth

Notes:

cy: cubic yards

sf: square feet

See Exhibit I for location of IAs

COC: Contaminant of Concern

NA: Not Applicable

Primary COCs are in Pond Sediments

⁽¹⁾ Institutional controls include facility deed restrictions, use of personal protective gear on site, fencing and other access deterrents, and all other items.

⁽²⁾ Operational controls include inspection, operation of stormwater control components (impoundments, pumps conveyance, etc.) and controls in facility operation.

Table 3-2
Summary of Soil Sample Results, Investigation Area 1
(Converter Building/Baghouse Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH1-1	BH1-1A	08/31/99	0.5-1.5 ft.	30	10 U	62
	BH1-1B	08/31/99	1.5-2.5 ft.	200	58	1600
	BH1-1C	08/31/99	10-12 ft.	17	10 U	10 U
	BH1-1D	08/31/99	15-17 ft.	10	10 U	10 U
	BH1-1E	08/31/99	20-22 ft.	20	10 U	10 U
	BH1-1F	08/31/99	25-27 ft.	16	20	10 U
	BH1-1G	09/01/99	30-32 ft.	48	10 U	11
	BH1-1H	09/01/99	35-37 ft.	33	10 U	16
	BH1-1I	09/01/99	40-42 ft.	16	10 U	10 U
	BH1-1J	09/01/99	45-47 ft.	18	10 U	10 U
BH1-2	BH1-2A	09/01/99	0-1 ft.	720	590	710
	BH1-2B	09/01/99	1-2 ft.	77	160	190
	BH1-2C	09/01/99	2-3 ft.	16	10 U	100
	BH1-2D	09/01/99	3-4 ft.	30	10 U	140
	BH1-2E	09/01/99	4-5 ft.	12	10 U	46
	BH1-2F	09/02/99	10-12 ft.	10 U	10 U	10 U
	BH1-2G	09/02/99	15-17 ft.	12	10 U	10 U
	BH1-2H	09/02/99	20-22 ft.	23	10 U	11
	BH1-2I	09/02/99	25-27 ft.	12	10 U	10 U
	BH1-2J	09/02/99	30-32 ft.	48	10 U	10 U
	BH1-2K	09/02/99	35-37 ft.	24	10 U	11
	BH1-2K2	09/02/99	DUP	25	10 U	12
	BH1-2L	09/02/99	40-42 ft.	21	11	10 U
EP-100	EP-100A	9/8/1999	0-1 ft.	850	360	850
	EP-100B	9/8/1999	1-2 ft.	2300	310	610
	EP-100C	9/8/1999	2-3 ft.	720	210	1900
	EP-100D	9/8/1999	3-4 ft.	280	410	1900
	EP-100E	9/8/1999	4-5 ft.	76	33	680
	EP-100F	9/8/1999	10-12 ft.	290	61	440
	EP-100G	9/8/1999	15-17 ft.	14	10 U	240
	EP-100H	9/8/1999	20-22 ft.	91	24	790
	EP-100H2	9/8/1999	20-22 ft.	63	53	660
	EP-100I	9/8/1999	25-27 ft.	130	10 U	370
	EP-100J	9/8/1999	30-32 ft.	28	10 U	37
	EP-100K	9/8/1999	35-37 ft.	100	220	50
	EP-100L	9/8/1999	40-42 ft.	100	10 U	10 U
	EP-100L2	9/8/1999	40-42 ft.	73	10 U	10 U
	EP-100M	9/8/1999	45-47 ft.	110	10 U	10 U

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.

Table 3-3
Summary of Groundwater Sample Results, Investigation Area 1
(Converter Building/Baghouse Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-51	0.979	0.773	0.380	0.033	0.003 U	0.026
EP-52	1.201	1.500	0.763	0.463	0.051	0.567
EP-100	NA	0.014	NA	0.033	NA	0.009
EP-115	NA	0.270	NA	0.645	NA	0.100

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-4
Summary of Soil Sample Results, Investigation Area 2
(Boneyard/Slag Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH2-1	BH2-1A	08/10/99	63-65 ft.	19	10 U	790
	BH2-1B	08/10/99	68-70 ft.	12	10 U	10 U
	BH2-1C	08/10/99	73-75 ft.	64	10 U	10 U
BH2-3	BH2-3A	08/13/99	40-42 ft.	27	10 U	10 U
	BH2-3B	08/13/99	45-47 ft.	10 U	10 U	10 U
	BH2-3C	08/13/99	50-52 ft.	10 U	10 U	10 U
	BH2-3D	08/13/99	55-57 ft.	10 U	10 U	10 U
	BH2-3E	08/13/99	60-62 ft.	21	14	10 U
	BH2-3E2	08/13/99	DUP	19	10 U	10 U
	BH2-3F	08/13/99	65-67 ft.	36	10 U	10 U
	BH2-3G	08/13/99	70-72 ft.	120	15	10 U
	BH2-3H	08/13/99	75-76 ft.	100	10 U	14
BH2-4	BH2-4A	08/16/99	54-55 ft.	170	120	59
BH2-5	BH2-5A	08/16/99	16-18 ft.	10 U	10 U	21
	BH2-5B	08/16/99	20-22 ft.	10 U	10 U	19
	BH2-5C	08/16/99	24-26 ft.	10 U	10 U	10 U
	BH2-5C2	08/16/99	DUP	10 U	10 U	12
BH2-6	BH2-6A	08/16/99	9-11 ft.	1100	450	56
	BH2-6B	08/16/99	15-17 ft.	3700	210	74
	BH2-6C	08/16/99	20-22 ft.	870	1600	23
	BH2-6D	08/16/99	24-26 ft.	400	630	15
	BH2-6D2	08/16/99	DUP	410	690	14
	BH2-6E	08/16/99	30-32 ft.	170	710	10 U
	BH2-6F	08/17/99	35-37 ft.	85	670	10 U
	BH2-6G	08/17/99	40-42 ft.	370	1400	10 U
	BH2-6H	08/17/99	45-47 ft.	47	58	10 U
BH2-7	BH2-7A	08/17/99	10-12 ft.	13	10 U	10 U
	BH2-7B	08/17/99	15-17 ft.	10 U	10 U	10 U
	BH2-7C	08/17/99	20-22 ft.	11	10 U	10 U
	BH2-7C2	08/17/99	DUP	11	10 U	10 U
	BH2-7D	08/17/99	25-27 ft.	10 U	10 U	10 U
	BH2-7E	08/17/99	30-32 ft.	22	10 U	10 U
	BH2-7F	08/17/99	35-37 ft.	11	10 U	10 U
	BH2-7G	08/17/99	40-41 ft.	11	14	10 U
	BH2-7H	08/17/99	45-46 ft.	10 U	10 U	10 U
EP-99	EP-99A	8/12/1999	57-59 ft.	10 U	10 U	45
	EP-99B	8/12/1999	65-67 ft.	10 U	10 U	10 U

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-5
Summary of Groundwater Sample Results, Investigation Area 2
(Boneyard/Slag Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-53	55.000	47.333	1.323	1.153	0.003 U	0.007
EP-75	17.333	15.000	0.019	0.005 U	0.004	0.017
EP-76	0.888	1.500	0.006	0.005 U	0.007	0.008
EP-99	NA	5.400	NA	0.005 U	NA	0.150

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-6
Summary of Soil Sample Results, Investigation Area 3
(Acid Plants 1 and 2 Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH3-1	BH3-11A	08/18/99	0-1 ft.	300	110	990
	BH3-11B	08/18/99	1-2 ft.	10 U	10 U	57
	BH3-11C	08/18/99	2-3 ft.	18	14	340
	BH3-11D	08/18/99	3-4 ft.	10 U	10 U	18
	BH3-11E	08/18/99	4-5 ft.	10 U	10 U	10 U
	BH3-11E2	08/18/99	DUP	10 U	10 U	10 U
	BH3-11F	08/23/99	25-27 ft.	10 U	10 U	10 U
	BH3-11G	08/23/99	30-32 ft.	24	10 U	10 U
	BH3-11H	08/23/99	35-37 ft.	22	10 U	10 U
	BH3-11I	08/23/99	40-42 ft.	28	10 U	10 U
	BH3-11J	08/23/99	45-47 ft.	19	10 U	10 U
	BH3-11J2	08/23/99	DUP	12	10 U	10 U
	BH3-11K	08/23/99	49-51 ft.	10 U	10 U	29
BH3-2	BH3-2A	08/23/99	0-1 ft.	890	560	2500
	BH3-2B	08/23/99	1-2 ft.	10 U	10 U	52
	BH3-2B2	08/23/99	1-2 ft.	74	37	280
	BH3-2C	08/23/99	25-27 ft.	72	51	34
	BH3-2D	08/23/99	30-32 ft.	10 U	14	10 U
	BH3-2E	08/23/99	35-37 ft.	10 U	10 U	16
	BH3-2F	08/23/99	40-42 ft.	16	10 U	10 U
	BH3-2G	08/23/99	45-47 ft.	10 U	10 U	10 U
BH-3-3	BH3-3A	08/24/99	40-42 ft.	10 U	10 U	18
	BH3-3B	08/24/99	45-47 ft.	18	13	10 U
BH3-4	BH3-4A	08/24/99	0-1 ft.	64	37	1300
	BH3-4B	08/24/99	1-2 ft.	10 U	10 U	120
	BH3-4C	08/25/99	39-41 ft.	370	360	72
	BH3-4D	08/25/99	45-47 ft.	20	10 U	15
	BH3-4E	08/25/99	40-52 ft.	19	10 U	10 U
BH3-5	BH3-5A	08/25/99	3-4.5 ft.	870	190	3800
	BH3-5A2	08/25/99	DUP	550	150	2400
	BH3-5B	08/25/99	31 ft.	2100	430	63
	BH3-5C	08/25/99	35 ft.	420	300	14
	BH3-5D	08/25/99	40 ft.	46	10 U	14
	BH3-5E	08/25/99	45 ft.	25	10 U	10 U
	BH3-5F	08/25/99	50-52 ft.	55	10 U	16

Table 3-6
Summary of Soil Sample Results, Investigation Area 3
(Acid Plants 1 and 2 Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH3-6	BH3-6A	08/25/99	18-20 ft.	10 U	41	23
	BH3-6B	08/25/99	25-27 ft.	10 U	28	14
	BH3-6C	08/26/99	30-32 ft.	10 U	10 U	20
	BH3-6D	08/26/99	35-37 ft.	10 U	16	10 U
	BH3-6E	08/26/99	40-42 ft.	40	14	22
	BH3-6F	08/26/99	45-47 ft.	10 U	10 U	27
	BH3-6G	08/26/99	50-52 ft.	330	26	24
	BH3-6G2	08/26/99	DUP	380	26	29
	BH3-6H	08/26/99	55-57 ft.	1100	40	48
	BH3-6I	08/26/99	60-62 ft.	10 U	10 U	24
	BH3-6J	08/26/99	65-67 ft.	72	10 U	28
BH3-7	BH3-7A	08/26/99	30-32 ft.	10 U	10 U	10 U
	BH3-7B	08/26/99	35-37 ft.	10 U	10 U	10 U
	BH3-7C	08/26/99	40-42 ft.	17	10 U	10 U
	BH3-7C2	08/26/99	DUP	10 U	10 U	10 U
	BH3-7D	08/26/99	45-47 ft.	18	10 U	38
	BH3-7E	08/26/99	50-52 ft.	15	10 U	46
	BH3-7F	08/26/99	55-57 ft.	56	10 U	10 U
	BH3-7G	08/26/99	60-62 ft.	10 U	10 U	41
	BH3-7H	08/26/99	65-67 ft.	50	10 U	63
	BH3-7I	08/27/99	69-70 ft.	10 U	10 U	12
BH3-8	BH3-8A	08/31/99	55-57 ft.	10 U	10 U	15
	BH3-8B	08/31/99	60-62 ft.	180	42	33
	BH3-8B2	08/31/99	60-62 ft.	170	62	41

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.

Table 3-7
Summary of Groundwater Sample Results, Investigation Area 3
(Acid Plants 1 and 2 Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-25	2.690	4.900	0.005 U	0.005 U	0.004	0.054
EP-49	282.329	130.500	37.429	6.640	0.027	0.402
EP-52	1.201	1.500	0.763	0.463	0.051	0.567
EP-54	44.000	50.333	1.728	0.633	0.008	0.016
EP-55	49.000	39.667	0.028	0.310	0.005	0.063
EP-73	0.040	0.035	0.006	0.005 U	0.003 U	0.015
EP-114	NA	166.000	NA	1.415	NA	3.310

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-8
Summary of Soil Sample Results, Investigation Area 4
(Front Slope/Western Facility Boundary Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH4-1	BH4-1A	11/17/1999	0-1 ft.	340	110	3700
	BH4-1A2	11/17/1999	0-1 ft.	240	66	3500
	BH4-1B	11/17/1999	1-2 ft.	260	77	4100
	BH4-1C	11/17/1999	2-3 ft.	200	60	2800
	BH4-1D	11/17/1999	3-4 ft.	170	83	3300
	BH4-1E	11/17/1999	4-5 ft.	140	54	2200
	BH4-1F	11/17/1999	10-12 ft.	11	10 U	97
BH4-2	BH4-2A	11/18/1999	0-1 ft.	760	380	6500
	BH4-2B	11/18/1999	1-2 ft.	650	320	4800
	BH4-2C	11/18/1999	2-3 ft.	350	120	2300
	BH4-2D	11/18/1999	3-4 ft.	200	83	1400
	BH4-2E	11/18/1999	4-5 ft.	180	72	1400
	BH4-2F	11/18/1999	10-12 ft.	23	10 U	30
	BH4-2G	11/18/1999	15-17 ft.	13	10 U	36
BH4-3	BH4-3A	11/18/1999	10-11 ft.	54	10 U	390
BH4-4	BH4-4A	11/18/1999	0-1 ft.	11000	2600	22000
	BH4-4A2	11/18/1999	0-1 ft.	7100	1700	15000
	BH4-4B	11/18/1999	1-2 ft.	2000	580	5300
	BH4-4C	11/18/1999	2-3 ft.	3200	900	7600
	BH4-4D	11/18/1999	3-4 ft.	1900	530	5300
	BH4-4E	11/18/1999	4-5 ft.	410	82	1300
	BH4-4F	11/18/1999	10-12 ft.	100	21	270
BH4-5	BH4-5A	11/18/1999	0-1 ft.	4200	1500	8600
	BH4-5A2	11/18/1999	0-1 ft.	4100	1400	8300
	BH4-5B	11/18/1999	1-2 ft.	2500	930	5300
	BH4-5C	11/18/1999	2-3 ft.	2000	700	4500
	BH4-5D	11/18/1999	3-4 ft.	910	100	3600
	BH4-5E	11/18/1999	4-5 ft.	300	84	950
	BH4-5F	11/18/1999	10-12 ft.	130	12	470
BH4-6	BH4-6A	11/18/1999	0-1 ft.	310	190	1500
	BH4-6B	11/18/1999	1-2 ft.	50	24	380
	BH4-6C	11/18/1999	2-3 ft.	150	60	890
	BH4-6D	11/18/1999	3-4 ft.	690	190	2800
	BH4-6E	11/18/1999	4-5 ft.	29	10 U	210
	BH4-6E2	11/18/1999	4-5 ft.	19	18	200
	BH4-6F	11/18/1999	10-12 ft.	43	10 U	140
EP-114	EP-114A	11/15/1999	2.5-3.5 ft.	600	200	840
	EP-114B	11/15/1999	3.5-4.5 ft.	310	460	270
	EP-114C	11/15/1999	4.5-5.5 ft.	18	10 U	64
	EP-114D	11/15/1999	10-12 ft.	110	24	210

Table 3-8
Summary of Soil Sample Results, Investigation Area 4
(Front Slope/Western Facility Boundary Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
EP-115	EP-115A	11/16/1999	0-1 ft.	2800	850	7000
	EP-115B	11/16/1999	1-2 ft.	950	400	2800
	EP-115C	11/16/1999	2-3 ft.	830	380	2300
	EP-115D	11/16/1999	3-4 ft.	1100	420	2800
	EP-115E	11/16/1999	4-5 ft.	750	320	1700
	EP-115F	11/16/1999	10-12 ft.	360	270	510
EP-116	EP-116A	11/16/1999	0-1 ft.	18000	530	40000
	EP-116A2	11/16/1999	0-1 ft.	11000	340	19000
	EP-116B	11/16/1999	1-2 ft.	9800	360	26000
	EP-116C	11/16/1999	2-2.5 ft.	9200	360	23000
	EP-116D	11/16/1999	5-7 ft.	6800	960	16000
	EP-116E	11/16/1999	10-12 ft.	5300	1200	13000
EP-117	EP-117A	11/16/1999	0-1 ft.	2300	480	3500
	EP-117B	11/16/1999	1-2 ft.	1700	300	2300
	EP-117C	11/16/1999	2-3 ft.	2300	460	4700
	EP-117D	11/16/1999	3-4 ft.	1200	230	2900
	EP-117E	11/16/1999	5-6 ft.	140	10 U	230
	EP-117F	11/16/1999	10-12 ft.	210	10 U	110
	EP-117F2	11/16/1999	10-12 ft.	500	66	1100
EP-118	EP-118A	11/17/1999	0-1 ft.	1300	340	10000
	EP-118A2	11/17/1999	0-1 ft.	1000	240	7400
	EP-118B	11/17/1999	1-2 ft.	720	200	5900
	EP-118C	11/17/1999	2-3 ft.	120	56	1700
	EP-118D	11/17/1999	3-4 ft.	61	29	950
	EP-118E	11/17/1999	4-5 ft.	75	43	1300
	EP-118F	11/17/1999	15-15.5 ft.	54	20	630

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.

Table 3-9
Summary of Groundwater Sample Results, Investigation Area 4
(Front Slope/Western Facility Boundary Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-20	0.968	0.770	0.039	0.033	0.003 U	0.008
EP-29	0.299	0.287	0.005 U	0.005 U	0.003 U	0.010
EP-35	0.506	0.790	0.005 U	0.005 U	0.003 U	0.018
EP-114	NA	166.000	NA	1.415	NA	3.310
EP-115	NA	0.270	NA	0.645	NA	0.100
EP-116	NA	3.600	NA	1.350	NA	3.050
EP-117	NA	8.500	NA	1.450	NA	5.140
EP-118	NA	0.325	NA	0.040	NA	1.335

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-10
Summary of Soil Sample Results, Investigation Area 5
(Historic Smeltertown Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
EP-111	EP-111A	10/27/1999	0	33	27	430
	EP-111B	10/27/1999	1	10 U	10 U	52
	EP-111C	10/27/1999	2	50	12	600
	EP-111D	10/27/1999	3	65	10 U	330
	EP-111E	10/27/1999	4	35	13	240
EP-112	EP-112A	10/27/1999	0	84	32	1200
	EP-112B	10/27/1999	1	86	54	1500
	EP-112C	10/27/1999	2	10 U	23	430
	EP-112D	10/27/1999	3	10 U	10 U	22
	EP-112E	10/27/1999	4	10 U	10 U	27
EP-113	EP-113A	10/28/1999	0	10 U	10 U	110
	EP-113B	10/28/1999	1	26	20	630
	EP-113C	10/28/1999	2	33	10 U	310
	EP-113D	10/28/1999	3	24	11	160
	EP-113E	10/28/1999	4	10 U	10 U	16

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.

Table 3-11
Summary of Groundwater Sample Results, Investigation Area 5
(Historic Smeltertown Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-57	0.680	0.407	0.005 U	0.005 U	0.003 U	0.006
EP-58	3.956	3.867	0.005 U	0.005 U	0.003 U	0.034
EP-59	3.118	2.733	0.005 U	0.005 U	0.003 U	0.007
EP-60	0.007	0.009	0.005 U	0.005 U	0.003 U	0.003 U
EP-61	0.018	0.026	0.005 U	0.005 U	0.003 U	0.014
EP-62	0.962	0.710	0.008	0.005 U	0.003 U	0.003 U
EP-63	0.021	0.023	0.005 U	0.005 U	0.003 U	0.006
EP-64	0.039	0.043	0.007	0.005 U	0.003 U	0.003 U
EP-65	0.007	0.019	0.005 U	0.005 U	0.003 U	0.004
EP-66	10.256	8.567	0.017	0.007	0.003 U	0.004
EP-80	0.016	0.015	0.005 U	0.005 U	0.003 U	0.003 U
EP-111	NA	0.940	NA	0.01	NA	0.025
EP-112	NA	0.013	NA	0.01	NA	0.009
EP-113	NA	0.005	NA	0.01	NA	0.006

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-12
Summary of Soil Sample Results, Investigation Area 8
(Bedding and Unloading Buildings Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH8-1	BH8-1A	10/29/1999	31-33 ft.	41	12	34
	BH8-1B	10/29/1999	35-37 ft.	19	10 U	28
	BH8-1C	10/30/1999	40-42 ft.	12	10 U	12
	BH8-1D	10/30/1999	45-47 ft.	10 U	10 U	14
	BH8-1E	10/30/1999	50-52 ft.	10 U	10 U	10 U
	BH8-1F	10/30/1999	55-57 ft.	10 U	10 U	10 U
	BH8-1F2	10/30/1999	55-57 ft.	10 U	10 U	10 U
	BH8-1G	10/30/1999	60-62 ft.	10 U	10 U	10 U
	BH8-1H	10/30/1999	65-67 ft.	10 U	10 U	10 U
	BH8-1I	10/30/1999	70-72 ft.	10 U	10 U	10 U
BH8-2	BH8-2A	11/1/1999	10-12 ft.	171	68	54
	BH8-2B	11/1/1999	15-17 ft.	64	610	30
	BH8-2C	11/1/1999	20-22 ft.	20	18	14
	BH8-2D	11/1/1999	25-27 ft.	12	10 U	10 U
	BH8-2D2	11/1/1999	25-27 ft.	10	11	12
	BH8-2E	11/1/1999	30-32 ft.	10 U	10 U	10 U
	BH8-2F	11/1/1999	35-37 ft.	29	10	11
	BH8-2G	11/1/1999	40-42 ft.	10 U	10 U	10 U
	BH8-2H	11/1/1999	45-47 ft.	10 U	10	10 U
	BH8-2I	11/1/1999	50-52 ft.	10 U	10 U	10 U
	BH8-2I2	11/1/1999	50-52 ft.	10 U	10 U	10 U
	BH8-2J	11/1/1999	55-57 ft.	25	10 U	10 U
	BH8-2K	11/1/1999	60-62 ft.	10 U	10 U	10 U
	BH8-2L	11/1/1999	65-67 ft.	12	10 U	10 U
BH8-3	BH8-3A	11/1/1999	14-16 ft.	63	11	143
	BH8-3B	11/1/1999	20-22 ft.	10 U	10 U	10 U
	BH8-3C	11/1/1999	25-27 ft.	10 U	10 U	15
	BH8-3C2	11/1/1999	25-27 ft.	10 U	10 U	12
	BH8-3D	11/1/1999	30-32 ft.	116	10 U	10 U
	BH8-3E	11/1/1999	35-37 ft.	87	10 U	10 U
	BH8-3F	11/2/1999	40-42 ft.	54	10 U	29
	BH8-3G	11/2/1999	45-47 ft.	10 U	10 U	10 U
	BH8-3H	11/2/1999	50-52 ft.	10 U	10 U	10 U
	BH8-3I	11/2/1999	55-57 ft.	21	10 U	10 U
BH8-4	BH8-4A	11/2/1999	0-1 ft.	6100	2600	29000
	BH8-4B	11/2/1999	1-2 ft.	210	110	550
	BH8-4C	11/2/1999	2-3 ft.	130	170	120
	BH8-4D	11/2/1999	3-4 ft.	10 U	150	26
	BH8-4E	11/2/1999	4-5 ft.	10 U	170	15
	BH8-4F	11/2/1999	10-12 ft.	31	48	10
	BH8-4G	11/2/1999	15-17 ft.	10 U	10 U	10 U
	BH8-4G2	11/2/1999	15-17 ft.	13	10 U	14
	BH8-4H	11/2/1999	20-22 ft.	11	10 U	18
	BH8-4I	11/2/1999	25-27 ft.	15	11	11
	BH8-4J	11/2/1999	30-32 ft.	11	10 U	10 U

Table 3-12
Summary of Soil Sample Results, Investigation Area 8
(Bedding and Unloading Buildings Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic		Cadmium		Lead	
BH8-4	BH8-4K	11/2/1999	35-37 ft.	10	U	10	U	10	U
	BH8-4L	11/2/1999	40-42 ft.	10	U	10	U	10	U
	BH8-4M	11/2/1999	45-47 ft.	10	U	10	U	23	
	BH8-4M2	11/2/1999	45-47 ft.	10	U	10	U	11	
	BH8-4N	11/2/1999	50-52 ft.	10	U	10	U	10	U
	BH8-4O	11/2/1999	55-57 ft.	10	U	10	U	10	U
	BH8-4P	11/2/1999	60-62 ft.	10	U	10	U	10	U
	BH8-4Q	11/2/1999	65-67 ft.	10	U	10	U	10	U
EP-103	EP-103A	10/4/1999	0-1 ft.	12		13		93	
	EP-103B	10/4/1999	1-2 ft.	10	U	19		390	
	EP-103C	10/4/1999	2-3 ft.	300		160		7900	
	EP-103D	10/4/1999	3-4 ft.	1400		55		11000	
	EP-103E	10/4/1999	4-5 ft.	6600		13		9700	
	EP-103F	10/4/1999	10-12 ft.	15		10	U	61	
	EP-103F2	10/4/1999	10-12 ft.	10	U	10	U	61	
	EP-103G	10/4/1999	15-17 ft.	21		10	U	26	
	EP-103H	10/4/1999	20-22 ft.	19		10	U	39	
	EP-103I	10/4/1999	25-27 ft.	11		10	U	33	
	EP-103J	10/4/1999	30-32 ft.	10	U	10	U	43	
	EP-103K	10/4/1999	35-37 ft.	10	U	10	U	46	
	EP-103L	10/4/1999	40-42 ft.	14		10	U	50	
	EP-103M	10/4/1999	45-47 ft.	26		10	U	37	
	EP-103N	10/4/1999	50-52 ft.	10		10	U	32	
	EP-103N2	10/4/1999	50-52 ft.	20		10	U	42	
	EP-103O	10/4/1999	55-57 ft.	10	U	10	U	41	
	EP-103P	10/1/1999	60-62 ft.	10	U	10	U	36	

Table 3-12
Summary of Soil Sample Results, Investigation Area 8
(Bedding and Unloading Buildings Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
EP-104	EP-104A	10/5/1999	0-1 ft.	110	36	2800
	EP-104B	10/5/1999	1-2 ft.	10	10 U	190
	EP-104C	10/5/1999	2-3 ft.	46	63	1900
	EP-104D	10/6/1999	3-4 ft.	16	12	580
	EP-104E	10/6/1999	4-5 ft.	10 U	10 U	220
	EP-104E2	10/6/1999	4-5 ft.	10 U	10 U	140
	EP-104F	10/6/1999	10-12 ft.	10 U	10 U	60
	EP-104G	10/6/1999	15-17 ft.	10 U	10 U	55
	EP-104G	10/6/1999	15-17 ft.	11	5 U	7.1
	EP-104H	10/6/1999	20-22 ft.	16	10 U	50
	EP-104I	10/5/1999	25-27 ft.	10 U	10 U	47
	EP-104J	10/5/1999	30-32 ft.	20	10 U	27
	EP-104K	10/5/1999	35-37 ft.	10 U	10 U	41
	EP-104L	10/5/1999	40-42 ft.	20	10 U	24
	EP-104M	10/5/1999	45-47 ft.	10 U	10 U	42
	EP-104N	10/6/1999	50-52 ft.	16	10 U	44
	EP-104N2	10/6/1999	50-52 ft.	13	10 U	41
	EP-104O	10/6/1999	55-57 ft.	10 U	10 U	46
	EP-104P	10/6/1999	60-62 ft.	10 U	10 U	37
	EP-104P	10/6/1999	60-62 ft.	5	5 U	7
	EP-104Q	10/6/1999	65-67 ft.	10 U	10 U	39
EP-105	EP-105A	10/7/1999	0-1 ft.	42	10 U	76
	EP-105B	10/7/1999	1-2 ft.	1600	600	13000
	EP-105C	10/7/1999	2-3 ft.	2400	120	10000
	EP-105D	10/7/1999	3-4 ft.	1100	39	1900
	EP-105E	10/7/1999	4-5 ft.	410	59	680
	EP-105E2	10/7/1999	4-5 ft.	470	40	910
	EP-105F	10/7/1999	10-12 ft.	170	17	480
	EP-105G	10/7/1999	15-17 ft.	10 U	10 U	130
	EP-105H	10/7/1999	20-22 ft.	11	10 U	55
	EP-105I	10/7/1999	25-27 ft.	14	10 U	48
	EP-105J	10/7/1999	30-32 ft.	10 U	10 U	47
	EP-105K	10/7/1999	35-37 ft.	13	10 U	51
	EP-105L	10/7/1999	40-42 ft.	17	10 U	39
	EP-105M	10/7/1999	45-47 ft.	10 U	10 U	42
	EP-105N	10/8/1999	50-52 ft.	21	10 U	40
	EP-105N2	10/8/1999	50-52 ft.	17	10 U	33
	EP-105O	10/8/1999	55-57 ft.	10 U	10 U	47
	EP-105P	10/8/1999	60-62 ft.	10 U	10 U	40
	EP-105Q	10/8/1999	75-77 ft.	10 U	10 U	46

Table 3-12
Summary of Soil Sample Results, Investigation Area 8
(Bedding and Unloading Buildings Area)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
EP-106	EP-106A	10/16/1999	0-1 ft.	270	82	2800
	EP-106B	10/16/1999	1-2 ft.	75	26	720
	EP-106C	10/16/1999	2-3 ft.	54	10 U	470
	EP-106D	10/16/1999	3-4 ft.	92	28	590
	EP-106E	10/16/1999	4-5 ft.	380	130	490
	EP-106F	10/16/1999	10-12 ft.	23	10 U	57
	EP-106F2	10/16/1999	10-12 ft.	13	10 U	48
	EP-106G	10/16/1999	15-17 ft.	21	10 U	34
	EP-106H	10/16/1999	20-22 ft.	10 U	10 U	43
	EP-106I	10/16/1999	25-27 ft.	10 U	10 U	48
	EP-106J	10/16/1999	30-32 ft.	24	10 U	27
	EP-106K	10/16/1999	35-37 ft.	17	10 U	38
	EP-106L	10/16/1999	40-42 ft.	22	10 U	27
	EP-106M	10/16/1999	45-47 ft.	25	10 U	25
	EP-106N	10/16/1999	50-52 ft.	10 U	10 U	32
	EP-106O	10/16/1999	55-57 ft.	10 U	11	25
	EP-106O2	10/16/1999	55-57 ft.	10 U	12	24
EP-107	EP-107A	10/11/1999	0-1 ft.	69	15	150
	EP-107B	10/11/1999	1-2 ft.	22	10 U	43
	EP-107C	10/11/1999	2-3 ft.	10 U	10 U	51
	EP-107D	10/11/1999	3-4 ft.	10 U	12	80
	EP-107E	10/11/1999	4-5 ft.	31	29	500
	EP-107F	10/11/1999	15-17 ft.	77	13	67
	EP-107F2	10/11/1999	15-17 ft.	63	12	85
	EP-107G	10/11/1999	20-22 ft.	10 U	10 U	54
	EP-107H	10/11/1999	25-27 ft.	10 U	10 U	71
	EP-107I	10/11/1999	30-32 ft.	10 U	10 U	68
	EP-107J	10/11/1999	35-37 ft.	11	10 U	49
	EP-107K	10/11/1999	40-42 ft.	14	10 U	32
	EP-107K2	10/11/1999	40-42 ft.	17	14	37
	EP-107L	10/11/1999	45-47 ft.	10 U	11	44
	EP-107M	10/11/1999	50-52 ft.	10 U	10 U	41
	EP-107N	10/12/1999	55-57 ft.	10 U	10 U	44
	EP-107O	10/12/1999	60-62 ft.	10 U	10 U	26
	EP-107P	10/12/1999	65-67 ft.	10 U	11	40

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.

Table 3-13
Summary of Groundwater Sample Results, Investigation Area 8
(Bedding and Unloading Buildings Area)
ASARCO El Paso Smelter Phase II RI

Site	Arsenic (AS) Diss	Arsenic (AS) TOT	Cadmium (CD) Diss	Cadmium (CD) TOT	Lead (PB) Diss	Lead (PB) TOT
EP-15	0.021	0.015	0.008	0.007	0.003 U	0.005 U
EP-67	0.019	0.016	0.005 U	0.005 U	0.003 U	0.006
EP-68	0.006	0.005	0.005 U	0.005 U	0.003 U	0.005 U
EP-70	1.253	0.705	0.012	0.008	0.003 U	0.011
EP-72	0.485	0.065	0.207	0.005 U	0.003 U	0.011
EP-103	NA	0.008	NA	0.005 U	NA	0.008
EP-104	NA	0.076	NA	0.005 U	NA	0.011
EP-105	NA	0.350	NA	0.005 U	NA	0.044
EP-106	NA	0.006	NA	0.005 U	NA	0.009
EP-107	NA	0.014	NA	0.005 U	NA	0.006

Notes:

Data presented in this table represents Phase I and Phase II period of record, August 1997 through February 2000.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per liter (mg/l)

Table 3-14A
Summary of Soil Sample Results
(On-Site Pond 5)
ASARCO El Paso Smelter Phase II RI

Site	Sample #	Date	Depth	Arsenic	Cadmium	Lead
BH9-5-1	BH9-5-1A	2/9/2000	0-1 ft.	1800	120	7900
	BH9-5-1B	2/9/2000	1-2 ft.	190	10 U	890
	BH9-5-1C	2/9/2000	2-3 ft.	210	10 U	1400
	BH9-5-1D	2/9/2000	3-4 ft.	650	35	7500
	BH9-5-1E	2/9/2000	4-5 ft.	270	10 U	1200
	BH9-5-1F	2/9/2000	5-6 ft.	91	10 U	320
	BH9-5-1G	2/9/2000	10-11 ft.	20	11	510
BH9-5-2	BH9-5-2A	2/9/2000	0-1 ft.	1000	390	12000
	BH9-5-2B	2/9/2000	1-2 ft.	1400	130	9600
	BH9-5-2C	2/9/2000	2-3 ft.	1200	74	6000
	BH9-5-2D	2/9/2000	3-4 ft.	560	33	3600
	BH9-5-2E	2/9/2000	4-5 ft.	1200	54	6200
	BH9-5-2F	2/9/2000	5-6 ft.	220	25	2600
	BH9-5-2G	2/9/2000	7-8 ft.	22	10 U	190
BH9-5-3	BH9-5-3A	2/9/2000	0-1 ft.	1600	700	18000
	BH9-5-3B	2/9/2000	1-2 ft.	28	22	710
	BH9-5-3C	2/9/2000	2-3 ft.	32	30	1200
	BH9-5-3D	2/9/2000	3-4 ft.	24	23	900
BH9-5-4	BH9-5-4A	2/9/2000	0-1 ft.	1800	790	23000
	BH9-5-4B	2/9/2000	1-2 ft.	1200	550	17000
	BH9-5-4C	2/9/2000	2-3 ft.	180	54	3100
	BH9-5-4D	2/9/2000	3-4 ft.	200	13	3600
	BH9-5-4E	2/9/2000	4-5 ft.	74	11	1300
	BH9-5-4F	2/9/2000	5-6 ft.	43	10 U	1000
BH9-5-5	BH9-5-5A	2/9/2000	0-1 ft.	4000	1300	30000
	BH9-5-5B	2/9/2000	1-2 ft.	1400	370	12000
	BH9-5-5C	2/9/2000	2-3 ft.	750	63	6700
	BH9-5-5D	2/9/2000	3-4 ft.	71	10 U	940
BH9-5-6	BH9-5-6A	2/9/2000	0-1 ft.	1500	840	12000
	BH9-5-6B	2/9/2000	1-2 ft.	1700	760	20000
	BH9-5-6C	2/9/2000	2-3 ft.	88	44	1900
	BH9-5-6D	2/9/2000	3-4 ft.	10	10 U	120
BH9-5-7	BH9-5-7A	2/9/2000	0-1 ft.	3900	1200	31000
	BH9-5-7B	2/9/2000	1-2 ft.	900	300	9700
	BH9-5-7C	2/9/2000	2-3 ft.	240	85	3700
	BH9-5-7D	2/9/2000	3-4 ft.	27	10 U	560

Notes:

Only Phase II soil sample results are included in this table. Phase I and Phase II data averages as a function of soil depth are presented graphically in Appendix C.

U: Less than listed value (detection limit)

NA: Not applicable

All concentrations in milligrams per kilogram (mg/kg)

Depth in feet below ground surface.